UNIT

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1

Cell Structure and Function

1. First successful tissue culture was of

a. Tomato root
b. Carrot root
c. Potato stem
d. Tobacco callus

Ans. (a) Tomato root

2. Tissue-used by Steward *et al* (1957) to prove cellular totipotency was

a. Pith of root
b. Pith of stem
c. Phloem of root
d. Phloem of stem

Ans. (c) Phloem of root

3. White performed successful tissue culture in

a. 1939
b. 1932
c. 1929
d. 1922

Ans. (b) 1932

4. The smallest animal egg is of

a. Ostrich
b. Human female
c. Duck
d. Hen

Ans. (b) Human female

5. Largest animal cell is of

a. Ostrich
b. Duck
c. Human
d. Hen

Ans. (a) Ostrich

6. Human egg is larger than human sperm because it has

a. Larger nucleus
b. More membranes
c. More cytoplasm
d. All of the above

Ans. (c) More cytoplasm

7. Larger sized organisms usually have

a. Large sized cells
b. More noncellular material
c. Higher number of cells
d. More cellular excretions

Ans. (c) Higher number of cells

8. Large cells have

a. High metabolic rate
b. High respiration rate
c. Low surface: volume ratio
d. High surface: volume ratio

Ans. (c) Low surface: volume ratio

9. Metabolically activity cells have

a. Lower nucleocytoplasmic ratio
b. Higher nucleocytoplasmic ratio
c. Higher surface: volume ratio
d. Both b and c

Ans. (d) Both b and c

10. Alga *Acetabularia* is

a. Unicellular prokaryote
b. Multicellular prokaryote
c. Unicellular eukaryote
d. Multicellular eukaryote

Ans. (c) Unicellular eukaryote

11. Size of *Acetabularia* is

a. 10 cm
b. 10 mm
c. 1.0 mm
d. 0.1 mm

Ans. (a) 10 cm

12. Largest cell of the human body is

a. Voluntary muscle fibre cell
b. Nerve cell
c. Striated muscle fibre cell
d. Cardiac muscle fibre cell

Ans. (b) Nerve cell

13. Average size of human body cells is

a. 5–10 µm
b. 10–15 µm
c. 20–30 µm
d. 70–80 µm

Ans. (c) 20–30 µm

14. Large plant cells are

a. Xylem vessel cells b. Parenchyma cells
c. Sieve tube cells d. Sclerenchyma fibres

Ans. (d) Sclerenchyma fibres

15. Jute fibres have a length of

a. 30–40 mm b. 300–400 mm
c. 30–90 cm d. 3–9 m

Ans. (c) 30–90 cm

16. Human egg has a volume larger than human sperm by time

a. 100,000 b. 10,000
c. 1000 d. 100

Ans. (a) 100,000

17. Efficient large sized cells should be

a. Elongated
b. Branched
c. With membrane extensions
d. Any of the above

Ans. (d) Any of the above

18. The term protoplasm was coined by

a. Corti b. Dujardin
c. Purkinje d. Dutrochet

Ans. (c) Purkinje

19. Purkinje coined the term protoplasm in

a. 1739 b. 1839
c. 1779 d. 1879

Ans. (b) 1839

20. A cilium beats

a. Asymmetrically by sweeping action
b. Symmetrically by sweeping action
c. Symmetrically by undulatory action
d. Asymmetrically by undulatory action

Ans. (a) Asymmetrically by sweeping action

21. Cell theory was put forward by

a. Schleiden and Schwann b. Sutton and Boveri
c. Watson and Crick d. Darwin and Wallace

Ans. (a) Schleiden and Schwann

22. The term cell was coined by or the cell was first seen by

a. Robert hooke b. Leeuwenhoek
c. Schleiden and Schwann d. Altmann and Kolliker

Ans. (a) Robert hooke

23. Figures of cork cells observed by Robert Hooke were published in

a. Genera plantarum b. Species plantarum
c. Origin of species d. Micrographia

Ans. (d) Micrographia

24. The cells discovered in thin sections of cork by Robert hooke were actually

a. Cell walls b. Cellulose
c. Protoplasm d. Nuclei

Ans. (a) Cell walls

25. Nucleus was discovered by

a. Robert Brown b. Leeuwenhoek
c. Robert Hooke d. Schleiden and Schwann

Ans. (a) Robert Brown

26. Smaller cell is

a. Less active metabolically
b. With smaller nucleus
c. With larger nucleus
d. More active metabolically

Ans. (d) More active metabolically

27. Credit for establishing nucleus as biological entity goes to

a. Leeuwen Hoek b. Schwann
c. Koch d. Robert Brown

Ans. (d) Robert Brown

28. Names of Schleiden and Schwann are associated with

a. Protoplasm as the physical basis of life
b. Cell theory
c. Theory of cell lineage
d. Nucleus functions as control centre of cell

Ans. (b) Cell theory

29. Which is correct about cell theory in view of current status of our knowledge about cell structure

a. It needs modification due to discovery of subcellular structures like chloroplasts and mitochondria
b. Modified cell theory means that all living beings are composed of cells capable of reproducing
c. Cell theory does not hold good because all living beings (e.g, viruse) do not have cellular organization
d. Cell theory means that all living objects consist of cells whether or not capable of reproducing

Ans. (c) Cell theory does not hold good because all living beings (e.g. viruse) do not have cellular organization

30. Minimum cell size seen under light microscope is

a. 1 µm b. 0.1 µm
c. 0.25 µm d. 0.5 µm

Ans. (c) 0.25 µm

31. An exception to cell theory is

a. Mycoplasma b. Virus
c. Protistans d. Algae

Ans. (b) Virus

32. Cellular totipotency means

a. Synthesis of new cells
b. Formation of new species
c. Formation of new plants
d. Capability of a plant cell to form complete plant

Ans. (d) Capability of a plant cell to form complete plant

33. Who proposed cell lineage/cell always arises from pre-existing cell?

a. Lamarck b. Virchow
c. Schwann d. Darwin

Ans. (b) Virchow

34. The suffix sin ribosome unit indicates

a. Sedimentation coefficient
b. Solubility
c. Surface area
d. Size

Ans. (a) Sedimentation coefficient

35. Letter S in the structural unit of ribosome denotes

a. Concentration unit b. Svedberg unit
c. Polymerization unit d. Stability unit

Ans. (b) Svedberg unit

36. Who proposed that cell is a unit of life and that a tissue is made of cells?

a. Schleiden b. Schwann
c. Dutrochet d. Steward

Ans. (b) Schwann

37. Longest cells in human body are

a. Nerve cells b. Bone cells
c. Leg muscle cells d. Heart muscle cells

Ans. (a) Nerve cells

38. A plant cell has potential to develop into full plant. The property is called

a. Tissue culture
b. Pleuripotency
c. Totipotency
d. Gene cloning

Ans. (c) Totipotency

39. Protoplasm forms percentage of total weight of the body

a. 45% b. 70%
c. 95% d. 15%

Ans. (c) 95%

40. According to cell theory

a. Cells are fundamental structural units of organisms
b. Cells reproduce
c. Cells are living
d. Cells have nuclei

Ans. (a) Cells are fundamental structural units of organisms

41. Protoplasm is

a. Emulsion
b. Complex colloidal solution
c. Molecular solution
d. Suspension

Ans. (b) Complex colloidal solution

42. The term sarcode was used for living substance of cell by

a. Hooke b. Dujardin
c. Purkinje d. Brown

Ans. (b) Dujardin

43. Protoplasm is

a. Nonliving matter
b. Bearer of hereditary characters
c. Living matter without function
d. Physical basis of life

Ans. (d) Physical basis of life

44. The ability of a cell to form the whole organism is

a. Regeneration b. Cloning
c. Totipotency d. Development

Ans. (c) Totipotency

45. Schleiden and Schwann proposed cell theory in

a. 1836–37 b. 1838–39
c. 1901–02 d. 1938–39

Ans. (b) 1838–39

46. An individual has a number of different types of cells was first stated by

a. Dujardin
b. Robert brown

c. Dutrochet
d. Schleiden and Schwann

Ans. (c) Dutrochet

47. Callus is

a. Material used in healing in phloem
b. Secondary tissue developed by woody plants
c. An undifferentiated mass of cells
d. All of the above

Ans. (c) An undifferentiated mass of cells

48. Which one is enucleated

a. Squamous epithelial cells
b. Mature leucocyte of man
c. Mature erythrocyte of frog
d. Mature erythrocyte of man

Ans. (d) Mature erythrocyte of man

49. One of the following is anucleate

a. Sieve tube
b. Companion cell
c. Medullary ray
d. All of the above

Ans. (a) Sieve tube

50. A cell can form many phenotypes. The property is called

a. Pleuripotency
b. Totipotency
c. Parasexuality
d. Parthenogenesis

Ans. (a) Pleuripotency

51. A flagellum beats

a. Independently, undulatory and asymmetrically
b. Independently, undulatory and symmetrically
c. Coordinated, pendular and symmetric
d. Coordinated, pendular and asymmetric

Ans. (b) Independently, undulatory and symmetrically

52. The coordinated beating of cilia is

a. Undulatory
b. Metachronous
c. Metachronous and isochronous
d. Both a and b

Ans. (c) Metachronous and isochronous

53. A typical vacuole possesses

a. Nucleoplasm
b. Cytoplasm
c. Hydroplasm
d. Both b and c

Ans. (c) Hydroplasm

54. Hydroplasm of vacuole possesses

a. Water
b. Minerals
c. Water and mineral
d. Air

Ans. (c) Water and mineral

55. A vacuole without a regular covering membrane is

a. Contractile vacuole
b. Food vacuole
c. Sap vacuole
d. Gas vacuole

Ans. (d) Gas vacuole

56. Which one possesses only a protein membrane

a. Feeding canals of contractile vacuole
b. Vesicles of a gas vacuole
c. Contractile vacuole
d. Gas vacuole

Ans. (b) Vesicles of a gas vacuole

57. Gas vacuoles occur in

a. Prokaryotes
b. Protistans
c. Both a and b
d. Fishes

Ans. (a) Prokaryotes

58. Gas vacuole takes part in

a. Storage of metabolic gases
b. Protection from intense radiations
c. Buoyancy regulation
d. All the above

Ans. (d) All the above

59. Food vacuole is formed from

a. Absorbed and digested food
b. Phagosome + Lysosome
c. Feeding canals + Lysosome
d. Feeding canals + Phagosome

Ans. (b) Phagosome + Lysosome

60. Vacuoles are

a. Cytoplasmic organelles
b. Non-cytoplasmic organelles
c. Non-cytoplasmic sacs
d. Cytoplasmic sacs

Ans. (c) Non-cytoplasmic sacs

61. Contractile vacuoles take part in

a. Storage of wastes
b. Osmoregulation
c. Excretion
d. Both b and c

Ans. (d) Both b and c

62. Filling of contractile vacuole and its swelling is called

a. Diastole b. Diapauses
c. Systole d. Both a and b

Ans. (a) Diastole

63. Bursting of contractile vacuole to throw its contents is

a. Ephagy b. Systole
c. Diapause d. Dehydration

Ans. (b) Systole

64. Number of sap vacuoles present in an animal cell is

a. One and large b. Many and large
c. Many and small d. None of the above

Ans. (c) Many and small

65. Young plant cells possess sap vacuoles

a. One, large and central
b. Many, large and dispersed
c. Many, small and dispersed
d. None of the above

Ans. (c) Many, small and dispersed

66. A single large central vacuole occurs in

a. Mature animal cells
b. Mature plant cells
c. Developing animal cells
d. Developing plants cells

Ans. (b) Mature plant cells

67. Liquid content of a vacuole is called

a. Cell sap b. Matrix
c. Nucleoid d. Core

Ans. (a) Cell sap

68. Protoplasm present inside the nucleus is called

a. Hyaloplasm b. Nucleoplasm
c. Nuclear matrix d. Hydroplasm

Ans. (b) Nucleoplasm

69. Nucleus was discovered by Robert Brown in

a. Orchid root cells b. Bean root cells
c. Maize stem cells d. Wheat stem cells

Ans. (a) Orchid root cells

70. A well organized nucleus is present in

a. Bacteria b. Prokaryotes
c. Blue green algae d. Eukaryotes

Ans. (d) Eukaryotes

71. A plant (cell) having more than two nuclei is known as

a. Syncytial b. Coenocyte
c. Polynucleate d. Plasmodium

Ans. (b) Coenocyte

72. An animal cell with numerous nuclei is called

a. Coenocyte b. Syncytial
c. Plasmodium d. Both a and b

Ans. (b) Syncytial

73. Nuclear envelope is composed of

a. Single membrane
b. Two membranes
c. Proteinaceous strand
d. Both a and c

Ans. (b) Two membranes

74. A biological membrane containing true pores is

a. Nuclear envelope
b. Plasma membrane
c. Vitelline membrane
d. Plastid envelope

Ans. (a) Nuclear envelope

75. Karyotheca is derived from

a. Envelop remains b. ER
c. Golgi apparatus d. Both a and b

Ans. (d) Both a and b

76. Perinuclear space has a width of

a. 100–150 Å b. 100–300 Å
c. 400–700 Å d. 100–150 nm

Ans. (b) 100–300 Å

77. Diameter of the nuclear pores is

a. 50–150 Å b. 100–200 Å
c. 300–500 Å d. 800–1500 Å

Ans. (d) 800–1500 Å

78. Nucleoplasm is also called

a. Nuclear sap b. Karyolymph
c. Both a and b d. Nuclear matrix

Ans. (c) Both a and b

79. Nucleus controls cytoplasmic functioning by sending out

a. Cholesterol b. Protein
c. RNAs d. DNA copies

Ans. (c) RNAs

80. In non-dividing cell, most of DNA is located in

a. Mitochondria
b. Chloroplasts
c. Chromosomes
d. Chromatin material

Ans. (d) Chromatin material

81. Chromatin material which remains condensed during interphase is called

a. Heterochromatin
b. Euchromatin
c. Chromonemata
d. Megachromatin

Ans. (a) Heterochromatin

82. Heterochromatin is genetically and metabolically

a. Very active
b. Inert
c. Very active genetically
d. Inert metabolically

Ans. (b) Inert

83. Nucleolus is a

a. Distinct membrane bound organelle
b. Part of chromosome
c. Ribonucleoprotein entity
d. DNA component

Ans. (c) Ribonucleoprotein entity

84. Nucleolus was discovered by

a. Robert brown
b. Leeuwenhoek
c. Robert hooke
d. Fontana

Ans. (d) Fontana

85. Size of nucleolus is large where

a. Protein synthesis is active
b. Protein synthesis is small
c. No protein synthesis occurs
d. Lipid metabolism is rapid

Ans. (a) Protein synthesis is active

86. Nucleolus contains

a. Genetic instructions
b. Ribosome assembly line
c. Protein synthesis machinery
d. Enzymes for polysaccharide formation

Ans. (b) Ribosome assembly line

87. Organelle having a significant role in mitosis is

a. Lysosomes
b. Mitochondria
c. Golgi bodies
d. Nucleolus

Ans. (c) Golgi bodies

88. Granules of nucleolus are precursors of

a. Chromosomes
b. Ribosomes
c. RNA
d. All the above

Ans. (b) Ribosomes

89. Nucleolus is formed from

a. Nucleus
b. Nuclear sap
c. Sat chromosome
d. Giant chromosome

Ans. (c) Sat chromosome

90. Temporary inactivation of one chromosome of a pair is

a. Facultative heterochromatin
b. Constitutive heterochromatin
c. Inactivated chromatin
d. None of the above

Ans. (a) Facultative heterochromatin

91. Barr body is

a. Nucleolus
b. Facultative heterochromatin
c. Constitutive heterochromatin
d. Euchromatin

Ans. (b) Facultative heterochromatin

92. Components of nucleus are

a. Karyotheca, nucleolus, chromatin, nucleoplasm and nuclear matrix
b. Nuclear envelope, nucleolus, chromatin and nucleoplasm
c. Nuclear envelop, nucleoplasm asn chromatin
d. All the above

Ans. (a) Karyotheca, nucleolus, chromatin, nucleoplasm and nuclear matrix

93. Nuclear matrix is

a. Heterochromatin complex
b. Crystallo-colloidal complex
c. Fibrous complex
d. Nucleoplasm

Ans. (c) Fibrous complex

94. Nuclear matrix is formed of

a. Histones
b. Neutral proteins
c. Acid proteins
d. Nucleosomes

Ans. (c) Acid proteins

95. Dense fibrous complex lying adjacent to inner membrane of nuclear envelope is

a. Chromatin b. Fibrous lamina
c. Nuclear lamina d. Both b and c

Ans. (d) Both b and c

96. Structural element of chromatin is

a. Histone
b. Acid protein and DNA
c. Nucleosomes
d. Nuclear matrix

Ans. (d) Nuclear matrix

97. Largest organelle of the cell is

a. Nucleus b. Chloroplast
c. Mitochondrion d. Vacuole

Ans. (a) Nucleus

98. The term chromatin was coined by

a. Heitz b. Flemming
c. Fontana d. Bowman

Ans. (b) Flemming

99. The term nucleoplasm was given by

a. Strasburger b. Flemming
c. Harris and James d. Bowman

Ans. (a) Strasburger

100. Nucleolus contains

a. No membrane covering
b. Amorphous matrix and granular zone
c. Fibrillar zone and chromatin
d. All the above

Ans. (d) All the above

101. Living beings are made up of cells. This was first stated by

a. Lamarck
b. Von Helmont
c. Schleiden and Schwann
d. Hugo de Vries

Ans. (c) Schleiden and Schwann

102. In tissue culture embryoids are formed from pollen grains due to

a. Test tube culture
b. Double fertilization
c. Cellular totipotency
d. Organogenesis

Ans. (c) Cellular totipotency

103. Cellular totipotency is demonstrated by

a. Only gymnosperm cells
b. All plant cells
c. All eukaryotic cells
d. Only bacterial cells

Ans. (b) All plant cells

104. Fertilization of an egg with sperm was discovered by

a. Hertwig b. Flemming
c. Waldeyer d. Malpighi

Ans. (a) Hertwig

105. The volume of which of the following is given in right sequence

a. Ostrich egg > Hen egg > Human egg > Smallest virus
b. Human egg > Ostrich > Smallest bacteria
c. Bacteria > Virus > Human sperm
d. Virus > Bacteria > Human sperm > Human egg

Ans. (a) Ostrich egg > Hen egg > Human egg > Smallest virus

106. Basic unit of life is

a. Cell b. Tissue
c. Organ d. Organ system

Ans. (a) Cell

107. Cell is a unit of

a. Structure b. Function
c. Mass of protoplasm d. Both a and b

Ans. (d) Both a and b

108. Study of the cell structure under microscope is

a. Cytology b. Cell biology
c. Cytochemistry d. Microanatomy

Ans. (a) Cytology

109. Study of cells in all aspects is

a. Cytotaxonomy b. Cytology
c. Cell biology d. Cytochemistry

Ans. (c) Cell biology

110. Cells were observed prior to Robert Hooke by

a. Aristole b. Malpighi
c. Bauhin d. Eicher

Ans. (b) Malpighi

111. Who initiated cell concept

a. Robert Hooke b. Leeuwenhoek
c. N. Grew d. Schleiden and Schwann

Ans. (c) N. Grew

112. Cell was discovered by

a. Swanson
b. Leeuwenhoek
c. Robert Hooke
d. Robert Brown

Ans. (c) Robert Hooke

113. The cell was discovered in

a. 18th century
b. 19th century
c. First half of 17th century
d. Second half of 17th century

Ans. (d) Second half of 17th century

114. Cell, as basic unit of plants, was discovered by

a. Robert Brown
b. Robert Hooke
c. Virchow
d. Schleiden

Ans. (b) Robert Hooke

115. Cell theory state that

a. All cells are living
b. All cells have nucleus
c. Cells are fundamental structural units of living organisms
d. Cell reproduce by mitosis and meiosis

Ans. (c) Cells are fundamental structural units of living organisms

116. Robert Brown is known for his discovery of

a. Chloroplasts
b. Respirometer
c. Nucleus
d. Mitochondria

Ans. (c) Nucleus

117. Who applied cell theory to plants

a. Schwann
b. Schleiden
c. Swanson
d. Jenssen

Ans. (b) Schleiden

118. The living substance of cell was named sarcode by

a. Corti
b. Dujardin
c. Lamarck
d. Dutrochet

Ans. (b) Dujardin

119. The modern cell theory is called

a. Protoplasmic theory
b. Cell Principle
c. Cell Doctrine
d. Both a and c

Ans. (d) Both a and c

120. Which ones do not have cellular structure

a. PPLO
b. Rickettsia
c. Viruses
d. Archaebacteria

Ans. (c) Viruses

121. Robert Hooke discovered cell in

a. 1665
b. 1725
c. 1545
d. 1595

Ans. (a) 1665

122. 'Micrographia' was written by

a. Grew
b. Hooke
c. Brown
d. Lamarck

Ans. (b) Hooke

123. Cell theory was first modified by

a. Schleiden
b. Brown
c. Schwann
d. Grew

Ans. (c) Schwann

124. *Omnis cellula e cellula* is generalization given by

a. Lamarck
b. Dutrochet
c. Leeuwenhoek
d. Virchow

Ans. (d) Virchow

125. Cells of Robert Hooke were actually

a. Cell walls
b. Protoplasts
c. Wall-less cells
d. Walled cells

Ans. (a) Cell walls

126. Cell principle is not applicable to

a. Bacteria
b. Viruses
c. Algae
d. Fungi

Ans. (b) Viruses

127. Distinction of individual cells is absent in coenocytic organism

a. Ulothrix
b. Volvox
c. Escherichia
d. Rhizopus

Ans. (d) Rhizopus

128. Who believed in the individuality of cells?

a. Leeuwenhoek
b. Lamarck
c. Dutrochet
d. Malpighi

Ans. (c) Dutrochet

129. Who saw the living matter for the first time?

a. Leeuwenhoek
b. Hooke
c. Grew
d. Corti

Ans. (d) Corti

130. A nucleus is absent in the mature

a. Sieve tube cells
b. Mammalian erythrocytes

c. Monocytes
d. Both a and b

Ans. (d) Both a and b

131. A tissue having more nonliving material than the living matter is

a. Epithelial tissue
b. Parenchyma
c. Connective tissue
d. Nervous system

Ans. (c) Connective tissue

132. Who proposed protoplasmic theory as opposed to cell theory?

a. Virchow
b. Schultze
c. Sachs
d. Strasburger

Ans. (b) Schultze

133. The theory proposing that body of an organism consists of incompletely dividing cells is

a. Organismal theory
b. Protoplasmic theory
c. Cell theory
d. Theory of cell lineage

Ans. (a) Organismal theory

134. Organismal theory was proposed by

a. Van Mohl
b. Sachs
c. Virchow
d. Haberlandt

Ans. (b) Sachs

135. Cells are autonomous because

a. They synthesise components of living protoplasm from nonliving materials
b. They are able to grow and divide
c. Each cell has its own life span
d. All of the above

Ans. (d) All of the above

136. "Each cell leads a double life" was first proposed by

a. Schleiden
b. Grew
c. Von Mohl
d. Malpighi

Ans. (a) Schleiden

137. Ageing is slow or absent in

a. Plants
b. Parrot
c. Hydra
d. Unicells

Ans. (d) Unicells

138. Which are less efficient?

a. Multicellular animals
b. Multicellular plants
c. Colonial organisms
d. Unicellular organisms

Ans. (d) Unicellular organisms

139. A multicellular organism possesses

a. Differentiated cells
b. Undifferentiated cells
c. Dedifferentiated cells
d. All of the above

Ans. (d) All of the above

140. Number of types of cells found in human body is

a. 20
b. 30
c. 200
d. 300

Ans. (c) 200

141. Cells which lose their nucleus during differentiation are

a. Nerve cells
b. Muscle cells
c. Erythrocytes
d. Leucocytes

Ans. (c) Erythrocytes

142. A nucleated differentiated cell that has lost the power to dedifferentiate is

a. Nerve cell
b. Kidney cell
c. Liver cell
d. All of the above

Ans. (a) Nerve cell

143. First successful culture was obtained by

a. Haberlandt
b. White
c. Skoog and Miller
d. Steward *et al*

Ans. (b) White

144. Callus was grown successfully for the first time by

a. White
b. Gautheret
c. Nabecourt
d. All of the above

Ans. (d) All of the above

145. Morphogenesis in tissue culture was discovered by

a. Gautheret
b. Skoog and Miller
c. Muir *et al*
d. Steward *et al*

Ans. (b) Skoog and Miller

146. Who proposed for the first time that cells are totipotent?

a. White
b. Haberlandt
c. Steward
d. Halperrin and Wetherell

Ans. (b) Haberlandt

147. Steward *et al* performed experiment to prove cellular totipotency of

a. Tomato
b. Carrot
c. Tobacco
d. Potato

Ans. (b) Carrot

148. Explants is

a. Propagule
b. Callus used for subculturing
c. Part of plant used in tissue culture
d. Part of tissue culture used for planting

Ans. (c) Part of plant used in tissue culture

149. What was done by Steward *et al* in order to separate individual cells of Carrot root?

a. Shaking in liquid medium
b. Homogenization
c. Pressure sieving
d. Microsurgery

Ans. (a) Shaking in liquid medium

150. Single cells in Steward's culture formed

a. Cellular clumps
b. Embryoids
c. Plantlets
d. All of the above

Ans. (d) Embryoids

151. Embryoids are

a. Somatic embryo-like structures
b. Small embryos through fertilization in culture
c. Early embryo stages used for propagation in tissue culture
d. All of the above

Ans. (a) Somatic embryo-like structures

152. In animals, cellular totipotency has been restricted only to

a. Germinal cells
b. Epithelial cells
c. Zygote
d. Zygote and early blastosomes

Ans. (d) Zygote and early blastosomes

153. Animal cloning is carried out by

a. Artificial fertilization of ovum
b. Direct growth of ovum
c. Ovum with somatic nucleus
d. All of the above

Ans. (c) Ovum with somatic nucleus

154. The first successful animal cloning, Dolly, was accomplished by

a. Fisher and Velton
b. Wilmut and Campbell
c. Morgan
d. Bernstein

Ans. (b) Wilmut and Campbell

155. Cells capable of division are

a. Stem cells
b. Meristematic cells
c. Undifferentiated cells
d. All of the above

Ans. (d) All of the above

156. Differentiated cells are

a. Premitotic specialized
b. Post-mitotic specialized
c. Pre-meiotic specialized
d. Post-meiotic specialized

Ans. (b) Post-mitotic specialized

157. RBCs are

a. Differentiated cells
b. Undifferentiated cells
c. Dedifferentiated cells
d. Dead cells

Ans. (a) Differentiated cells

158. During differentiation, RBCs lose

a. Aerobic respiration
b. DNA replication
c. RNA synthesis
d. All of the above

Ans. (d) All of the above

159. Dedifferentiated cells are formed in the region of

a. Injury
b. Regeneration
c. Secondary growth
d. All of the above

Ans. (d) All of the above

160. Functionally important dead cells are

a. Cork cells
b. Tracheary elements
c. Both A and B
d. Endothelial cells

Ans. (c) Both A and B

161. Rapidly dividing unorganized mass of cells in tissue culture is

a. Callose
b. Callus
c. Embryoid
d. Plantlet

Ans. (b) Callus

162. Mitosis allows the eukaryotic cells to

a. Expose DNA for protein synthesis
b. Grow in size
c. Multiply
d. Become specialized

Ans. (c) Multiply

163. In prophase and metaphase a chromosome contains two

a. Chromatids
b. Chromomeres
c. Centromeres
d. Centrioles

Ans. (a) Chromatids

164. The centromere does not divide till the end of metaphase. This is important because centromere

a. Is connected with nuclear envelop
b. Produces spindle fibres
c. Contains genes that control prophase and metaphase
d. Holds the replicated DNAs together

Ans. (a) Is connected with nuclear envelop

165. Microtubules appearing around centriole pair in the beginning of prophase in animal cells form

a. Spindle
b. Aster
c. Spindle pole
d. Chromosome fibres

Ans. (b) Aster

166. The stage at which cytokinesis begins in plant cell is

a. Anaphase
b. Telophase
c. G_0 phase
d. Interphase

Ans. (a) Anaphase

167. The stage at which cleavage or cytokinesis begins in animal cells is

a. Anaphase
b. Telophase
c. G_0 phase
d. Interphase

Ans. (a) Anaphase

168. A circle of vesicles appears at the equator of spindle towards the end of anaphase. It will form

a. Cleavage furrow
b. Phragmoplast
c. Cell plate
d. Middle lamella

Ans. (c) Cell plate

169. The correct sequence of different phases of mitosis is

a. Anaphase → Metaphase → Prophase → Telophase → Interphase
b. Interphase → Telophase → Metaphase → Anaphase → Prophase
c. Metaphase → Anaphase → Telophase → Prophase
d. Interphase → Prophase → Metaphase → Anaphase → Telophase

Ans. (d) Interphase → Prophase → Metaphase → Anaphase → Telophase

170. Which one of the organelles is responsible for the formation of aster in cell division?

a. Ribosome
b. Centrosome
c. Lysosome
d. Chromosome

Ans. (b) Centrosome

171. Region of chromosome where force is exerted during chromatid separation is

a. Telomere
b. Centromere
c. Chromomere
d. Chromonemata

Ans. (b) Centromere

172. Separation of chromosome daughters takes place at

a. Telophase
b. Metaphase
c. Anaphase
d. Prophase

Ans. (c) Anaphase

173. Mitosis is usually studied in smears or sections of

a. Root tips
b. Stem tips
c. Floral buds
d. All the above

Ans. (a) Root tips

174. Mitosis takes place in

a. All types of cells except those involved in gamete formation
b. Gonads
c. Axillary buds situated near the apical bud
d. Cells of mature leaf

Ans. (a) All types of cells except those involved in gamete formation

175. Distribution of chromosomes in dividing cells occurs during

a. Telophase
b. Prophase
c. Metaphase
d. Anaphase

Ans. (d) Anaphase

176. Plant and animal cell division differ in

a. Cell plate
b. Prophase
c. Telophase
d. Metaphase

Ans. (a) Cell plate

177. Cytoplasmic structures involved in cell division are

a. Mitochondria
b. Ribosomes
c. Lysosomes
d. Centrioles

Ans. (d) Centrioles

178. Which one occurs once in life cycle?

a. Replication of DNA
b. Replication of chromosomes
c. Meiosis
d. Mitosis

Ans. (c) Meiosis

179. Bouquet stage occurs during

a. Leptotene
b. Zygotene
c. Pachytene
d. Diplotene

Ans. (a) Leptotene

180. Synapsis of homologous chromosomes was first observed by

a. Winiwater
b. Montgomery
c. Johanssen
d. Zickler

Ans. (b) Montgomery

181. Syneptinemal complex is found associated with

a. Paired meiotic chromosomes
b. Lampbrush chromosomes
c. Polytene chromosomes
d. Mitotic chromosomes

Ans. (a) Paired meiotic chromosomes

182. In meiosis, chromosome replication occurs during

a. Interphase
b. Interkinesis
c. Prophase I
d. Prophase II

Ans. (a) Interphase

183. The transition between meiosis I and meiosis II is

a. Interphase
b. Interkinesis
c. Telophase I
d. Prophase II

Ans. (b) Interkinesis

184. Chromosomes similar in size, shape, genes and gene sequences are

a. Sister chromatids
b. Chromomeres
c. Homologous chromosomes
d. Parental chromosomes

Ans. (c) Homologous chromosomes

185. Function of meiosis I is to separate

a. Homologous chromosomes pair
b. Sister chromatids
c. Cross-overs
d. Parental chromosomes

Ans. (a) Homologous chromosomes pair

186. Crossing over occurs in meiosis during

a. Prophase I
b. Prophase II
c. Interphase
d. Interkinesis

Ans. (a) Prophase I

187. Pairing of homologous chromosomes is

a. Chiasma formation
b. Synapsis
c. Disjunction
d. Crossing over

Ans. (b) Synapsis

188. Separation of homologous chromosomes is called

a. Dispersion
b. Bivalent formation
c. Disjunction
d. Crossing over

Ans. (c) Disjunction

189. Homologous chromosomes separate during

a. Prophase I
b. Prophase II
c. Metaphase I
d. Anaphase I

Ans. (d) Anaphase I

190. Name the stage in meiosis when there are two cells each with sister chromatids aligned at the equator of the spindle

a. Prophase
b. Metaphase II
c. Metaphase I
d. Anaphase II

Ans. (b) Metaphase II

191. The points of crossing over in meiosis appear as

a. Synaptinemal complexes
b. Protein axes
c. Chiasmata
d. Diakinesis

Ans. (c) Chiasmata

192. Number of bivalents are 8 in prophase I. what is the number of chromosomes during anaphase II?

a. 8
b. 4
c. 16
d. 32

Ans. (a) 8

193. Chromosomes normally occur as homologous pairs in

a. Egg
b. Sperm
c. Gamete
d. Zygote

Ans. (d) Zygote

194. Genome is

a. Genes of haploid of chromosomes
b. Genes of diploid of chromosomes
c. A single chromosome
d. None of the above

Ans. (a) Genes of haploid of chromosomes

195. Synapsis means

a. Pairing of any two chromosomes
b. Homologous chromosomes start separating
c. Pairing of homologous chromosomes
d. None of the above

Ans. (c) Pairing of homologous chromosomes

196. Chiasmata are formed during

a. Zygotene
b. Pachytene
c. Diplotene
d. Leptotene

Ans. (c) Diplotene

197. Meiosis is studied in smears of

a. Developing anthers
b. Testes
c. Both a and b
d. Axillary buds

Ans. (c) Both a and b

198. Chromosome syndesis or bivalent formation occurs in

a. Leptotene
b. Zygotene
c. Pachytene
d. Diplotene

Ans. (c) Pachytene

199. Meiosis occurs in

a. Haploid cells
b. Mostly haploid cells but occasionally diploid cells
c. Diploid cells
d. Mostly diploid cells but occasionally haploid cells

Ans. (d) Mostly diploid cells but occasionally haploid cells

200. Oogenesis is an example of

a. Mitosis
b. Meiosis
c. Specialization of cell
d. DNA replication

Ans. (b) Meiosis

201. Disjunction is

a. Chromosome separation during mitosis
b. Chromosome separation during prophase I
c. Chromosome separation in anaphase I
d. Chromosome separation during metaphase I

Ans. (c) Chromosome separation in anaphase I

202. At which stage of meiosis I, the homologous chromosomes separate but are held by chiasmata

a. Diakinesis
b. Diplotene
c. Pachytene
d. Zygotene

Ans. (b) Diplotene

203. Swellings present over the chromosomes are

a. Centromeres
b. Centrosome
c. Puffs
d. Chromomeres

Ans. (a) Centromeres

204. Number of cells daily replaced in human body is

a. 1×10^9
b. 5×10^9
c. 1×10^{10}
d. 5×10^{10}

Ans. (b) 5×10^9

205. The term eumitosis is used for

a. Mitosis is higher in plants
b. Mitosis in animals
c. Mitosis where spindle is extranuclear
d. Mitosis with intranuclear spindle

Ans. (c) Mitosis where spindle is extranuclear

206. Premitosis is

a. Amitosis
b. G_1
c. G_2
d. Intranuclear mitosis

Ans. (d) G_1

207. In leptotene, the chromosomes are

a. Attached to nuclear membrane by one end
b. Attached to nuclear membrane by both ends directly
c. Attached to nuclear membrane by both ends through attachment plate
d. Both b and c

Ans. (c) Attached to nuclear membrane by both ends through attachment plate

208. Cell division was first studied by

a. Leeuwenhoek
b. Virchow
c. Prevost and Dumas
d. Flemming

Ans. (c) Prevost and Dumas

209. Who found that new cells develop from pre-existing cells?

a. Remak b. Virchow
c. Prevost and Dumas d. Strasburger

Ans. (b) Virchow

210. Cell lineage theory was proposed by

a. Strasburger b. Virchow
c. Winiwater d. Van Beneden

Ans. (b) Virchow

211. Nucleus develops from a pre-existing nucleus. The finding was made by

a. Farmer and Moore b. Winiwater
c. Sutton d. Strasburger

Ans. (d) Strasburger

212. A mitogen of plant origin is

a. Colchicine
b. Epidermal growth factor
c. Cytokinin
d. Lymphokine

Ans. (a) Colchicine

213. A mitogen of animal origin is

a. Cyanide
b. Azide
c. Chalone
d. Platelet derived growth factor

Ans. (d) Platelet derived growth factor

214. Which one is not a mitogen?

a. Epidermal growth factor
b. Platelet derived growth factor
c. Lymphokine
d. None of the above

Ans. (d) None of the above

215. Colchicine is

a. Mitotic poison b. Prophase poison
c. Cytokinesis poison d. None of the above

Ans. (a) Mitotic poison

216. Colchicine prevents

a. Interphase
b. Completion of metaphase
c. Condensation of chromosomes
d. Replication of chromosomes

Ans. (b) Completion of metaphase

217. Autumn Crocus is source of

a. Azides b. Chalones
c. Colchicine d. Cytokinin

Ans. (c) Colchicine

218. Which one induces cell division?

a. Critical decrease in surface volume ratio
b. Critical decrease in nucleocytoplasmic or kernplasma ratio
c. Both a and b
d. Decrease in cell size

Ans. (c) Both a and b

219. The term mitosis was introduced by

a. Watson and Crick b. Beadle and Tatum
c. Farmer and Moore d. Flemming

Ans. (d) Flemming

220. The term meiosis was introduced by

a. Watson and Crick
b. Beadle and Tatum
c. Farmer and Moore
d. Strasburger

Ans. (c) Farmer and Moore

221. Abnormal unlimited and uncontrolled cell division results in

a. Pleurisy b. Cancer
c. Tumour d. Asphyxia

Ans. (b) Cancer

222. Cells having large nucleus in proportion to cytoplasm are

a. Dead b. Dividing
c. Active d. None of the above

Ans. (b) Dividing

223. Colchicines results in doubling of chromosome number because of

a. Nonformation of spindle
b. Double replication of chromosomes
c. Nonpairing of chromosomes
d. Splitting of chromosomes

Ans. (a) Nonformation of spindle

224. Generation time represents period of

a. Cell cycle b. Interphase
c. M-phase d. S-phase

Ans. (a) Cell cycle

225. Which one is the longest phase of cell cycle?

a. Prophase b. Telophase
c. G_1-phase d. G_2-phase

Ans. (c) G_1-phase

226. Invisible stage of M-phase is

a. G_1-phase b. S-phase
c. G_2-phase d. G_0-phase

Ans. (b) S-phase

227. Histones are synthesized in

a. Prophase b. G_1-phase
c. S-phase d. Metaphase

Ans. (c) S-phase

228. Intermitosis is

a. Stage between meiosis I and meiosis II
b. Stage between two mitotic divisions
c. Interphase
d. Both b and c

Ans. (d) Both b and c

229. Which one is stored in G_1-phase?

a. ATP b. Tubulin
c. Histone d. All the above

Ans. (a) ATP

230. Centriole replication occurs in

a. Early prophase b. G_1-phase
c. S-phase d. G_0-phase

Ans. (c) S-phase

231. Post-mitotic phase is

a. G_0-phase b. G_1-phase
c. S-phase d. G_2-phase

Ans. (b) G_1-phase

232. Cell cycle was discovered by

a. Farmer and Moore
b. Prevost and Dumas
c. Howard and Pele
d. Remak

Ans. (c) Howard and Pele

233. Decision of G_0-phase occurs

a. Towards the end of G_1-phase
b. Towards middle of G_1-phase
c. At the end of telophase
d. Towards end of cytokinesis

Ans. (b) Towards middle of G_1-phase

234. Which specific protein is formed in G_2-phase?

a. Histone b. DNA-polymerase
c. Scaffold proteins d. Tubulin protein

Ans. (d) Tubulin protein

235. The stage at which DNA/chromosome replication occurs is

a. Prophase b. Interphase
c. Metaphase d. Previous telophase

Ans. (b) Interphase

236. Each cell grows during the cell cycle in

a. Interphase b. Prophase
c. Metaphase d. Anaphase

Ans. (a) Interphase

237. The cell size doubles in a stage of cell cycle called

a. M b. G_2
c. S d. G_1

Ans. (d) G_1

238. The decision for cell division is taken

a. Before the start of prophase
b. G_1-phase
c. S-phase
d. G_2-phase

Ans. (b) G_1-phase

239. Chromatin fibres are observed only in the

a. Prophase b. Metaphase
c. Telophase d. Interphase

Ans. (d) Interphase

240. Chromosome replication occurs during

a. Metaphase b. S-phase
c. Anaphase d. G_2-phase

Ans. (b) S-phase

241. It is very difficult to stop cell division when the cell has entered

a. G_1-phase b. G_2-phase
c. S-phase d. Prophase

Ans. (c) S-phase

242. At the time of fission, meganucleus of *Paramecium* undergoes

a. Dispersion b. Mitosis
c. Amitosis d. Budding

Ans. (c) Amitosis

243. Amitosis occurs during cell division in

a. Foetal membranes b. Endosperm
c. Cartilage cells d. All the above

Ans. (d) All the above

244. The division in which chromosomes do not differentiate is

a. Amitosis b. Free nuclear division
c. Intracellular division d. All the above

Ans. (a) Amitosis

245. Amitosis was discovered by Remak in

a. 1841 b. 1855
c. 1880 d. 1905

Ans. (b) 1855

246. Dividing animal cells become nearly rounded in

a. Interphase b. Early prophase
c. Late prophase d. Metaphase

Ans. (b) Early prophase

247. When do viscosity and refractivity of cytoplasm increase?

a. G_1-phase b. S-phase
c. Prophase d. Metaphase

Ans. (c) Prophase

248. Congression occurs during

a. Early prophase b. Late prophase
c. Early metaphase d. Late metaphase

Ans. (c) Early metaphase

249. In mitotic metaphase the limbs of the chromosomes occur

a. On the equator
b. In different directions
c. In divaricate condition
d. All the above

Ans. (b) In different directions

250. Phase of shortest duration is

a. Prophase b. Metaphase
c. Anaphase d. S-phase

Ans. (c) Anaphase

251. In animal cytokinesis, cleavage occurs with the help of

a. Microtubules b. Spindle fibres
c. Microfibrils d. Microfilaments

Ans. (d) Microfilaments

252. A mid body is formed during

a. Animal cytokinesis b. Plant cytokinesis
c. Metaphase d. Both a and b

Ans. (a) Animal cytokinesis

253. After mitosis, the number of chromosomes in the daughter cell shall be

a. One fourth of parent cell
b. One half of parent cell
c. Twice of the parent cell
d. Same as the parent cell

Ans. (d) Same as the parent cell

254. The term nucleolus was coined by

a. Bowman b. Fontana
c. Hanstein d. Strasburger

Ans. (a) Bowman

255. Constitutive heterochromatin is

a. Condensed chromatin
b. Present in all cells
c. Made of repetitive bases
d. All the above

Ans. (d) All the above

256. Nonliving cell inclusions are called

a. Ergastic substances
b. Deuteroplasmic substances
c. Paraplasmic substances
d. All the above

Ans. (d) All the above

257. Idioblast is

a. Plant cell different from others
b. Plant cell having cell inclusions
c. Both a and b
d. Animal cell different from others

Ans. (c) Both a and b

258. Chromomeres were discovered by

a. Strasburger b. Van Beneden
c. Pfitzner d. Winiwater

Ans. (c) Pfitzner

259. The modern concept of chromosome structure was put forward by

a. Du Praw b. Laemli
c. Ris d. Kornbery

Ans. (b) Laemli

260. NOR is

a. Nucleotide organizing replicase
b. Nucleotide occluding region
c. Number of replicons
d. Nucleolar organizing region

Ans. (d) Nucleolar organizing region

261. NOR occurs in the region of

a. Secondary constriction
b. Primary constriction
c. Telomere
d. Centromere

Ans. (a) Secondary constriction

262. The term chromosome was introduced by

a. Strasburger
b. Benda
c. Waldeyer
d. Hofmeister

Ans. (c) Waldeyer

263. Chromosomes having slightly unequal arms is called

a. Metacentric
b. Submetacentric
c. Telocentric
d. Acrocentric

Ans. (b) Submetacentric

264. If the centromere is terminal, the chromosome is

a. Metacentric
b. Submetacentric
c. Telocentric
d. Acrocentric

Ans. (c) Telocentric

265. In salivary gland chromosomes/polytene chromosomes, pairing is

a. Absent
b. Occasional
c. Formed between nonhomologous chromosomes
d. Formed between homologous chromosomes

Ans. (d) Formed between homologous chromosomes

266. Polytene chromosome was first observed by

a. Stevens and Wilson
b. Heitz and Bauer
c. Balbiani
d. Khorana

Ans. (c) Balbiani

267. Chromosomes were first seen by

a. Hofmeister
b. Waldeyer
c. Walter S. Sutton
d. Crick and Watson

Ans. (a) Hofmeister

268. Chromosomes having equal or almost equal arms are called

a. Metacentric
b. Acrocentric
c. Polycentric
d. Acentric

Ans. (a) Metacentric

269. Chromosomes which remain condensed during interphase are called

a. Heterochromosomes
b. Euchromosomes
c. Mega chromosomes
d. Polytene chromosomes

Ans. (a) Heterochromosomes

270. Diagrammatic representation of the chromosomes of an organism arranged according to their size is known as

a. Genome
b. Karyotype
c. Idiogram
d. None of the above

Ans. (c) Idiogram

271. Eukaryotic chromosomes are composed of

a. DNA + Protein
b. DNA + RNA
c. RNA + Protein
d. Only DNA

Ans. (a) DNA + Protein

272. Chromosomes other than sex chromosomes are called

a. Allosomes
b. Autosomes
c. Microsomes
d. All the above

Ans. (b) Autosomes

273. Lampbrush chromosomes are also called diplotene chromosomes because they

a. Show chiasmata
b. Resemble diplotene chromosomes
c. Are in permanent diplotene stage
d. All the above

Ans. (d) All the above

274. During staining, chromosomes get stained with

a. Eosine
b. Borax carmine
c. Acetocarmine
d. Safranin

Ans. (c) Acetocarmine

275. Polytene chromosomes are noticed in

a. Man
b. Pisum sativum
c. Mice
d. Drosophila

Ans. (d) Drosophila

276. The hereditary vehicle is

a. Chromosome b. Centromere
c. Nucleus d. Nucleolus

Ans. (a) Chromosome

277. Balbiani rings are

a. Uncoiling of chromonemata
b. Coiling of chromonemata
c. Enlargements of centromere
d. None of the above

Ans. (a) Uncoiling of chromonemata

278. Polytene chromosome in *Drosophila* is

a. 10 times larger than somatic chromosome
b. 50 times larger than somatic chromosome
c. 10 to 50 times larger than somatic chromosome
d. About 500 times larger than somatic chromosome

Ans. (d) About 500 times larger than somatic chromosome

279. Satellite means

a. Terminal part of the chromosome beyond secondary constriction
b. Terminal part of the chromosome beyond primary constriction
c. Terminal part of the chromosome beyond tertiary constriction
d. None of the above

Ans. (a) Terminal part of the chromosome beyond secondary constriction

280. Length of chromosomes is directly proportional to

a. Size of the cell b. Size of nucleus
c. Number of genes d. All the above

Ans. (c) Number of genes

281. A constriction on the chromosome is

a. Centromere b. Centrosome
c. Centriole d. Chromomere

Ans. (a) Centromere

282. Chromosome banding was discovered by

a. Casperson *et al* b. Muller
c. Berg *et al* d. Christian de Duve

Ans. (a) Casperson *et al*

283. Banding techniques used in case of plant chromosomes are

a. G and R b. C and G
c. C and N d. Q and G

Ans. (c) C and N

284. The technique used to locate specific DNA sequences over the chromosome is

a. Flow cytometry
b. Banding technique
c. Fluorescence *in situ* hybridization
d. Electrophoresis

Ans. (c) Fluorescence *in situ* hybridization

285. Flow cytometry prepares

a. Chromosome histogram
b. Idiogram
c. Karyotype
d. All the above

Ans. (a) Chromosome histogram

286. Mc FISH is used in

a. Locating a specific DNA sequence over a chromosome
b. Locating two or more DNA sequences on the same chromosome
c. Location deletion
d. Finding duplicated segments

Ans. (b) Locating two or more DNA sequences on the same chromosome

287. Asymmetric karyotype is the one in which

a. There are more metacentric chromosomes
b. A few metacentric chromosomes
c. Differences between smallest and largest chromosome is large
d. Both b and c

Ans. (d) Both b and c

288. The term cell membrane was coined by

a. Nageli and Cramer b. Flemming
c. Sachs d. Plowe

Ans. (a) Nageli and Cramer

289. The term plasmalemma was coined by

a. Robertson
b. Plowe
c. Strasburger
d. Overton

Ans. (b) Plowe

290. Cell membrane is visible under

a. Electron microscope
b. Optical microscope
c. Both optical and electron microscope
d. Oil immersion lens

Ans. (a) Electron microscope

291. Average thickness of plasmalemma is

a. 0.25 nm b. 2.5 nm
c. 0.75 nm d. 7.5 nm

Ans. (d) 7.5 nm

292. Cell membrane is

a. Unilaminar
b. Bilaminar
c. Trilaminar
d. Quadrilaminar

Ans. (c) Trilaminar

293. Tripartite nature of plasmalemma was discovered by

a. Davson b. Robertson
c. Danieli d. Both a and b

Ans. (b) Robertson

294. Who proposed the first lamellar model of biomembranes

a. Danielli and Davson
b. Robertson
c. Helleir and Hoffmann
d. Singer and Nicolson

Ans. (a) Danielli and Davson

295. The concept of unit membrane was propounded by

a. Overton b. Gorter and Grendel
c. Davson d. Robertson

Ans. (d) Robertson

296. What is the latest and most acceptable model of cell membranes

a. Lamellar model
b. Fluid mosaic model
c. Micellar model
d. Unit membrane concept

Ans. (b) Fluid mosaic model

297. Cell membrane is composed of

a. Phospholipid b. Nucleoprotein
c. Polysaccharides d. Lipoprotein

Ans. (d) Lipoprotein

298. A biomembrane is made of

a. Proteins, lipids and carbohydrates
b. Proteins, lipids and RNA
c. Proteins, lipids and DNA
d. Proteins, lipids and hormones

Ans. (a) Proteins, lipids and carbohydrates

299. Biomembranes are similar to "protein icebergs in sea of lipids" was saying of

a. Singer and Nicolson
b. Danielli and Davson
c. Gorter and Grendel
d. Helleir and Hoffmann

Ans. (a) Singer and Nicolson

300. A cell membrane has

a. Middle electron dense layer
b. Middle electron transparent layer
c. Outer electron transparent layer
d. Inner electron transparent layer

Ans. (b) Middle electron transparent layer

301. Which one forms the continuous part of cell membrane

a. Proteins b. Carbohydrates
c. Lipids d. All the above

Ans. (c) Lipids

302. Most abundant lipid of cell membrane is

a. Cholesterol b. Phospholipid
c. Glycolipid d. Cerebroside

Ans. (b) Phospholipid

303. Integral proteins of plasmalemma occur

a. On the outer surface
b. On the inner surface
c. On both the surfaces
d. In the phospholipid matrix

Ans. (d) In the phospholipid matrix

304. Hydrophilic chemical of cell wall is

a. Pectin b. Suberin
c. Fat d. Lignin

Ans. (a) Pectin

305. Structural element of cell wall is

a. Matrix
b. Microfibrils
c. Microtubules
d. Arabinogalactans

Ans. (b) Microfibrils

306. Cellulose microfibrils get bound to pectins of matrix through

a. Hemicelluloses b. Lignin
c. Peptidoglycan d. Glycoprotein

Ans. (a) Hemicelluloses

307. Different layers of cell wall are

a. Middle lamella and primary wall
b. Primary wall and secondary wall
c. Middle lamella, primary wall and secondary wall
d. Wall layer exclude middle lamella

Ans. (c) Middle lamella, primary wall and secondary wall

308. Which is the outermost structure of cell wall

a. Primary wall
b. Secondary wall
c. Tertiary wall
d. Middle lamella, if present

Ans. (d) Middle lamella, if present

309. The first wall layer of cell is

a. Tertiary wall, if present
b. Secondary wall
c. Primary wall
d. Middle lamella, if present

Ans. (d) Middle lamella, if present

310. The innermost layer of cell wall is

a. Tertiary wall, if present
b. Secondary wall
c. Primary wall
d. Middle lamella, if present

Ans. (a) Tertiary wall, if present

311. Which is component of cell wall is normally in contact with plasmalemma

a. Primary wall
b. Secondary wall
c. Plasmodesmata
d. Middle lamella

Ans. (b) Secondary wall

312. Primary wall grows by

a. Accretion
b. Introgression
c. Intussusception
d. All the above

Ans. (c) Intussusception

313. Secondary wall grows in thickness by

a. Intercalation
b. Introgression
c. Accretion
d. Epiboly

Ans. (c) Accretion

314. Secondary wall is commonly formed of

a. Single layer
b. Many layers
c. Two layers
d. Three layers

Ans. (d) Three layers

315. Load bearing parts of the plant cells is

a. Middle lamella
b. Secondary wall
c. Primary wall
d. Tertiary wall

Ans. (b) Secondary wall

316. Primary wall has a thickness of

a. 0.1–3.0 µm
b. 0.01–0.03 µm
c. 0.1–0.5 µm
d. 0.5–1.5 µm

Ans. (a) 0.1–3.0 µm

317. Primary wall is generally elastic due to absence of

a. Lignin
b. Suberin
c. Cutin
d. Silica

Ans. (a) Lignin

318. Plant cells are distinguishable from animal cell in containing

a. Mitochondria
b. Ribosomes
c. ER
d. Cell wall

Ans. (d) Cell wall

319. The structural material of fungal cell wall is

a. Pectin
b. Cellulose
c. Peptidoglycan
d. Chitin

Ans. (d) Chitin

320. Ripe fruits soften due to

a. Degeneration of cell walls
b. Partial solubilisation of pectic compounds
c. Metabolism of tannins
d. Exosmosis

Ans. (b) Partial solubilisation of pectic compounds

321. Hardness of woody tissue is due to

a. Silica
b. Lignin
c. Cellulose
d. Suberin

Ans. (b) Lignin

322. Impermeability of cork is related to

a. Silica
b. Lignin
c. Cellulose
d. Suberin

Ans. (d) Suberin

323. Cutin occurs in

a. Phloem tissue
b. Xylem tissue
c. Endodermis
d. Epidermis

Ans. (d) Epidermis

324. In primary wall, cellulose microfibrils are

a. Small, loose and wavy
b. Long, loose and wavy
c. Small, compact and straight
d. Long, compact and straight

Ans. (a) Small, loose and wavy

325. Cellulose content is high in

a. Primary wall
b. Secondary wall
c. Tertiary wall
d. Middle lamella

Ans. (a) Primary wall

326. Tertiary wall is known from

a. Compression wood of dicots
b. Tension wood of gymnosperms
c. Cotton fibres
d. All hard woods

Ans. (b) Tension wood of gymnosperms

327. Plasmodesmata were discovered by

a. Hanstein
b. Kolliker
c. Strasburger
d. Granier

Ans. (c) Strasburger

328. Part of endoplasmic reticulum present in a plasmodesma is called

a. Desmotubule
b. Cisterna
c. Vesicle
d. Myeloid body

Ans. (a) Desmotubule

329. Uncutinised and non-suberised cell wall is

a. Semipermeable
b. Permeable
c. Impermeable
d. Selectively permeable

Ans. (b) Permeable

330. Adjacent tracheids and vessels can transfer sap through thin areas in their walls called

a. Plasmodesmata
b. Gap junctions
c. Tight junctions
d. Pits

Ans. (d) Pits

331. Pits are

a. Depressions in primary walls
b. Depressions in secondary walls
c. Both a and b
d. Plasmodesmal connections

Ans. (b) Depressions in secondary walls

332. A complete pit is

a. Depression in secondary wall
b. Pit chamber and primary wall
c. Pit chambers of two adjacent cells and pit membrane
d. Pit chamber, primary wall and middle lamella

Ans. (c) Pit chambers of two adjacent cells and pit membrane

333. Pit membrane consists of

a. Primary wall
b. Middle lamella
c. Middle lamella + primary wall
d. Primary wall + middle lamella + primary wall

Ans. (d) Primary wall + middle lamella + primary wall

334. A pit present in the wall of cell lying adjacent to an intracellular space is

a. Complete pit
b. Blind pit
c. A pit without its partner
d. Both b and c

Ans. (d) Both b and c

335. A disc-shaped thickening present on the pit membrane is

a. Torus
b. Callus
c. Tylosis
d. Stoma

Ans. (a) Torus

336. Apoplast is

a. Cytoplasm and plasmalemma
b. Protoplast and plasmodesmata
c. Cell walls
d. Nonliving continuum made of free or outer spaces of cells

Ans. (d) Nonliving continuum made of free or outer spaces of cells

337. Cell coat consists of

a. Glycocalyx
b. Cellulose
c. Cellulose + Hemicellulose + Pectin
d. Protein

Ans. (a) Glycocalyx

338. Glycocalyx is

a. Glycoproteins and glycolipids
b. Oligosaccharide part of glycolipids and glycoproteins

c. lipid and protein parts of glycolipids and glycoproteins
d. mucopolysaccharides attached to cell wall

Ans. (b) Oligosaccharide part of glycolipids and glycoproteins

339. Separated cells of two sponge species are mixed up. They will

a. Remain separate
b. Aggregate tissue-wise
c. Aggregate and fuse to form hybrids
d. Aggregate species wise and reconstruct the sponges

Ans. (d) Remain separate

340. Separated cells of two vertebrates are mixed up. They will

a. Aggregate species-wise
b. Aggregate tissue-wise
c. Aggregate species-wise and then tissue-wise
d. Aggregate species-wise and then reconstruct the animals

Ans. (b) Aggregate tissue-wise

341. Glycocalyx is responsible for

a. Antigens like those of blood groups ABO
b. Immune reactions and histocompatibility
c. Hormone receptors
d. All the above

Ans. (d) All the above

342. The term protoplasm was coined by

a. Huxley b. Purkinje
c. Dujardin d. Schultze

Ans. (b) Purkinje

343. A unit of protoplasm having a nucleus and covered by plasmalemma is called

a. Ectoplast b. Cell
c. Cytoplast d. All the above

Ans. (b) Cell

344. Protoplasm is

a. Alveolar b. Granular
c. Fibrillar d. Crystallo-colloidal

Ans. (d) Crystallo-colloidal

345. Who proposed cryastallo-coloidal nature of protoplasm

a. Kolliker b. Fromann
c. Velton d. Hanstein

Ans. (a) Kolliker

346. Protoplast is

a. Granular protoplasm
b. Whole protoplasm of an organism
c. Unit of protoplasm contained in a cell
d. All the above

Ans. (c) Unit of protoplasm contained in a cell

347. The percentage of proteins in the plasma membrane is usually around

a. 70 b. 60
c. 40 d. 30

Ans. 60

348. Who differentiated prokaryotic and eukaryotic cells

a. Huxley b. Linnaeous
c. Whittaker d. Dougherty

Ans. (d) Dougherty

349. Mesokaryotic condition was distinguished by

a. Whittaker b. Dodge
c. Copeland d. Haeckel

Ans. (b) Dodge

350. An akaryotic cell is

a. Single nucleated b. Prokaryotic
c. Denucleated d. Both b and c

Ans. (d) Both b and c

351. Protoplast excluding nucleus is called

a. Cytoplasm b. Endoplasm
c. Ectoplasm d. Protoplasm

Ans. (a) Cytoplasm

352. Cell structure between plasmalemma and karyotheca is

a. Vacuole b. Nucleoplasm
c. Endoplasm d. Cytoplasm

Ans. (d) Cytoplasm

353. Which one is an extracytoplasmic cell organelle

a. Vacuole b. ER
c. Nucleus d. Golgi apparatus

Ans. (c) Nucleus

354. In a membrane phospholipids, there are

a. One polar head and two nonpolar tails
b. Two polar head and one nonpolar tails
c. One nonpolar head and two polar tails
d. Two nonpolar head and one polar tails

Ans. (a) One polar head and two nonpolar tails

355. Extrinsic proteins of cell membrane are

a. Present superficially and are easily separable
b. Present superficially and are not separable
c. Attached to intrinsic proteins but are easily separable
d. Attached to intrinsic but are not easily separable

Ans. (c) Attached to intrinsic proteins but are easily separable

356. Main function of plasma membrane is to

a. Control cell movements
b. Control cell activities
c. Maintain cell shape and size
d. Regulate exchange of materials

Ans. (d) Regulate exchange of materials

357. Plasmalemma is

a. Permeable
b. Selectively permeable
c. Nonpermeable
d. Semipermeable

Ans. (b) Selectively permeable

358. The process of taking in liquid material by infolding of membrane is known as

a. Phagocytosis
b. Osmosis
c. Active transport
d. Pinocytosis

Ans. (d) Pinocytosis

359. Taking in of food particles or foreign bodies through cell membrane is

a. Phagocytosis
b. Pinocytosis
c. Osmosis
d. Active transport

Ans. (a) Phagocytosis

360. Pinocytosis was studied for the first time by

a. Metchnikoff
b. Lewis
c. Plowe
d. Nageli

Ans. (b) Lewis

361. A prokaryotic cell is characterized by

a. Cellulose cell wall
b. Single envelope system
c. Double envelope system
d. Presence of histones

Ans. (b) Single envelope system

362. Bacteria do not possess

a. DNA
b. RNA
c. Nucleus
d. Lipids

Ans. (c) Nucleus

363. Bacteria with tuft of flagella at one end is

a. Monotrichous
b. Lophotrichous
c. Peritrichous
d. Atrichous

Ans. (b) Lophotrichous

364. *Vibrio cholerae* is

a. Monotrichous
b. Amphitrichous
c. Lophotrichous
d. Peritrichous

Ans. (a) Monotrichous

365. A bacterium is stained with Gram stain. It retains purple stain even after washing with acetone. The bacterium is

a. Gram (+)
b. Gram (–)
c. Gram neutral
d. Eosinophil

Ans. (a) Gram (+)

366. Which one is Gram (+)

a. Pseudomonas
b. Escherichia
c. Pneumococcus
d. Cyanobacteria

Ans. (c) Pneumococcus

367. A Gram (–) prokaryotic is

a. Mycoplasma
b. Rickettsia
c. Chlamydia
d. All the above

Ans. (d) All the above

368. Cell envelope is

a. Glycocalyx
b. Mucilage sheath
c. Mucilage sheath and cell wall
d. Mucilage cheath, cell wall and plasmalemma

Ans. (d) Mucilage cheath, cell wall and plasmalemma

369. Teichoic acid is present in

a. Mycobacterium
b. Haemophilus
c. Gram (+) bacteria
d. Gram (–) bacteria

Ans. (c) Gram (+) bacteria

370. Mycotic acid occurs in the wall of

a. Eubacteria
b. Actinomycetes
c. Archaebacteria
d. Blue green algae

Ans. (b) Actinomycetes

371. Periplasmic space occurs in between

a. Outer wall and inner wall
b. Outer wall membrane and inner membrane
c. Wall and plasmalemma
d. Plasmalemma and cytoplasma

Ans. (c) Wall and plasmalemma

372. Wall is

a. Single layered and wavy in Gram (–) bacteria
b. Two layered and smooth in Gram (+) bacteria
c. Two layered and wavy in Gram (+) bacteria
d. Two layered and wavy in Gram (–) bacteria

Ans. (d) Two layered and wavy in Gram (–) bacteria

373. In Gram (–) bacteria, peptidoglycan is

a. 70 – 80% and present in outer wall layer
b. 10 – 20% and present in inner wall layer
c. 10 – 20% and present in outer wall layer
d. 70 – 80% and found in inner wall layer

Ans. (c) 10 – 20% and present in outer wall layer

374. Bacterial wall contains

a. Cellulose
b. Peptidoglycan
c. Murein
d. Both b and c

Ans. (d) Both b and c

375. Murein peptidoglycan of bacterial wall is formed of

a. Glucose and peptide
b. Acetyl glucosamine and peptide
c. Acetyl muramic acid and acetyl glucosamine
d. Acetyl glucosamine and acetyl muramic acid cross linked with small peptides.

Ans. (d) Acetyl glucosamine and acetyl muramic acid cross linked with small peptides.

376. Antibiotic penicillin and cyclosporine kill bacteria by

a. Hydrolyzing pepidoglycans
b. Preventing cross-linking of acetyl glucosamine and acetyl muramic acid
c. Hydrolyzing plasmalemma
d. Preventing ATP synthesis

Ans. (b) Preventing cross-linking of acetyl glucosamine and acetyl muramic acid

377. Porins occur in

a. Outer wall of Gram (–) bacteria
b. Inner wall of Gram (–) bacteria
c. Wall of Gram (+) bacteria
d. Wall of all types of bacteria

Ans. (a) Outer wall of Gram (–) bacteria

378. Plasmalemma of bacteria contains

a. Cholesterol
b. Hopanoids
c. Cerebrosides
d. All the above

Ans. (b) Hopanoids

379. Chondriod is

a. A small mitochondrion found in prokaryotes
b. Anaerobic bacterium
c. A respiratory mesosome
d. A spiral aggregate of ribosomes

Ans. (c) A respiratory mesosome

380. Components of 70 S ribosome are

a. 50 S and 30 S
b. 50 S and 20 S
c. 40 S and 40 S
d. 40 S and 30 S

Ans. (a) 50 S and 30 S

381. Chromoplasm occurs in

a. Bacteria
b. Actinomyces
c. Cyanobacteria
d. Mycoplasma

Ans. (c) Cyanobacteria

382. Chlorosomes occur in

a. Purple bacteria
b. Cyanobacteria
c. Green bacteria
d. All the above

Ans. (c) Green bacteria

383. Chlorosomes are peculiar in having

a. Bacteriochlorophyll
b. Bacteriophaeophytin
c. Carotenoids
d. Non-unit protein membrane

Ans. (d) Non-unit protein membrane

384. Chromoneme is the term used for

a. Plasmid
b. Nucleoid
c. Genophore
d. Both b and c

Ans. (d) Both b and c

385. Prokaryotic DNA is naked because it is not

a. Covered by nuclear envelope
b. Associated with histone
c. Organized into nucleus
d. All the above

Ans. (b) Associated with histone

386. A plasmid which gets associated with nucleoid is called

a. Episome
b. Cryptic plasmid
c. Proplasmid
d. Temperate

Ans. (a) Episome

387. A bacterial cell inclusion which does not have its own covering membrane is

a. Gas vesicle b. Gas vacuole
c. Sulphur granule d. PHB granules

Ans. (b) Gas vacuole

388. Which one are called metachromatic granules?

a. Volutin granules
b. Magnetite granules
c. Sulphur and iron granules
d. All the above

Ans. (d) All the above

389. Magnetic granules occur in

a. Aquaspirillium b. Spirulina
c. Cladothrix d. Thiobacillus

Ans. (a) Aquaspirillium

390. Which one is a proteinaceous food reserve

a. α-granules b. β-granules
c. Cyanophycin d. PHB granules

Ans. (c) Cyanophycin

391. Bacterial flagella are

a. Unistranded solid b. Unistranded hollow
c. Multistranded solid d. Multistranded hollow

Ans. (b) Unistranded hollow

392. Which one takes part in bacterial conjugation

a. Flagellum b. Pilus
c. Fimbria d. Plasmodesma

Ans. (b) Pilus

393. Number of basal body rings present in Gram (–) bacteria is

a. One b. Two
c. Three d. Four

Ans. (d) Four

394. Number of network present in a plant cell wall is

a. Three b. Two
c. One d. Four

Ans. (a) Three

395. Besides cellulose microfibrils, the other two cell wall networks are

a. Protein and hemicelluloses
b. Hemicelluloses and protein
c. Pectin and glycoprotein
d. Pectin and hemicelluloses

Ans. (c) Pectin and glycoprotein

396. Mitochondria and plastids multiply through

a. Binary fission
b. Multiple fission
c. Budding
d. All the above

Ans. (a) Binary fission

397. A nonliving structure of cell is

a. Cell wall
b. Plasma membrane
c. Cytoplasm
d. Nucleus

Ans. (a) Cell wall

398. The chemical present in the cell wall is

a. Pectin b. Lignin
c. Cellulose d. All the above

Ans. (d) All the above

399. All plant cells possess

a. Middle lamella b. Primary wall
c. Lysosomes d. Centriole

Ans. (b) Primary wall

400. Middle lamella occurs

a. Inner to primary wall
b. Inner to secondary wall
c. Outer to secondary wall
d. Outer to primary wall

Ans. (d) Outer to primary wall

401. Middle lamella contains

a. Cellulose b. Pectate
c. Lignin d. Cutin

Ans. (b) Pectate

402. Matrix of cell wall is made of

a. Pectin b. Hemicelluloses
c. Glycoprotein d. Cellulose

Ans. (a) Pectin

403. Chemical absent from matrix of cell wall is

a. Lipid b. Water
c. Glycoprotein d. Cellulose

Ans. (d) Cellulose

404. The term cytoplasm was coined by

a. Sachs b. Strasburger
c. Hanstein d. Flemming

Ans. (b) Strasburger

405. Jelly-like semifluid complex of cytoplasm is called

a. Endoplast
b. Cytosol
c. Cytoplasmic matrix
d. Both b and c

Ans. (d) Both b and c

406. Plasmagel or gel part of cytosol in contact with plasmalemma is

a. Ectoplast
b. Hyaloplasm
c. Hyalosome
d. Both a and b

Ans. (a) Ectoplast

407. Plasmasol or sol part of cytosol is known as

a. Hyalosome
b. Hyaloplasm
c. Endoplast
d. Both b and c

Ans. (d) Both b and c

408. Which part of protoplast shows streaming or cyclosis

a. Ectoplast
b. Endoplast
c. Endoplasmic matrix
d. Nucleoplasm

Ans. (b) Endoplast

409. Cytoplasmic streaming or cyclosis is absent in

a. Plant cells
b. Animal cells
c. Protozoan protists
d. Prokaryotes

Ans. (d) Prokaryotes

410. Cyclosis was first studied by

a. Robert brown
b. Dalton and Felix
c. Amici
d. Sachs

Ans. (c) Amici

411. Amici (1818) studied cyclosis for the first time in

a. Hydrilla
b. Amoeba
c. Chara
d. Acetabularia

Ans. (c) Chara

412. Cyclosis is caused by activity of

a. Microtubules
b. Microfilaments
c. Intermediate filaments
d. All the above

Ans. (b) Microfilaments

413. Circulation type of protoplasmic streaming is studied in

a. Stamina hair cell of Tradescantia
b. Hydrilla leaf cells
c. Vallisneria leaf cells
d. Both b and c

Ans. (a) Stamina hair cell of Tradescantia

414. In circulation streaming protoplasm moves in

a. One direction
b. Two opposite directions around a vacuole
c. Different directions around different vacuoles
d. Both a and b

Ans. (c) Different directions around different vacuoles

415. In rotation type of cyclosis, the cytoplasmic matrix flows in

a. One direction
b. Two opposite directions
c. Different directions
d. Side-ways

Ans. (a) One direction

416. The term organoid is used for

a. III defend organ
b. A distinct tissue
c. Idioblast
d. Cell organelle

Ans. (d) Cell organelle

417. A membrane-lined system of channels present throughout the cytoplasm is

a. Endoplasmic reticulum
b. Golgi apparatus
c. Microtubules
d. Both b and c

Ans. (a) Endoplasmic reticulum

418. Percentage of cell membranes contained in ER is

a. 10–20 %
b. 20–30%
c. 30–60%
d. 60–75%

Ans. (c) 30–60%

419. ER is absent in

a. Animal cells
b. Prokaryotes
c. Plant cells
d. Protista and fungi

Ans. (b) Prokaryotes

420. Eukaryotic cells devoid of ER are

a. Liver cells
b. Kidney cells
c. Mature leucocytes
d. Mature erythrocytes

Ans. (d) Mature erythrocytes

421. An intracellular structure believed to be formed by inpushing of plasmalemma is

a. Endoplasmic reticulum
b. Nuclear envelope
c. Mitochondrion
d. Chloroplasts

Ans. (a) Endoplasmic reticulum

422. Eukaryotic cells which contain very little of ER are

a. Early embryonic cells b. Ova
c. Resting cells d. All the above

Ans. (d) All the above

423. ER is made of

a. Cisternae b. Tubules
c. Vesicles d. All the above

Ans. (d) All the above

424. Spermatocytes possess ER in the form of

a. A few vesicles
b. A few tubules
c. Abundant tubules and vesicles
d. Cisternae, tubules and vesicles

Ans. (a) A few vesicles

425. Sacroplasmic reticulum is endoplasmic reticulum of

a. Adipose cells b. Muscle cells
c. Nerve cells d. Leucocytes

Ans. (b) Leucocytes

426. In nerve cells, ER forms

a. Myeloid bodies b. Neurotubules
c. Nissl granules d. Neurofilaments

Ans. (d) Neurofilaments

427. Myeloid bodies are granular structures formed of ER in

a. Retinal cells b. Adipose cells
c. Plasma cells d. Reticulocytes

Ans. (a) Retinal cells

428. In adipose cells, ER is represented by

a. Cisternae and tubules
b. A few tubules
c. Cisternae and vesicles
d. A few vesicles

Ans. (b) A few tubules

429. ER was discovered by

a. Palade b. Porter *et al*
c. Thompson d. Both b and c

Ans. (d) Both b and c

430. The term endoplasmic reticulum was coined by

a. Thompson b. Palade
c. Porter d. Garnier

Ans. (c) Porter

431. The term ergastoplasm was given to basophilic membranous structures by

a. Palade b. Garnier
c. Schimper d. Fleming

Ans. (b) Garnier

432. ER was discovered from

a. Liver cells b. Kidney cells
c. Muscle cells d. Nerve cells

Ans. (a) Liver cells

433. Membrane thickness of ER is

a. 75 Å b. 90 Å
c. 50–60 Å d. 30–40 Å

Ans. (c) 50–60 Å

434. ER without association with ribosomes is called

a. Transitional ER b. SER
c. Agranal ER d. Both b and c

Ans. (d) Both b and c

435. Rough endoplasmic reticulum is the one that contains

a. Abundant tubules
b. Association with ribosomes
c. Fenestrations
d. Both b and c

Ans. (b) Association with ribosomes

436. RER is

a. Neutrophilic b. Acidophilic
c. Basophilic d. Neutrogenic

Ans. (c) Basophilic

437. What is more abundant in SER

a. Cisternae and vesicles
b. Cisternae and tubules
c. Tubules and vesicles
d. Cisternae

Ans. (c) Tubules and vesicles

438. What is more abundant in RER

a. Cisternae b. Vesicles
c. Tubules d. Both a and b

Ans. (a) Cisternae

439. P_{450} and P_{448} occurs over

a. SER b. RER
c. Annulate ER d. Transitional ER

Ans. (a) SER

440. SER takes part in synthesis of

a. Lipids and steroids b. Vitamins
c. Carbohydrates d. All the above

Ans. (d) All the above

441. RER is specialized for synthesis of

a. Local proteins
b. Local proenzymes
c. Proteins and proenzymes for transport
d. Hormones

Ans. (c) Proteins and proenzymes for transport

442. Pollutants and carcinogens are detoxified by

a. P_{450} and P_{448} b. SER in liver
c. RER in liver d. Both a and b

Ans. (d) Both a and b

443. Ribophorins are required for

a. Synthesis of ribosomes in nucleolus
b. Attachment of ribosomes over RER
c. Attachment of ribosome subunits
d. Attachment of mRNA to ribosomes for protein synthesis

Ans. (b) Attachment of ribosomes over RER

444. Which of the following provides mechanical support to cell

a. Ribosomes
b. Golgi bodies
c. Lysosomes
d. Microfibrils

Ans. (d) Microfibrils

445. Endoplasmic reticulum occurs in the form of

a. Vesicles
b. Cisternae
c. Tubules
d. All the above

Ans. (d) All the above

446. Cells specialized in secretion of proteinaceous substances possess

a. Bound ribosomes b. Free ribosomes
c. Abundant amino acids d. Abundant mRNA

Ans. (a) Bound ribosomes

447. Besides proteins, ribosomes contain

a. DNA b. RNA
c. Both DNA and RNA d. Lipids

Ans. (b) RNA

448. Sedimentation unit of ribosome is

a. μ (micron) b. μm (milimicron)
c. Å (Angstrom) d. S (Svedberg)

Ans. (d) S (Svedberg)

449. Cytoribosomes of eukaryotes are different from those of bacterial cells in having

a. Smaller size (70 S type)
b. Larger size (80 S type)
c. Differential chemical structure
d. All the above

Ans. (b) Larger size (80 S type)

450. A ribosome is composed of

a. A single unit b. Two subunits
c. Three subunits d. Four subunits

Ans. (b) Two subunits

451. Ribosome develop from

a. Nucleus b. Nucleolus
c. Endoplasmic reticulum d. Mitochondria

Ans. (b) Nucleolus

452. Polysome is a chain of

a. Oxysomes b. Sphareosomes
c. Ribosomes d. Dicytosomes

Ans. (c) Ribosomes

453. Enzyme peptidyl transferase occurs in

a. Large subunit of ribosome
b. Smaller subunit of ribosome
c. Endoplasmic reticulum
d. Lysosomes

Ans. (a) Large subunit of ribosome

454. Hydrolases identified from different lysosomes are

a. 30 b. 35
c. 50 d. 70

Ans. (c) 50

455. An enzyme often present in lysosomes and having antiseptic property is

a. Lysozyme b. Plasminogen activator
c. Lipofucin d. Both b and c

Ans. (a) Lysozyme

456. Secondary lysosome are

a. Digestive vacuoles b. Autophagic vacuoles
c. Residual vacuoles d. All the above

Ans. (d) All the above

457. Lysosomes containing inactive enzymes are called

a. Primary lysosomes
b. Secondary lysosomes
c. Autophagosomes
d. Residual bodies

Ans. (a) Primary lysosomes

458. Lysosomes alongwith food content is known as

a. Primary lysosomes b. Secondary lysosomes
c. Microbodies d. Residual bodies

Ans. (b) Secondary lysosomes

459. Autophagic vacuoles digest

a. Cell organelles
b. Solid particles of phagosomes
c. Fluid droplets of pinosomes
d. All the above

Ans. (a) Cell organelles

460. Residual vacuoles throw their undigested materials by

a. Pinocytosis b. Phagocytosis
c. Ephagy d. Diffusion

Ans. (c) Ephagy

461. Lipofuscin granules present in nerve cells are actually

a. Primary lysosomes
b. Digestive vacuoles
c. Residual bodies
d. Newly digested lipids

Ans. (c) Residual bodies

462. Cartilage matrix is digested during its osteogenesis through

a. Intracellular autophagic activity
b. Extracellular lysosomal activity
c. Intracellular heterophagic activity
d. Both b and c

Ans. (b) Extracellular lysosomal activity

463. Disease caused by hyperactivity of lysosomes is

a. Arthritis b. Gout
c. Lung fibrosis d. All the above

Ans. (d) All the above

464. A disease caused by reduced ephagic activity of residual bodies is

a. Hepatitis b. Polynephritis
c. Hypertension d. Both a and b

Ans. (d) Both a and b

465. Which one is lysosomal activity

a. Reabsorption of tadpole tail
b. Mobilization of stored substances
c. Removal of obstructions
d. All the above

Ans. (d) All the above

466. When are lysosomes extra-active

a. Seed maturation b. Seed germination
c. Flowering d. Fruiting

Ans. (b) Seed germination

467. Cell organelles getting stained with redox dye Janus Green is

a. Lysosome b. Mitochondrion
c. Ribosome d. Golgi apparatus

Ans. (b) Mitochondrion

468. An early name of mitochondrion was

a. Fila b. Sacrosome
c. Bioplast d. All the above

Ans. (d) All the above

469. Mitochondria were discovered by

a. Michaelis b. Benda
c. Kolliker d. Krebs

Ans. (c) Kolliker

470. The scientist who related mitochondria to aerobic respiration is

a. Kinsbury b. Michaelis
c. Seekevitz d. Fernandes-Moran

Ans. (a) Kinsbury

471. An eukaryotic aerobic cell that does not possess mitochondria is

a. Liver cell b. Kidney cell
c. Erythrocyte d. Leucocyte

Ans. (c) Erythrocyte

472. Single mitochondria is found in

a. Microasterias b. Chlorella
c. Micromonas d. All the above

Ans. (d) All the above

473. Number of mitochondria present in a sperm is

a. 4–6 b. 12–14
c. 20–24 d. 40–50

Ans. (c) 20–24

474. Number of mitochondria found in a kidney cell is

a. 100–150 b. 300–400
c. 500–600 d. 1000–1200

Ans. (b) 300–400

475. A liver cell contains mitochondria

a. 500–600 b. 1000–1200
c. 1500–2000 d. 2000–4000

Ans. (a) 500–600

476. Giant Amoeba (*Chaos chaos*) has mitochondria

a. 5000–10000 b. 50,000
c. 80,000 d. 100,000

Ans. (b) 50,000

477. Number of mitochondria found in flight muscle cell can be

a. 500,000 b. 200,000
c. 100,000 d. 50,000-100,000

Ans. (b) 200,000

478. In animal cell, a mitochondrion is

a. Largest organelle
b. Second largest organelle
c. Third largest organelle
d. None of the above

Ans. (b) Second largest organelle

479. Outer mitochondrial membrane resembles bacterial membrane and outer chloroplast membrane having

a. Selective permeability b. Single ion channels
c. Porin d. All the above

Ans. (c) Porin

480. Cristae were discovered by

a. Palade b. Fernandes-Moran
c. Nass and Afzelius d. Luck and Rich

Ans. (a) Palade

481. Power houses of the cell are

a. ATP b. Lysosomes
c. Mitochondria d. Chloroplasts

Ans. (c) Mitochondria

482. Number of oxisomes present in a mitochondrion is believed to be

a. 10^3–10^4 b. 10^4–10^5
c. 10^5–10^6 d. 10^6–10^7

Ans. (b) 10^4–10^5

483. In the inner mitochondrial membrane, proton channel is constituted by

a. F_0 b. F_1
c. NADH (H^+) d. Cytochrome oxidase

Ans. (a) F_0

484. Mitochondrial matrix contains

a. Enzymes b. DNA and RNA
c. Ribosomes d. All the above

Ans. (d) All the above

485. Small particles attached to inner mitochondrial membrane are

a. Ergosomes b. Cristae
c. Elementary particles d. Quantasomes

Ans. (c) Elementary particles

486. Mitochondria are concerned with

a. Oxidative phosphorylation
b. Intermediate metabolism
c. Krebs cycle
d. All the above

Ans. (d) All the above

487. In prokaryotes oxidative phosphorylation is carried out by

a. Chondriome b. Plasma membrane
c. Lomasome d. Chromatophore

Ans. (b) Plasma membrane

488. Mitochondria are semi-autonomous due to

a. Presence and functional naked DNA
b. Presence of ribosomes
c. Ability to divide
d. All the above

Ans. (d) All the above

489. Pigment free plastids are

a. Chloroplasts b. Chromoplasts
c. Lysosomes d. Leucoplasts

Ans. (d) Leucoplasts

490. The term plastids was given by

a. Schimper b. Haeckel
c. Hanstein d. Strasburger

Ans. (b) Haeckel

491. All types of plastids are formed from

a. Protoplastids b. Leucoplasts
c. Amyloplasts d. Aleuroplasts

Ans. (a) Protoplastids

492. Protoplastids are found in

a. Root cells b. Storage cells
c. Meristematic cells d. Cortical cells

Ans. (c) Meristematic cells

493. The plastid which can form all other types of plastids is

a. Leucoplast b. Amyloplast
c. Chloroplast d. Chromoplast

Ans. (a) Leucoplast

494. Chromoplasts are formed from chloroplasts during

a. Ripening of tomato b. Ripening of chilli
c. Development of carrot d. Both a and b

Ans. (d) Both a and b

495. Chromoplasts are formed from leucoplasts in

a. Rose petals b. Carrot
c. Dahlia florets d. All the above

Ans. (b) Carrot

496. The plastids with irregular shape are

a. Leucoplasts b. Chloroplasts
c. Chromoplasts d. Amyloplasts

Ans. (c) Chromoplasts

497. Irregular shape of chromoplasts is due to

a. Genetic differences
b. Crystallization of carotenoids
c. Formation of lipids
d. Destruction of lamellae

Ans. (b) Crystallization of carotenoids

498. Leucoplasts are present in

a. Green cells
b. Pigmented cells other than green
c. Nonpigmented cells
d. Both a and b

Ans. (c) Nonpigmented cells

499. Organelle covered by double membrane is

a. Nucleus b. Mitochondrion
c. Plastid d. All the above

Ans. (d) All the above

500. Plastids with 3 or 4 membrane covering are found in

a. Gymnosperms
b. Pteridophytes
c. Euglenoids and Brown Algae
d. Bryophytes

Ans. (c) Euglenoids and Brown Algae

501. Plastids contain

a. Double membrane covering
b. DNA, RNA and ribosomes
c. Lamellae
d. All the above

Ans. (d) All the above

502. Starch is stored in

a. Chromoplasts b. Amyloplasts
c. Chloroplasts d. Both b and c

Ans. (d) Both b and c

503. Plastids storing proteins are called

a. Elaioplasts b. Oleosomes
c. Aleuroplasts d. Phaeoplasts

Ans. (c) Aleuroplasts

504. Organelle ribosomes occur in

a. Bacteria
b. Blue-Green algae
c. Plastids and mitochondria
d. Nucleus

Ans. (c) Plastids and mitochondria

505. Organelle ribosomes resembles

a. Organelle ribosomes of prokaryotes
b. Cytoribosomes of prokaryotes
c. Cytoribosomes of eukaryotes
d. All the above

Ans. (b) Cytoribosomes of prokaryotes

506. Ribosomes was first observed by

a. Claude b. Palade
c. George d. De Duve

Ans. (a) Claude

507. Palade granules are

a. Glycoprotein particles b. Pigment granules
c. Excretory vesicles d. Ribosomes

Ans. (d) Ribosomes

508. Ribosomes were discovered by

a. Palade b. Thompson
c. Perner d. Schimper

Ans. (a) Palade

509. Organelle and prokaryotic ribosomes are generally

a. 80 S
b. 100 S
c. 70 S
d. 45 S

Ans. (c) 70 S

510. Eukaryotes possess ribosomes

a. 60 S
b. 70 S
c. 80 S
d. Both b and c

Ans. (c) 80 S

511. An organelle devoid of membrane covering is

a. Lysosome
b. Peroxisome
c. Ribosome
d. Sap vacuole

Ans. (c) Ribosome

512. Element required for bringing about union of ribosome subunit is

a. Ca^{2+}
b. Mg^{2+}
c. Fe^{2+}
d. Cu^{+}

Ans. (b) Mg^{2+}

513. Size of 80S, ribosome is

a. 150–200 Å × 135–150 Å
b. 200–290 Å × 170–210 Å
c. 250–300 Å × 180–220 Å
d. 300–340 Å × 200–240 Å

Ans. (d) 300–340 Å × 200–240 Å

514. Dalton weight of 70S ribosome is

a. 2.7–3.0 million
b. 3.1–3.5 million
c. 3.6–4.0 million
d. 4.0–4.5 million

Ans. (a) 2.7–3.0 million

515. rRNA: protein ratio of 80 S ribosome is

a. 40–44 : 56–60
b. 45–50 : 50–55
c. 50–55 : 45–50
d. 60–65 : 35–40

Ans. (a) 40–44 : 56–60

516. rRNA present in 40 S subunit of ribosome is

a. 5 S
b. 5.8 S
c. 28 S
d. All the above

Ans. (d) All the above

517. rRNA present in 60 S subunit of ribosome is

a. 5 S
b. 5.8 s
c. 28 s
d. All the above

Ans. (d) All the above

518. rRNA present in 50 S subunit of ribosome is

a. 23 S
b. 5 S
c. Both a and b
d. 23 S, 5.8 S and 5 S

Ans. (c) Both a and b

519. Number of proteins associated with 60 S ribosome subunit is

a. 40
b. 34
c. 30
d. 21

Ans. (a) 40

520. Chloramphenicol prevents protein synthesis over

a. Prokaryotic ribosomes
b. Organelle ribosomes
c. Both a and b
d. 80 S ribosomes

Ans. (c) Both a and b

521. Most abundant organelles of the cell are

a. Mitochondria
b. Plastids
c. Ribosomes
d. Microbodies

Ans. (c) Ribosomes

522. Golgi apparatus was first seen by

a. George
b. Golgi
c. Cajal
d. Robinson and Brown

Ans. (b) Golgi

523. Who studied Golgi apparatus for the first time

a. Golgi
b. George
c. Cajal
d. Koltzoff

Ans. (a) Golgi

524. Golgi was able to differentiate Golgi apparatus through

a. Phase contrast microscopy
b. Metallic impregnation technique
c. Electron microscopy
d. Special redox dye

Ans. (b) Metallic impregnation technique

525. Golgi studied Golgi apparatus in

a. Nerve cells of dog and fish
b. Goblet cells of dog's stomach
c. Nerve cells of barn owl and cat
d. Goblet cells of barn owl and cat

Ans. (c) Nerve cells of barn owl and cat

526. Metallic stain used by Golgi was

a. Lead acetate
b. Osmium chloride and silver salts

c. Phosphotungstate
d. Palladium

Ans. (b) Osmium chloride and silver salts

527. Golgi apparatus was first seen under electron microscope by

a. Novikoff
b. Dalton and Felix
c. Rhodin
d. De Robertis and Franchi

Ans. (b) Dalton and Felix

528. A cell organelle with a definite polarity is

a. Ribosome
b. Mitochondrion
c. Golgi apparatus
d. Chloroplast

Ans. (c) Golgi apparatus

529. Golgi apparatus is made of

a. Cisternae
b. Tubules and vesicles
c. Golgian vacuoles
d. All the above

Ans. (d) All the above

530. On which side of golgi apparatus are the membranes thin

a. Concave distal side
b. Concave proximal side
c. Convex distal side
d. Convex proximal side

Ans. (d) Convex proximal side

531. Golgian vacuoles develop from

a. Tubules
b. Convex proximal cisterna
c. Concave distal cisterna
d. Transition vesicles

Ans. (c) Concave distal cisterna

532. Golgi apparatus receives biochemicals with the help of transition vesicles formed by

a. ER
b. Plasmalemma
c. Lysosomes
d. Nuclear blebs

Ans. (a) ER

533. Number of cisternae present in Golgi apparatus of an animal cell is

a. 4–8
b. 8–13
c. 13–20
d. 20–30

Ans. (a) 4–8

534. Space between adjacent cisternae of Golgi apparatus is

a. 15 Å
b. 30 Å
c. 80–100 Å
d. 100–300 Å

Ans. (d) 100–300 Å

535. Inter-cisternal space is occupied by

a. Cytosol
b. Cementing materials
c. Fibrils
d. All the above

Ans. (d) All the above

536. Which one is the function of Golgi apparatus

a. Cell plate formation
b. Matrix formation of connective tissue
c. Secretion of tears
d. All the above

Ans. (d) All the above

537. Golgi apparatus is concerned with

a. Excretion
b. Secretion
c. ATP synthesis
d. RNA synthesis

Ans. (a) Excretion

538. Golgi complex is not found in

a. Nerve cells
b. RBCs
c. Germ cells
d. All the above

Ans. (b) RBCs

539. Golgi apparatus is found in

a. Cryptogams only
b. Phanerogams only
c. Prokaryotic cells
d. Eukaryotic cells

Ans. (d) Eukaryotic cells

540. Cell organelle specialized in forming acrosome part of sperm is

a. Mitochondrion
b. Centriole
c. Peroxisome
d. Golgi apparatus

Ans. (d) Golgi apparatus

541. Amongst plants, Golgi apparatus is absent in

a. Sieve tube cells
b. Sperms of bryophytes
c. Sperms of pteridophytes
d. All the above

Ans. (d) All the above

542. Membrane flow occurs in

a. Golgi apparatus
b. ER
c. Karyotheca
d. Contractile vacuoles

Ans. (a) Golgi apparatus

543. Isolated units of Golgi apparatus found in plant cells are called

a. Golgisomes
b. Dictyosomes
c. Lipochondria
d. Cisternae

Ans. (b) Dictyosomes

544. Dictyosomes are unicisternal in

a. Fungi
b. Protistans
c. Algae
d. Bryophytes

Ans. (a) Fungi

545. Which cell organelle is involved in formation of saliva, tears and sweat

a. RER
b. SER
c. Golgi apparatus
d. Both b and c

Ans. (c) Golgi apparatus

546. Golgi apparatus takes part in synthesis of

a. Carbohydrates
b. Glycoproteins
c. Hormones
d. All the above

Ans. (d) All the above

547. Lysosomes were first seen and named by

a. De Duve
b. Palade
c. Novikoff
d. Robertson

Ans. (a) De Duve

548. Lysosomes originated from

a. Plasmalemma
b. Golgi apparatus
c. Bothe a and b
d. RER

Ans. (b) Golgi apparatus

549. Main function of lysosomes is

a. Secretion
b. Respiration
c. Extracellular digestion
d. Intracellular digestion

Ans. (d) Intracellular digestion

550. Lysosomes are

a. All alike
b. Of three types
c. Of four types
d. Of two types

Ans. (c) Of four types

551. De Duve discovered lysosomes from

a. Orchid root cells
b. Rat liver cells
c. Rat kidney cells
d. Leaf cells

Ans. (b) Rat liver cells

552. Lysosomes are absent in animal cells

a. Erythrocytes
b. Plasma cells
c. Nerve cells
d. Muscle cells

Ans. (a) Erythrocytes

553. pH of lysosome interior is

a. 10–12
b. 8–10
c. 5–7
d. 4–5

Ans. (d) 4–5

554. The three types of plastids were named by

a. Meyer
b. Schimper
c. Hanstein
d. Pyrenoids

Ans. (b) Schimper

555. Autoplasts of Meyer are

a. Leucoplasts
b. Proplastids
c. Chloroplasts
d. Both a and b

Ans. (c) Chloroplasts

556. Structural elements of chloroplasts are

a. Plastoglobuli
b. Photosynthetic pigments
c. Thylakoids
d. Quantosomes

Ans. (c) Thylakoids

557. Thylakoids of chloroplasts are also called

a. Lamellae
b. Fret membranes
c. Loculi
d. Grana

Ans. (a) Lamellae

558. In a chloroplasts. The photosynthetic pigments occur

a. In matrix
b. Grana
c. Membranes of thylakoids
d. Loculi and fret channels of thylakoids

Ans. (c) Membranes of thylakoids

559. Grana are present in

a. Mitochondria
b. Chloroplasts
c. Golgi bodies
d. Ribosomes

Ans. (b) Chloroplasts

560. Grana are

a. Protein storing plastids
b. Coloured plastids
c. Stacks of thylakoids
d. Individual thylakoids present in stroma

Ans. (c) Stacks of thylakoids

561. Number of grana present in a chloroplast is

a. 10–20 b. 20–30
c. 30–40 d. 40–60

Ans. (d) 40–60

562. Number of thylakoids present in a granum is

a. 10–100 b. 5–10
c. 100–200 d. 200–500

Ans. (a) 10–100

563. Particles of thylakoid membranes involved in ATP synthesis are called

a. Quantosomes b. CF_0–CF_1
c. Photosystems d. Pyrenoids

Ans. (b) CF_0–CF_1

564. Structure associated with chloroplast of green algae is

a. Pyrenoid b. Stigma
c. Both a and b d. Endoplasmic reticulum

Ans. (c) Both a and b

565.Plastids which provide bright colour to the flowers and fruits are

a. Chloroplasts b. Leucoplasts
c. Chromoplasts d. Proplastids

Ans. (c) Chromoplasts

566. Peroxisomes and glyoxisomes are

a. Energy transforming organelles
b. Membrane-less organelles
c. Macrobodies
d. Microbodies

Ans. (d) Microbodies

567. Which one is a microbody

a. Sphaerosome b. Lysosome
c. Peroxisome d. All the above

Ans. (c) Peroxisome

568. Organelle covered by a single membrane is

a. Sphareosomes b. Peroxisomes
c. Glyoxisomes d. All the above

Ans. (d) All the above

569. Microbody present only in plants is

a. Sphareosomes b. Peroxisomes
c. Glyoxisomes d. Both b and c

Ans. (c) Glyoxisomes

570. Microbodies resemble mitochondria in

a. Using oxygen
b. Producing reducing power
c. Having catalase
d. Formation of ATP

Ans. (a) Using oxygen

571. Microbodies differ from mitochondria in

a. Single membrane b. Absence of DNA
c. Direct oxidation d. All the above

Ans. (d) All the above

572. New spherosomes develop from

a. Old sphaerosomes b. ER
c. Golgi apparatus d. Prospherosomes

Ans. (b) ER

573. Spherosomes are involved in

a. Utilization of alcohol
b. Storage of fat
c. Synthesis and storage of fat
d. Synthesis and storage of carbohydrates

Ans. (c) Synthesis and storage of fat

574. Scientist credited with discovery of spherosome is

a. Rhodin b. Perner
c. Koltzokk d. Claude

Ans. (b) Perner

575. An organelle reported to have lysosomal activity in plants is

a. Sphaerosome b. Glyoxisome
c. Peroxisome d. All the above

Ans. (a) Sphaerosome

576. A cell organelle called uricosome is

a. Lysosome b. Sphaerosome
c. Peroxisome d. Glyoxysome

Ans. (c) Peroxisome

577. Microbodies possess

a. Hydrolases b. Oxidases
c. Isomerases d. All the above

Ans. (b) Oxidases

578. Peroxisome was discovered by

a. De Duve b. Rhodin
c. De Roertis and Franchi d. Beevers

Ans. (a) De Duve

579. Cell organelle having enzyme uricase or urate oxidase is

a. Lysosome
b. Glyoxisome
c. Peroxisomes
d. Sphaerosome

Ans. (c) Peroxisomes

580. Major function of peroxisomes is oxidation of

a. Excess purine
b. Surplus amino acids
c. Alcohol and drugs
d. All the above

Ans. (d) All the above

581. Glyoxisomes occur in

a. Leaf cells
b. Fatty seeds
c. Roots
d. Meristematic cells

Ans. (b) Fatty seeds

582. Glyoxisomes are useful in

a. Converting sugars to fats
b. Converting fats to sugars
c. Deamination and converting amino acids to fatty acids
d. Amination and changing fatty acids to amino acids

Ans. (b) Converting fats to sugars

583. The term cytoskeleton was given by

a. Koltsov
b. Rhodin
c. Menke
d. Park

Ans. (a) Koltsov

584. The term microtubule was coined by

a. De Robertis and Franchi
b. Mayer
c. Palade
d. Slautterback

Ans. (d) Slautterback

585. A microtubule has a diameter of

a. 100 Å
b. 150 Å
c. 250 Å
d. 100 nm

Ans. (c) 250 Å

586. A microtubule is made of

a. Protofilaments
b. Microfilaments
c. Microfibrils
d. Elementary fibrils

Ans. (a) Protofilaments

587. Number of protofilaments in a microtubule is

a. 10
b. 13
c. 16
d. 18

Ans. (b) 13

588. Microtubules are formed of a protein called

a. Tubulin
b. Actin
c. Flagellin
d. Myosin

Ans. (a) Tubulin

589. Microtubules are present in

a. Bacteria
b. Viruses
c. Eukaryotic cells
d. Mycoplasma

Ans. (c) Eukaryotic cells

590. Protein tubulin occurs in microtubules as

a. Monomers
b. Homodimers
c. Heterodimers
d. Heteropolymers

Ans. (c) Heterodimers

591. Microtubule assembly is inhibited by

a. GTP
b. Ca^{2+}
c. Mg^{2+}
d. Colchicine

Ans. (d) Colchicine

592. Microtubule assembly is promoted by

a. Calmodulin
b. GTP
c. Ca^{2+} and Mg^{2+}
d. All the above

Ans. (d) All the above

593. Microfilaments were discovered by

a. Slautterback
b. Paleviz *et al*
c. Altman
d. Ledbetter and Porter

Ans. (b) Paleviz *et al*

594. Diameter of a microfilament is

a. 7 nm
b. 10 nm
c. 15 nm
d. 25 nm

Ans. (a) 7 nm

595. Microfilaments are required for

a. Movement of flagella and cilia
b. Cell polarity
c. Sol-gel changes
d. All the above

Ans. (c) Sol-gel changes

596. Cell polarity is determined by

a. Intermediate filaments
b. Microtubules
c. Protofilaments
d. Centrioles

Ans. (b) Microtubules

597. Cytoskeleton components that determine orientation of cellulose microfibrils are

a. Microfilaments
b. Microtubules
c. Intermediate filaments
d. Basal bodies

Ans. (b) Microtubules

598. Which one provides support to microvilli, membrane ruffling and pseudopodia

a. Microfilaments
b. Desmin and vimentin filaments
c. Microtubules
d. ER

Ans. (a) Microfilaments

599. The contractile constituent of cytoskeleton is

a. Microtubules
b. Intermediate filaments
c. Microfilaments
d. Microfibrils

Ans. (c) Microfilaments

600. The diameter of intermediate filament is

a. 1 nm
b. 5 nm
c. 7–8 nm
d. 10 nm

Ans. (d) 10 nm

601. Tonofibrils are

a. Intermediate filaments
b. Microfilaments
c. Cross-linked microtubules
d. Both a and b

Ans. (a) Intermediate filaments

602. In nerve fibres, intermediate filaments form

a. Neurotubules
b. Neurofilaments
c. Neurofibrils
d. Dendrites

Ans. (c) Neurofibrils

603. In muscle cells, intermediate filaments produce

a. Z-line
b. M-line
c. H-line
d. Both a and b

Ans. (d) Both a and b

604. Centrioles are found

a. Singly
b. Pairs
c. Triplets
d. Quadruplets

Ans. (b) Pairs

605. The centriole pair occurs in a complex called

a. Centrosome
b. Centromere
c. Kinetochore
d. Basal plate

Ans. (a) Centrosome

606. The two centrioles of a pair occur

a. Parallel to each other
b. At right angles to each other
c. At an angle other than 90°
d. End to end

Ans. (b) At right angles to each other

607. Each centriole has on its periphery MTOCs called

a. Spokes
b. Pericentriolar thickenings
c. Massules
d. Both a and b

Ans. (c) Massules

608. Centrosome was discovered by

a. Boveri
b. Porter
c. Thompson
d. Schimper

Ans. (a) Boveri

609. Cell organelle having a cartwheel constitution is

a. Centriole and basal body
b. Microtubule
c. Microfilament
d. Basal plate

Ans. (a) Centriole and basal body

610. The pattern of organization in centrioles is

a. 9 + 2
b. 9 + 3
c. 9 + 0
d. 9 + 1

Ans. (c) 9 + 0

611. In ultrastructure blepharoplasts resemble

a. Centrioles
b. Flagella
c. Cilia
d. None of the above

Ans. (a) Centrioles

612. Subfibres of cilia and flagella are made of

a. Tubulin
b. Elastin
c. Myosin
d. Actin

Ans. (a) Tubulin

613. Pattern of organization of eukaryotic cilia and flagella is

a. 9 + 0
b. 9 + 1
c. 9 + 2
d. 9 + 3

Ans. (c) 9 + 2

614. Bacterial flagellum is made of

a. Flagellin
b. Actin
c. Elastin
d. Myosin

Ans. (a) Flagellin

615. Number of microtubules present in a centriole is

a. 20 b. 25
c. 9 d. 18

Ans. (c) 9

616. Number of microtubules found in cilium or flagellum is

a. 11 b. 13
c. 18 d. 20

Ans. (d) 20

617. Doublet fibrils of a cilium or flagellum are tilted at an angle of

a. 5° b. 10°
c. 15° d. 20°

Ans. (b) 10°

618. Triplet fibrils of a centriole are tilted at an angle of

a. 40° b. 30°
c. 20° d. 10°

Ans. (a) 40°

619. Which microtubule or subfibre of the triplet disappears while passing through basal plate

a. C b. A
c. B d. None of the above

Ans. (a) C

620. Number of dynein arms

a. Four attached to subfibre B
b. Two attached to subfibre B
c. Two attached to subfibre A
d. Four attached to subfibre A

Ans. (c) Two attached to subfibre A

621. Cilium or flagellum is structurally bilateral due to presence of

a. Central sheath b. Singlet fibrils
c. Double bridge d. Both b and c

Ans. (d) Both b and c

622. Thylakoid are found in the plastids of

a. Bacteria b. Blue green algae
c. Higher plants d. All of these

Ans. (c) Higher plants

623. The most abundant protein in the plant world is found in

a. Root hair
b. Mitochondria
c. Chloroplasts
d. Viruses

Ans. (c) Chloroplasts

624. Ribosomes are attached to endoplasmic reticulum through

a. Ribophorins
b. rRNA
c. tRNA
d. Hydrophobic interaction

Ans. (a) Ribophorins

625. The release of lysosmal enzymes fakes pace under critical levels of

a. Ag^{++}, Zn^{++}, Mg^{++}
b. Ag^{++}, Zn^{++}, Zg^{++}
c. Hg^{++}, Mn^{++}, Cu^{++}
d. Hg^{++}, Cu^{++}, Ag^{++}

Ans. (d) Hg^{++}, Cu^{++}, Ag^{++}

CHECK YOUR GRASP

1. The stage at which cytokinesis begins in plant cell is

a. Anaphase
b. Telophase
c. G_0 phase
d. Interphase

2. The stage at which cleavage or cytokinesis begins in animal cells is

a. Anaphase
b. Telophase
c. G_0 phase
d. Interphase

3. Meiosis is studied in smears of

a. Developing anthers
b. Testes
c. Both a and b
d. Axillary buds

4. Chromosome syndesis or bivalent formation occurs in

a. Leptotene
b. Zygotene
c. Pachytene
d. Diplotene

5. Separation of chromosome daughters takes place at

a. Telophase
b. Metaphase
c. Anaphase
d. Prophase

6. Amitosis was discovered by Remak in

a. 1841 b. 1855
c. 1880 d. 1905

7. Mitosis is usually studied in smears or sections of

a. Root tips
b. Stem tips
c. Floral buds
d. All the above

8. Mitosis takes place in

a. All types of cells except those involved in gamete formation
b. Gonads
c. Axillary buds situated near the apical bud
d. Cells of mature leaf

9. Homologous chromosomes separate during

a. Prophase I
b. Prophase II
c. Metaphase I
d. Anaphase I

10. Bouquet stage occurs during

a. Leptotene
b. Zygotene
c. Pachytene
d. Diplotene

11. Large plant cells are

a. Xylem vessel cells
b. Parenchyma cells
c. Sieve tube cells
d. Sclerenchyma fibres

12. Study of the cell structure under microscope is

a. Cytology
b. Cell biology
c. Cytochemistry
d. Microanatomy

13. Study of cells in all aspects is

a. Cytotaxonomy
b. Cytology
c. Cell biology
d. Cytochemistry

14. Schleiden and Schwann proposed cell theory in

a. 1836–37
b. 1838–39
c. 1901–02
d. 1938–39

In case of less than 80% score, go through brief review and glance once again from chapter

Key: 1-a 2-a 3-c 4-b 5-c 6-b 7-a 8-a 9-d 10-a 11-d 12-a 13-c 14-b

2

Molecular Biology

1. A palindrome is a sequence of nucleotides in DNA that

a. Has local symmetry and may serve as recognition site for various protein
b. Is a structural gene
c. Is part of the introns of eukaryotic genes
d. Is highly reiterated

Ans. (a) Has local symmetry and may serve as recognition site for various protein

2. A polypeptide having 15 amino acid residues can form any of the

a. 15 amino acid sequences
b. 15^{20} amino acid sequences
c. 20^{15} amino acid sequences
d. None of these

Ans. (c) 20^{15} amino acid sequences

3. A transition mutation

a. Occurs when a purine is substituted from a pyrimidine of *vice-versa*
b. Result from insertion of one or two bases in to the DNA chain
c. Always a missense mutation
d. Results from the substitution of one purine for another or of one pyrimidine for another

Ans. (d) Results from the substitution of one purine for another or of one pyrimidine for another

4. Acetylcholine receptor is

a. Cl^- channel
b. Na^+ channel
c. Ca^{+2} channel
d. Non of the above

Ans. (b) Na^+ channel

5. ADAR is an enzyme which plays a significant role in

a. RNA editing in prokaryotes
b. RNA editing in eukaryotes
c. 5′ capping
d. Chromatin remodelling

Ans. (b) RNA editing in eukaryotes

6. Addition of mannose-6-phosphate to a protein results in its location in

a. Lysosome
b. Ribosome
c. Golgi body
d. Nuclei

Ans. (a) Lysosome

7. Agar-Agar is the polymer of

a. Galactose
b. Glucose
c. Fructose
d. Xylose

Ans. (a) Galactose

8. Alcohol is used as disinfectant because it can destroy the surrounding bacteria by breaking

a. Hydrogen bonds of bacterial protein
b. Ionic bonds of bacterial protein
c. Hydrophobic and disulphide bonds of bacterial protein
d. None of these

Ans. (b) Ionic bonds of bacterial protein

9. Alfalfa is used as biofertilizer due to presence of

a. *Sinorhizobium*
b. *Rhizobium*
c. *Mesorhizobium*
d. *Azorhizobium*

Ans. (a) *Sinorhizobium*

10. All the amino acids are specified by more than one codon *except*

a. Phenylalanine and tyrosine
b. Tryptophan and serine
c. Methionine and tryptophan
d. Alanine and tyrosine

Ans. (c) Methionine and tryptophan

11. Amino acid sequence for a protein is known, we can estimate the sequence of mRNA coding that protein

a. Precisely
b. Can't be predicted

c. Precisely to certain extent if codon frequency is known
d. Data not sufficient

Ans. (c) Precisely to certain extent if codon frequency is known

12. Amino acids are translocated by intestinal epithelial cells by

a. K^+/amino acid co-transporters
b. Na^+/amino acid co-transporters
c. H^+/amino acid co-transporters
d. Amino acid / glucose anti porters

Ans. (b) Na^+/amino acid co-transporters

13. Among closely lying cells signal are communicated by

a. Hormones
b. Gap junction
c. Neurotransmitters
d. Cell membrane protein

Ans. (b) Gap junction

14. Among the following enzymes which is not involved in DNA replication process?

a. RNA polymerase
b. DNA polymerase
c. Ligase
d. Helicase

Ans. (a) RNA polymerase

15. Among the following which mutagen induces formation of thymidine dimmers in DNA?

a. Nitrous oxide
b. Ethylmethyl sulphate
c. UV light
d. Ethidium bromide

Ans. (c) UV light

16. An operon is inducible means

a. The operon is for catabolic process
b. The operon is for anabolic process
c. There is another operator in the system
d. None of these

Ans. (a) The operon is for catabolic process

17. V. Ramakrishnan shared noble prize for chemistry in the year 2009 for describing the detailed structure of

a. 50s ribosomal subunit
b. 40s ribosomal subunit
c. 30s ribosomal subunit
d. None of these

Ans. (c) 30s ribosomal subunit

18. Bacterial DNA polymerase-I can cause nick translation. This property of the enzyme is due to

a. $3' \rightarrow 5'$exonuclease activity
b. $3' \rightarrow 5'$polymerase activity
c. $5' \rightarrow 3'$exonuclease activity
d. $5' \rightarrow 3'$ polymerase activity

Ans. (c) $5' \rightarrow 3'$exonuclease activity

19. Biologically not common but sometimes playing regulatory role in gene expression, the DNA is

a. B-form
b. Z-form
c. E-form
d. All of the above

Ans. (b) Z-form

20. CAAT box and GC box are component of the promoter of

a. Halo bacteria
b. Arabidopsis
c. Mycoplasma
d. Bacteria

Ans. (b) Arabidopsis

21. Ca^{+2} binding proteins is

a. Tropomysosin
b. Myosin
c. Actin
d. Troponin

Ans. (d) Troponin

22. Calmodulin, a calcium binding protein, is found in living organisms except

a. Prokaryotes
b. Eukaryotes
c. Plant
d. Animals

Ans. (a) Prokaryotes

23. Which of the following sequences lists the compounds in order of increasing molecular weight?

a. DNA, NAD, ADP, ATP
b. Alanine, ATP, NAD, DNA
c. Alanine, ATP, DNA, NAD
d. ATP, alanine, DNA, NAD

Ans. (b) Alanine, ATP, NAD, DNA

24. cAMP is directly involved in regulation of

a. GTP
b. ATP
c. PFK
d. Protein kinase A

Ans. (d) Protein kinase A

25. The scientist who first synthesized DNA *in vitro* was

a. A garrod
b. J. D watson
c. A Kornberg
d. Ochoa

Ans. (c) A Kornberg

26. CD 4 receptors are specialized for

a. MHC I
b. MHC II
c. CDK
d. Ig G

Ans. (b) MHC II

27. The nitrogen bases in DNA are

a. AUGC
b. UTGC
c. ATGC
d. ATUC

Ans. (c) ATGC

28. RNA is absent in

a. Ribosome
b. Chromosom
c. Plasma membrane
d. Cytoplasm

Ans. (c) Plasma membrane

29. Cdk-1/cyclin A complex acts at

a. S to G2 transition
b. G1 to S transition point
c. Restriction point
d. G2 to M transition point

Ans. (a) S to G2 transition

30. Cdk-1, with cyclin B acts at

a. G1 phase
b. G2 phase
c. S phase
d. M phase

Ans. (d) M phase

31. Cdk4/cyclin D complex acts on

a. Cell cycle progression through S phase
b. Restriction point
c. G1/S transition
d. G2/M transition

Ans. (b) Restriction point

32. β-1,4 glycosidic linkage is not found in

a. Sucrose
b. Fructose
c. Maltose
d. Lacose

Ans. (a) Sucrose

33. Who was awarded Nobel Prize for the synthesis of RNA in 1959?

a. A K frnberg
b. H. Khorna
c. S. Ochoa
d. Nirenbirg

Ans. (a) S. Ochoa

34. Cellular proteins are degraded by

a. Cyclosomes
b. Chymotripsins
c. Proteasomes
d. Lysosomes

Ans. (c) Proteasomes

35. Feulgen reaction is a specific test for establishing the presence of

a. RNA
b. DNA
c. Sugar
d. Protein

Ans. (b) DNA

36. Change from purine to pyrimidine or pyrimidine to purine is

a. Transversion
b. Transition
c. Deletion
d. Frame-shift

Ans. (a) Transversion

37. Codon degeneracy has evolutionary significance because

a. It reduces the number of t-RNA performing translation for 61 codon
b. It creates new reading frame and promotes formation of new polypeptides
c. It maintains wild-type eliminating lethal affects of mutation
d. None of these

Ans. (c) It maintains wild-type eliminating lethal affects of mutation

38. Colchicines treated cells are arrested in

a. Meta phase
b. G1 phase
c. S phase
d. G2 phase

Ans. (a) Meta phase

39. Cooperativity effect in proteins is the result of

a. Tertiary structure of protein
b. Quaternary structure of protein
c. Secondary structure of protein
d. All of these

Ans. (b) Quaternary structure of protein

40. COP II vesicle transport proteins froms

a. Rough ER to the golgi
b. From the *cis*-golgi to the rough ER
c. From plasma membrance and the trans golgi to late endosomes
d. From trans golgi to the lysosome

Ans. (a) Rough ER to the golgi

41. Copy error mutation is an example of

a. Transition
b. Transversion
c. Frameshift
d. Deletion

Ans. (a) Transition

42. Copy error mutation is thought to occur due to

a. Tautomeric shift
b. Nitous oxide
c. UV rays
d. DNA methylation

Ans. (a) Tautomeric shift

43. Crossing over is not found in

a. Male drosophila
b. Maize
c. Evening primrose
d. Female drosophila

Ans. (a) Male drosophila

44. Crossing over occurs at

a. Pachytene
b. Diplotene
c. Zygotene
d. Leptotene

Ans. (a) Pachytene

45. C-value paradox is

a. Percentage of junk DNA in eukaryotes
b. Lack of correlation between genome size and complexity
c. Correct correlation between genome size and complexity
d. None of these

Ans. (b) Lack of correlation between genome size and complexity

46. C-value refers to

a. Diploid level of DNA
b. Haploid level of DNA
c. Triploidy
d. Polyploidy

Ans. (b) Haploid level of DNA

47. Cytoplasmic polyadenylation is a critical aspect of gene expression in

a. Early embryo cell death
b. Programmed cell death
c. Aging
d. Cancer cells

Ans. (a) Early embryo cell death

48. Cytoplasmic streaming is associated with

a. Microtubules
b. Microfilaments
c. Intermediate filament
d. None of these

Ans. (b) Microfilaments

49. Cytoplasmic streaming results in to mobility of substances and organelles it involves interaction of

a. Tubulin, myosin
b. Actin, myosin
c. Tubulin kinesin
d. Actin, kinesin

Ans. (b) Actin, myosin

50. Degeneracy of the genetic code denotes the existence of

a. Multiple amino acids for a single codon
b. Codons that include one or more of the unusual bases
c. Codons consisting of only two bases
d. Multiple amino acids for a single amino acid

Ans. (d) Multiple amino acids for a single amino acid

51. You have isolated a motile, gram positive cell with no visible nucleus, you can assume this cell has

a. Ribosome
b. Mitochondria
c. Golgi complex
d. ER

Ans. (a) Ribosome

52. Dicentric bridges are formed in

a. Reciprocal translocation
b. Pericentric inversion
c. Paracentric inversion
d. Terminal deletion

Ans. (c) Paracentric inversion

53. X-rays induce mutagenic changes mainly by

a. Chromosomal breakage
b. Transition
c. Frame shifting
d. Transversion

Ans. (a) Chromosomal breakage

54. Disulfide bond formation in proteins takes place in

a. Smooth ER
b. Rough ER
c. Golgi complex
d. Cytosol

Ans. (b) Rough ER

55. Disulphide bond can not be formed within cytosol because

a. It's environment is highly reducing due to presence of free radicals
b. It's environment is highly reducing due to presence of glutathione
c. It lacks PDI
d. None of these

Ans. (b) It's environment is highly reducing due to presence of glutathione

56. DNA fossils are

a. Very primitive sequence of DNA
b. DNA is extracted from fossils
c. Inactive transposons in human genome
d. All of the above

Ans. (d) All of the above

57. DNA gyrase is inhibited by

a. Puromycin
b. Streptomycin
c. Nalidixic acid
d. All of the above

Ans. (c) Nalidixic acid

58. Wobble hypothesis explains that

a. A single t-RNA molecule can recognize more than one codon
b. In mitochondria genetic code does not follow universal rule of genetic code
c. In some viruses and bacteria genetic code is overlapping
d. None of these

Ans. (a) A single tRNA molecule can recognize more than one codon

59. DNA in the form of minicircles and maxicircles is found in

a. Chloroplast genome
b. Mitochondrial genome
c. Apicoplast
d. Kinetoplast

Ans. (d) Kinetoplast

60. DNA replication occurs in 5′-3′ direction because

a. It enhances fidelity of the DNA
b. It is thermodynamically favourable
c. DNA is right handed
d. It reduces mismatch pairing

Ans. (b) It is thermodynamically favourable

61. Double stranded DNA break can be repaired by

a. Homologous recombination
b. Mismatch repair
c. Nucleotide excision repair
d. Direct repair

Ans. (a) Homologous recombination

62. Down's syndrome results in mental retardation in human. This condition is characterized by having

a. Monosomy for 21
b. Trisomy for chromosome X
c. Trisomy for chromosome Y
d. Trisomy for chromosome 21

Ans. (d) Trisomy for chromosome 21

63. Drug detoxification occur in

a. Rough ER
b. Smooth ER
c. Glyoxysomes
d. Peroxisomes

Ans. (b) Smooth ER

64. During cell division the transition of the cell into the S phase is controlled by?

a. CDK2
b. CDK1
c. CDK25
d. CDK4/CDK5

Ans. (a) CDK2

65. During chromatid separation microtubules attached to the

a. Telomere
b. Kinetochore
c. Centromere
d. Secondary construction

Ans. (c) Centromere

66. During DNA replication in eukaryotes RNA primers are removed by

a. RNase H
b. DNA Polymerase I
c. DNA polymerase II
d. RNA polymerase I

Ans. (a) RNase H

67. During DNA synthesis frame reading form

a. 3′–5′
b. 5′–3′
c. Both simultaneously
d. None of these

Ans. (a) 3′-5′

68. During glycosylation of protein the oligosaccharide groups are modified by

a. Glycosidase
b. Glycosyl transferases
c. Proteases
d. None of these

Ans. (b) Glycosyl transferases

69. During meiosis centromere divides at

a. Metaphase
b. Anaphase
c. Teleophase
d. Anaphase II

Ans. (d) Anaphase II

70. During meiosis cohesion protein is broken down at

a. Anaphase I
b. Anaphase II
c. metaphase
d. interkinesis

Ans. (b) Anaphase II

71. During photoreactivation reaction DNA photolyase utilizes

a. Red light
b. Blue light
c. Far red light
d. Green light

Ans. (b) Blue light

72. During RNA processing splicing is mediated by

a. mRNA b. rRNA
c. tRNA d. Sn RNA

Ans. (d) Sn RNA

73. During termination of protein synthesis the release factor RF3 recognizes

a. UAA b. UAG
c. Both UAA and UAG d. UGA and UAA

Ans. (d) UAG

74. During transcription holoenzyme RNA polymerase binds to a DNA sequence and the DNA assumes a saddle-like structure at that point. What is the sequence called?

a. AAAT box b. CAAT box
c. TATA box d. GGTT box

Ans. (c) TATA box

75. During transcription RNA polymerase binds to the

a. Promoter b. Operator
c. Structural d. Regulator

Ans. (a) Promoter

76. During translation proof reading activity is performed by

a. Ribosome
b. Aminoacyl transfer RNA synthetase
c. Translation factor
d. Peptidyl transferase

Ans. (b) Aminoacyl transfer RNA synthetase

77. Enhancers of eukaryotic gene may have a special form of DNA called

a. A-DNA b. C-DNA
c. B-DNA d. Z-DNA

Ans. (d) Z-DNA

78. Epinephrine plays its role in glycogenolysis by

a. Activating glycogen synthase
b. Activating phophorylase kinase
c. Inactivating adenylyl cyclase
d. None of these

Ans. (b) Activating phophorylase kinase

79. Epinephrine promotes glycogenolysis there by

a. Hydrolysizing cAMP
b. Synthesizing cAMP
c. Inactivating G-protein
d. Inactivating Adenylyl cyclase

Ans. (b) Synthesizing cAMP

80. Eukaryotic chromosomes are transcriptionally most active during

a. Prophase b. Metaphase
c. Anaphase d. Interphase

Ans. (d) Interphase

81. Eukaryotic organisms lack

a. DNA photolyase b. DNA glycosylase
c. AP endonuclease d. Excinucleases

Ans. (a) DNA photolyase

82. Eukaryotic transcription

a. Is independent of the presence of consensus sequences upstream from the start of transcription.
b. May involve a promoter located with in the region transcribed rather than upstream
c. Is affected by enhancer sequences only if they are adjacent to the promoter
d. None of the these

Ans. (b) May involve a promoter located with in the region transcribed rather than upstream

83. With which of the following base compositions will the Tm be highest in a double-stranded DNA molecule?

a. 30% thymine b. 25% guanine
c. 5% thymine d. 5% guanine

Ans. (c) 5% thymine

84. Full expression of the lac operon requires

a. Allolactose
b. Lactose
c. Lactose and cAMP
d. Allolactose and cAMP

Ans. (b) Lactose

85. G band corresponds to large regions of the human genome that have unusually

a. Low A + T content
b. High A + T content
c. Low G + C content
d. High G + C content

Ans. (d) High G + C content

86. Which statement is not true for DNA transcription?

a. Template strand is used as coding strand
b. Transcription is in 5′–3′ direction
c. Template strand and mRNA have complementary
d. None of these

Ans. (a) Template strand is used as coding strand

87. Genetic code is not degenerate for

a. Leucine b. Isoleucine
c. Glycine d. Cysteine

Ans. (c) Glycine

88. Guide RNA are involved in

a. Cutting event of m-RNA
b. RNA editing
c. End modification of hn-RNA
d. Splicing

Ans. (b) RNA editing

89. Histones are replaced by protamines in

a. Nerve cell b. Muscle cell
c. Heart cell d. Sperm cell

Ans. (d) Sperm cell

90. Holiday junction are formed during

a. DNA replication
b. DNA repair
c. Chromosomal aberration
d. Recombination

Ans. (d) Recombination

91. Holiday structure is used to explain

a. Site specific recombination
b. Homologous recombination
c. Gene transfer
d. Nonhomologous recombination

Ans. (b) Homologous recombination

92. Holocentric chromosomes are found in

a. Man b. Luzula
c. Chimpanzee d. Birds

Ans. (b) Luzula

93. Hopanoids are sterol like-molecules which are found in the plasma membrane of

a. Fungi
b. Mycoplasma
c. Archaebacteria
d. Certain bacteria and cyanobacteria

Ans. (d) Certain bacteria and cyanobacteria

94. How many kinetochores are present in a human cell?

a. 41 b. 42
c. 45 d. 46

Ans. (d) 46

95. How many linkage groups are found in human cell?

a. 21 b. 22
c. 23 d. 24

Ans. (d) 24

96. If there is 20% cytosine in DNA, what is the percentage of adenine?

a. 35% b. 30%
c. 45% d. 40%

Ans. (b) 30%

97. If there is mutation in cdk/cyclin, the key molecule in regulating the cell cycle, then

a. There would be uncontrolled growth
b. Cells will arrest to G_0 phase
c. The level of cdki/cyclins will enhance
d. Cell will not pass to S phase

Ans. (a) There would be uncontrolled growth

98. In an intact cell the DNA double helix is right handed because

a. The bases are asymmetric
b. It consists of D-ribose only
c. It is more stable than left handed
d. None of these

Ans. (b) It consists of D-ribose only

99. In B-DNA the distance between two base pair is

a. 0.24 b. 0.35
c. 0.34 d. 0.45

Ans. (c) 0.34

100. In cell–cycle centrioles replicate in

a. G1- phase b. G2-phase
c. S-phase d. M-phase

Ans. (c) S-phase

101. In cell cycle which of the following is usually not a check point?

a. G2-check point b. G1-check point
c. S-check point d. None of these

Ans. (c) S-check point

102. In comparison to their natural environments biologically active cell are

a. Hypotonic
b. Hypertonic
c. Isotonic
d. Vary from condition to condition

Ans. (b) Hypertonic

103. In culture, cells may reversibly be arrested in the mitotic phase by treatment with

a. Radiation
b. Gentamycin
c. Colchicine
d. Mitomycin-C

Ans. (c) Colchicine

104. In DNA the histone responsible for higher order chromatin structure is

a. H1
b. H2A
c. H2B
d. H3 AND H4

Ans. (a) H1

105. In humans t-RNA genes are transcribed by

a. RNA Polymerase I
b. RNA polymerase II
c. RNA polymerase III
d. All of the above

Ans. (c) RNA polymerase III

106. In *lac* operon CAP binding site is found

a. Upstream the RNA binding site
b. Downstream the RNA binding site
c. Any where the RNA binding site
d. Structural gene

Ans. (a) Upstream the RNA binding site

107. Which sequence is the best target for damage by UV radiation

a. AGGCAAA
b. AGGCAAA
c. GUAAAAU
d. CTTTTGA

Ans. (d) CTTTTGA

108. Kinetochore is a proteinaceous structure of centromere. It is important for cell division because

a. It causes spindle formation
b. Microtubules attach to kinetochore during separation of chromosome
c. It causes spindle formation
d. None of these

Ans. (b) Microtubules attach to kinetochore during separation of chromosome

109. Lactose operon is both negatively and positively regulated, this means that lactose is used

a. Along with glucose
b. After glucose has been used
c. Preferentially
d. All of these

Ans. (b) After glucose has been used

110. DNA replication under going in an *E. coli* cell resulted into two circular DNA interlocked with each other; this may be due to a defective gene encoding

a. Primase
b. DNA topoisomerase I
c. DNA topoisomerase II
d. DNA polymerase

Ans. (c) DNA topoisomerase II

111. In prokaryotes, the lagging primers are removed by

a. 3′ to 5′ exonuclease
b. DNA ligase
c. DNA polymerase I
d. DNA polymerase III

Ans. (c) DNA polymerase I

112. The essential initiator protein at the *E. Coli* origin of replication is

a. DnaA
b. DnaB
c. DnaC
d. DnaE

Ans. (a) DnaA

113. Which phase would a cell enter if it was starved of mitogens before the R point?

a. G1
b. S
c. G2
d. G0

Ans. (d) G0

114. Prokaryotic plasmids can replicate in yeast cells if they contain a cloned yeast

a. ORC
b. CDK
c. ARS
d. RNA

Ans. (c) ARS

115.Which enzyme removes the RNA primer and fills in deoxyribonucleotides in prokaryotic replicons?

a. DNA polymerase III
b. DNA polymerase II
c. DNA polymerase I
d. None of these

Ans. (c) DNA polymerase I

116. The bacterial enzyme that changes positively supercoiled DNA into negatively supercoiled DNA is

a. DNA helicase
b. DNA gyrase
c. Single stranded binding protein
d. Polymerase

Ans. (b) DNA gyrase

117. Characteristic unique in DNA is

a. Denaturation and renaturation
b. Polymer complex
c. Replication
d. resistance to temperature change

Ans. (c) Replication

118. Isotopes used for proving semiconservative replication of DNA are

a. N^{14} and P^{31} b. N^{14} and N^{15}
c. N^{14} and C^{14} d. C^{14} and P^{31}

Ans. (b) N^{14} and N^{15}

119. T4 DNA ligase

a. Requires ATP
b. Joins double-stranded DNA fragments with an adjacent 3′-phosphate and 5′-OH
c. Requires NADH
d. Joins single-stranded DNA

Ans. (a) Requires ATP

120. Which of the following is used in rolling circle DNA replication but not in normal cellular DNA replication?

a. Endonuclease
b. Exonuclease
c. Primase
d. DNA ligase

Ans. (a) Endonuclease

121. In eukaryotes, RNA primers are removed after replication by

a. DNA Pol α b. DNA Pol δ
c. helicase d. FEN I

Ans. (d) FEN I

122. Which of the following DNA Pol has proofreading property in animal cells?

a. DNA Pol α
b. DNA Pol δ
c. DNA Pol β
d. All

Ans. (b) DNA Pol δ

123. Choose the incorrect statement

a. Mitochondrial DNA replicates by D-loop formation
b. Rolling circle replication is also known as σ replication
c. DNA Pol I is made up of single polypeptide
d. DNA Pol III has ability of nick translation

Ans. (d) DNA Pol III has ability of nick translation

124. Which of the following DNA Pol in eukaryote has 5′ → 3′ exonuclease activity?

a. DNA Pol α b. DNA Pol β
c. DNA Pol δ d. None

Ans. (d) None

125. Mitochondrial DNA is replicated from

a. A single ori site bidirectionally
b. Two different ori sites in the same direction
c. Two different ori sites at different times in opposite directions
d. Many sites bidirectionally, like nuclear chromosomes

Ans. (c) Two different ori sites at different times in opposite directions

126. Chloroplast DNA is replicated from

a. A single *ori* site bidirectionally
b. Two different *ori* sites in the same direction
c. Two different *ori* sites simultaneously and in opposite directions
d. Many sites bidirectionally, like nuclear chromosomes

Ans. (c) Two different *ori* sites simultaneously and in opposite directions

127. In eukaryotes, the lagging strand DNA is synthesized by DNA polymerase

a. β b. δ
c. γ d. ε

Ans. (d) ε

128. C-bands are deeply stained chromosomal regions which represents the

a. Euchromatin
b. Constitutive heterochromatin
c. Cytosine dominant regions of chromosome
d. Metaphase chromosome

Ans. (b) Constitutive heterochromatin

129. Bar bodies are found in

a. Interphase of male cells
b. Interphase of female cells
c. Prophase of female cells
d. Prophase of male cells

Ans. (b) Interphase of female cells

130. According to operon concept,in the tryptophan operon the regulator gene forms

a. Inducer b. Repressor
c. Aporepressor d. General inhibitor

Ans. (c) Aporepressor

131. Similarities between RNA polymerase and DNA Polymerase activities in prokaryotes include

a. Requirement for a template
b. Requirement for a primer
c. Synthesis of the nascent chain in 5′ to 3′ direction
d. 3′ to 5′ exonuclease editing function

Ans. (c) Synthesis of the nascent chain in 5′ to 3′ direction

132. Post-transcriptional modification of prokaryotes RNA molecule includes

a. Cleavage of primary transcripts to form functional molecules of rRNA and tRNA
b. Addition of a CCA 3′terminus to all tRNA molecules
c. Methylation of bases using S-adenosylmethionine as methyl donor
d. Addition of a cap structure to the 5′ end of mRNA

Ans. (c) Methylation of bases using S-adenosylmethionine as methyl donor

133. A trans esterification reaction

a. Requires no ATP
b. Breaks one bond and forms one bond
c. Involves the nucleophilic attack of an OH group on the sugar phosphate backbone
d. All of the above

Ans. (d) All of the above

134. Polycistronic messengers RNA are common in

a. *Homo sapiens*
b. *Saccharomyces cerevisiae*
c. *E. coli*
d. *Dinosaur*

Ans. (c) *E. coli*

135. Which one of the following does not require a primer?

a. RNA dependent DNA Polymerase
b. DNA dependent RNA Polymerase
c. DNA dependent DNA Polymerase
d. Taq DNA Polymerase

Ans. (b) RNA dependent DNA Polymerase

136. The poly A end of eukaryotic mRNAs originates from

a. Addition of a pre- synthesized poly A tail to the 3′ end of the primary transcript
b. Transcription of corresponding poly T region of the respective gene
c. Sequential addition of A residues at the 3′ end of the primary transcript
d. None

Ans. (c) Sequential addition of A residues at the 3′ end of the primary transcript

137. Regulation of polygenic transcription in prokaryotes can be at the level of

a. RNA polymerase holoenzyme recruitment to DNA
b. Enhancer binding protein induced isomerisation of the binary complex
c. Repressor and antitermination of transcription
d. All of the above

Ans. (d) All of the above

138. Catabolite activator protein acts as

a. Apo repressor
b. Co- repressor
c. Apo inducer
d. Inducer

Ans. (c) Apo inducer

139. Term 'Homeobox' was used by

a. Walter Gehring
b. Dr. Hogness
c. Goldberg
d. Lewis

Ans. (a) Walter Gehring

140. Genes whose products are constantly needed for cellular activity are called

a. Regulator genes
b. Structural genes
c. House keeping genes
d. Smart genes

Ans. (c) House keeping genes

141. Bacteria utilize glucose first, even if other sugars are present, through a mechanism called

a. Operon repression
b. Enzyme repression
c. Catabolite repression
d. Glucose utilization

Ans. (c) Catabolite repression

142. If there is a deletion mutation in the "operator" for *lac* operon, expression of lac structural gene will be

a. Permanently stop
b. Constitutively expressed
c. Not expressed
d. Resistant to catabolite expression

Ans. (b) Constitutively expressed

143. 'Zinc fingers' are important in cellular function because they are

a. Catalytic site of many metabolic enzymes
b. Structural motifs in many DNA binding proteins
c. Structures with high redox potential
d. Characteristic of palindromic stretches of unique DNA sequence

Ans. (b) Structural motifs in many DNA binding proteins

144. *Lac* operon is negatively regulated by repressor encoded by *lacI* gene. A mutation in *lacI* that prevents binding of lactose will result in

a. Constitutive phenotype that will be recessive
b. Uninducible phenotype that will be dominant
c. Constitutive phenotype that will be dominant
d. Uninducible phenotype that will be recessive

Ans. (c) Constitutive phenotype that will be dominant

145. Amplification of genes involves

a. Removal of histones from DNA to allow transcription of gene
b. Multiple duplications of gene via replication
c. Multiplication of extra chromosomal elements only
d. Invertebrate genomes only

Ans. (b) Multiple duplications of gene via replication

146. Full expression of *lac* operon requires

a. Lactose and cAMP
b. Allolactose and cAMP
c. Lactose
d. Allolactose

Ans. (b) Allolactose and cAMP

147. Which one of the following partial diploids will express β-galactosidase constitutively?

a. F′ $lacO^c$ $lacZ^+$ / $lacO^+$ $lacZ^+$
b. F′ $lacO^-$ $lacZ^+$ / $lacI^+$ $lacZ^+$
c. F′ $lacO^+$ $lacZ^+$ / $lacI^-$ $lacZ^+$
d. F′ $lacO^c$ $lacZ^-$ / $lacO^+$ $lacZ^+$

Ans. (b) F′ $lacO^-$ $lacZ^+$ / $lacI^+$ $lacZ^+$

148. Synthesis of β-galactosidase will be constitutive in a strain with the genotype

a. $I^+ Z^+ Y^+$
b. $I^- Z^+ Y^+$
c. $I^+ Z^- Y^+$
d. $I^+ Z^+ Y^-$

Ans. (b) $I^- Z^+ Y^+$

149. House keeping genes are

a. Inducible genes
b. Expressed in tumour cells
c. Expressed in all cells
d. Do not express at all

Ans. (c) Expressed in all cells

150. What is the chemical basis of gene imprinting?

a. Phosphorylation of DNA
b. Methylation of DNA
c. Oxidation of DNA
d. Glycosylation of DNA

Ans. (b) Methylation of DNA

151. The leader region (trpL) of tryptophan biosynthetic operon codes for RNA that may function as the operon's

a. Corepressor
b. Holorepressor
c. Aporepressor
d. Attenuator

Ans. (d) Attenuator

152. Chaperone proteins help in

a. Protein folding and assembly
b. Protein stability
c. Both
d. None

Ans. (c) Both

153. How many energy bonds are expended in formation of a peptide bond?

a. 2
b. 4
c. 3
d. 6

Ans. (b) 4

154. 'Kozak' is associated with

a. Transcription
b. DNA replication
c. DNA repair
d. Translation

Ans. (b) DNA replication

155. GUG codes for valine in both prokaryotes and eukaryotes but when GUG is initiation codon, this codes

a. Methionine
b. Valine
c. tryptophan
d. None

Ans. (a) Methionine

156. An antibiotic which inhibits in both prokaryotes and eukaryotes is

a. Chloromycetin
b. Puromycin
c. Actinomycin-D
d. Tetracycline

Ans. (b) Puromycin

157. At initiation the two ribosomal subunits combine with mRNA and

a. Threonine charged tRNA
b. Methionine charged tRNA
c. Serine charged tRNA
d. Proline charged tRNA

Ans. (b) Methionine charged tRNA

158. Chloramphenicol inhibits

a. Cell wall synthesis in bacteria
b. Protein synthesis on 70S ribosome

c. Protein synthesis on 80S ribosome
d. DNA replication

Ans. (b) Protein synthesis on 70S ribosome

159. An antibiotic that resembles 3′ end of a charged tRNA molecule is

a. Streptomycin
b. Penicillin
c. Tetracycline
d. Puromycin

Ans. (d) Puromycin

160. Which of the following is involved in the majority of ATP dependent cytosolic degradation of proteins in eukaryotes?

a. Cathepsins
b. Calpains
c. Lysosome
d. 26S proteosome

Ans. (d) 26S proteosome

161. Peptide bond synthesis not requires an input of energy during

a. Amino acid activation
b. Formation of 70S initiation complex of prokaryotes
c. Binding of aminoacyl-tRNA to the A site on ribosome
d. Movement of peptidyl-tRNA to the P site and associated movement of mRNA

Ans. (d) Movement of peptidyl-tRNA to the P site and associated movement of mRNA

162. What is the E-site of ribosome?

a. Site where eukaryotic mRNA is processed
b. Exciting term made up by your instructor
c. Site where tRNA exits the prokaryotic ribosome
d. Site where endonuclease EcoRI restricts ribosome

Ans. (c) Site where tRNA exits the prokaryotic ribosome

163. *E. coli* release factor1 recognizes which codons?

a. UAA only
b. UGA
c. UAA and UGA
d. UAG and UAA

Ans. (d) UAG and UAA

164. All aminoglycoside antibiotics inhibits Protein synthesis by

a. Binding to small ribosomal subunit
b. Binding to large ribosomal subunit
c. Binding to both small and large ribosomal subunit
d. Inactivating eEF-2

Ans. (a) Binding to small ribosomal subunit

165. In the Protein synthesis, tRNA carrying initiating amino acid enters in which site of ribosome

a. A site
b. P site
c. Anticodon
d. Recognition site

Ans. (b) P site

166. In the case of humans lysine is an essential acid because

a. It is present in all proteins
b. It is highly nutritive
c. It is not formed in body and had to be supplied the diet
d. It is required for protein synthesis

Ans. (c) It is not formed in body and had to be supplied the diet

167. To clone a gene corresponding to a protein with partial amino acid sequence. Met-Trp-Cys Trp (no. of codons for Met = 1, Cys = 2, trp = 1), no. of oligonucleotides that need to be designed to screen cDNA library is

a. 2
b. 4
c. 5
d. 8

Ans. (a) 2

168. Three of the four eukaryotic rRNAs are synthesized from a single transcription unit consisting of the rDNA. Which one of the following does not belong to this group?

a. 5.8S
b. 5S
c. 18S
d. 28S

Ans. (b) 5S

169. Synthesis of peptide bond is catalyzed by

a. A site of ribosome
b. P site of ribosome
c. 23S rRNA
d. tRNA

Ans. (c) 23S rRNA

170. How many polypeptide chains can be formed simultaneously by a given ribosome?

a. One
b. Up to 30
c. Variable, depending on the length of mRNA
d. Variable, depending both on the length or mRNA and temperature

Ans. (a) One

171. A single nucleotide pair is inserted near the 5′ end of a protein coding DNA sequence. The most likely effect will be production of

a. A protein with a single altered amino acid
b. A protein with an almost completely altered sequence

c. A greatly truncated protein
d. No protein

Ans. (b) A protein with an almost completely altered sequence

172. A recessive mutation is one which

a. Is not expressed
b. Is expressed only when in heterozygous
c. Is expressed only when in homozygous or hemizygous
d. Is eliminated by natural selection

Ans. (c) Is expressed only when in homozygous or hemizygous

173. Thymine dimer formation during replication of DNA is caused due to

a. Gamma radiation b. UV radiation
c. X-rays d. IR radiation

Ans. (b) UV radiation

174. The fluctuation tests done by Luria and Delbruck showed that

a. Antibiotics induce the development of resistance in bacteria
b. Growth of bacteria fluctuates based on the conc. of antibiotics in the media
c. The conc. of antibiotics fluctuates in response to the no. of bacteria in a sample
d. Phage T1 not induce mutation in wild type *E. coli*

Ans. (d) Phage T1 not induce mutation in wild type *E. coli*

175. Ames test is used to determine if a chemical

a. Increases rate at which bacterial cell divides
b. Decreases no. of cells in a culture
c. Induces mutations in cell's DNA
d. Decreases ability of a cell to photosynthesize

Ans. (c) Induces mutations in cell's DNA

176. Sites where mutations occur at rates higher than normal are known as

a. Suppressor sites b. Hotspots
c. Mutator sites d. Cistrons

Ans. (c) Mutator sites

177. In bacteria, which enzyme binds single stranded DNA, denatures double stranded DNA and matches single stranded DNA with complementary denatured DNA?

a. RecA b. RecBCD
c. UvrABC d. UvrD

Ans. (a) RecA

178. High energy phosphate bond of adenosine diphosphate is used in biological systems by

a. Hydrolysis of terminal phosphate to give adenosine monophosphate
b. Coupling of hydrolysis of terminal phosphate to another reaction via common intermediates
c. Transfer of terminal phosphate to glucose or similar substrates
d. Transfer of terminal phosphate of one adenosine diphosphate to another ADP to form adenosine triphosphate

Ans. (b) Coupling of hydrolysis of terminal phosphate to another reaction via common intermediates

179. If the ratio (A+G)/ (T+C) in one strand of DNA is 0.7, what is the same ratio in the complementary strand?

a. 0.7 b. 1.43
c. 0.35 d. None

Ans. (b) 1.43

180. Rate of renaturation of DNA is proportional to the

a. Square of the conc. of single strand
b. conc. of single strand
c. Square of length of single strand
d. None

Ans. (a) Square of the conc. of single strand

181. Molecular weight of mRNA that codes for a protein of molecular weight 75000 is closest to

a. 6000 b. 60000
c. 600000 d. 600

Ans. (c) 600000

182. Mammalian kinases are able to convert which of the following nucleosides to nucleotides?

a. Adenosine b. Inosine
c. glutamine d. Guanine

Ans. (a) Adenosine

183. End product of purine catabolism in normal humans is

a. Urea b. Uric acid
c. Creatinine d. Xanthine

Ans. (b) Uric acid

184. Ring structure of glucose is due to formation of hemiacetal and ring formation between

a. C_1 and C_5 b. C_1 and C_4
c. C_1 and C_3 d. C_2 and C_4

Ans. (a) C_1 and C_5

185. The scientists involved in discovery of DNA as chemical basis of heredity were

a. Hershey and Chase
b. Griffith and Avery
c. Avery, Mac Leod and Mc Carty
d. Watson and Crick

Ans. (c) Avery, Mac Leod and Mc Carty

186. One turn of DNA possesses

a. One base pair
b. Two base pairs
c. Five base pairs
d. Ten base pairs

Ans. (d) Ten base pairs

187. Number of codons in the genetic triplet code is

a. 4
b. 16
c. 32
d. 64

Ans. (d) 64

188. Initiation codons for protein synthesis are

a. UUU and GGG
b. AAU and UAA
c. AUG and GUA
d. GUG and AUG

Ans. (d) GUG and AUG

189. Termination codons for protein synthesis are

a. AUU, AUG and GUU
b. UGA, UAA and UAG
c. UAU, UAG and UUA
d. AAA, UUU and UGA

Ans. (b) UGA, UAA and UAG

190. The two antiparallel strands of DNA are

a. Equidistant and run in $5' \rightarrow 3'$ direction
b. Equidistant and run in $5' \rightarrow 3'$ and $3' \rightarrow 5'$ directions
c. Unequal and run in opposite directions
d. Unequal and diverge from each other

Ans. (b) Equidistant and run in $5' \rightarrow 3'$ and $3' \rightarrow 5'$ directions

191. The process of multiplication of DNA from DNA is known as

a. Replication
b. Duplication
c. Transcription
d. Translation

Ans. (a) Replication

192. Formation of RNA over the template of DNA is

a. Replication
b. Translation
c. Transversion
d. Transcription

Ans. (d) Transcription

193. The area of unwinding and separation of DNA strands during replication is called

a. Origin
b. Initiation point
c. Primer
d. Replication fork

Ans. (a) Origin

194. Topoisomerase is involved in

a. Producing RNA primer
b. Joining of DNA segments
c. Producing nick in DNA
d. Separation of DNA strands

Ans. (c) Producing nick in DNA

195. In DNA replication, the primer is

a. Small deoxyribonucleotide polymer
b. Small ribonucleotide polymer
c. Helix destabilising protein
d. Enzyme taking part in joining nucleotides to their complementary template bases

Ans. (b) Small ribonucleotide polymer

196. DNA strand is synthesized in the direction

a. $5' \rightarrow 3'$
b. $3' \rightarrow 5'$
c. $1' \rightarrow 4'$
d. $6' \rightarrow 1'$

Ans. (a) $5' \rightarrow 3'$

197. Okazaki segments are

a. Small segments of RNA
b. Small peptides
c. Small DNA segments
d. Small DNA segments formed over DNA template running in $3' \rightarrow 5'$ direction

Ans. (d) Small DNA segments formed over DNA template running in $3' \rightarrow 5'$ direction

198. Okazaki fragments are joined by

a. DNA polymerase III
b. DNA ligase
c. DNA polymerase II
d. DNA polymerase I

Ans. (b) DNA ligase

199. Okazaki fragments give rise to

a. Master strand
b. Sense strand
c. Lagging strand
d. Leading strand

Ans. (c) Lagging strand

200. Leading strand during DNA replication is formed

a. Continuously
b. In short segments
c. First
d. Ahead of replication

Ans. (a) Continuously

201. In proof reading during DNA replication

a. Wrong nucleotides are inserted
b. Wrong nucleotides are taken out
c. Wrong nucleotides are removes and correct ones inserted
d. Mutations are prevented

Ans. (c) Wrong nucleotides are removes and correct ones inserted

202. Nonsense codons take part in

a. Helping protein synthesis
b. Termination gene message for polypeptide synthesis
c. Initiating gene message for polypeptide synthesis
d. Synthesis of nonprotein amino acids

Ans. (b) Termination gene message for polypeptide synthesis

203. The two strand of DNA are

a. Similar and parallel
b. Similar but antiparallel
c. Complementary and antiparallel
d. Complementary and parallel

Ans. (c) Complementary and antiparallel

204. Transcription involves

a. Protein synthesis over ribosomes
b. Removal of worn out organelles by lysosomes
c. Synthesis of RNA over DNA
d. Synthesis of DNA over DNA

Ans. (c) Synthesis of RNA over DNA

205. DNA acts as a template for synthesis of

a. DNA b. RNA
c. Both a and b d. Protein

Ans. (c) Both a and b

206. Code transfer for synthesis of polypeptide involves

a. DNA, tRNA, rRNA and mRNA
b. mRNA, tRNA, rRNA and DNA
c. tRNA, DNA, mRNA and rRNA
d. DNA, mRNA, tRNA and amino acids

Ans. (d) DNA, mRNA, tRNA and amino acids

207. In polypeptide synthesis, amino acids are brought over ribosome-mRNA complex by

a. rRNA b. tRNA
c. DNA d. Nucleotides

Ans. (b) tRNA

208. tRNA attaches amino acid at its

a. 3′-end b. 5′-end
c. Anticodon d. Loop

Ans. (a) 3′-end

209. Blender experiment to prove DNA as genetic material was performed by

a. Hershey and Chase b. Messelson and Stahl
c. Watson and Crick d. Rosalind and Franklin

Ans. (a) Hershey and Chase

210. The strain of *Neurospora*, which grows on minimal medium is called

a. Autotroph b. Prototroph
c. Auxotroph d. Heterotroph

Ans. (b) Prototroph

211. For their contribution in biochemical genetics the scientists who received Nobel prize in 1958 were

a. Beadle and Tatum b. Beadle and Lederberg
c. Lederberg and Zinder d. Zinder and Morgan

Ans. (a) Beadle and Tatum

212. Genetic information is carried out by long chain molecule made up of

a. Amino acids b. Enzymes
c. Nucleotides d. Histone proteins

Ans. (c) Nucleotides

213. One gene one enzyme hypothesis was proposed by

a. Khorana and Nirenberg
b. Beadle and Tatum
c. Bateson and Punnet
d. Bridges

Ans. (b) Beadle and Tatum

214. A mutant strain of *Neurospora* which fails to grow on a minimal medium unless supplemented with a nutrient is called

a. Auxotroph b. Autotroph
c. Heterotroph d. Prototroph

Ans. (a) Auxotroph

215. The terms triplet code and genetic code were coined by

a. Watson and Crick b. Nirenberg
c. Gamow d. Conrat

Ans. (c) Gamow

216. Beadle and Tatum produced mutant strain of *Neurospora* by

a. X-rays b. UV rays
c. Beta rays d. Gamma rays

Ans. (a) X-rays

217. The technique of detecting and screening the nutritional mutants in *Neurospora crassa* was developed by

a. Mendel b. Morgan
c. Bateson and Punnet d. Beadle and Tatum

Ans. (d) Beadle and Tatum

218. A gene that takes part in the synthesis of polypeptide is

a. Structural gene
b. Regulator gene
c. Operator gene
d. Promoter gene

Ans. (a) Structural gene

219. Components of an operon are

a. Operator, promoter and regulator genes
b. Regulator, promoter, operator and structural genes
c. Operator, regulator and structural genes
d. Regulator, promoter and structural genes

Ans. (b) Regulator, promoter, operator and structural genes

220. Regulated unit of genetic material is termed as

a. Operon
b. Regulator gene
c. Operator gene
d. Okazaki segment

Ans. (a) Operon

221. A codon specifies the same amino acid in *Brassica* and *Homo* because codons are

a. Nonoverlapping
b. Commaless
c. Universal
d. Nonambiguous

Ans. (c) Universal

222. In eukaryotes mRNA is synthesized with the aid of

a. RNA polymerase III
b. RNA polymerase II
c. RNA polymerase I
d. Reverse transcriptase

Ans. (b) RNA polymerase II

223. A bacterium grown over medium having radioactive ^{35}S incorporates radioactivity in

a. Carbohydrates
b. Proteins
c. DNA
d. RNA

Ans. (b) Proteins

224. GUG specifies amino acid valine. However, when functioning as initiation codon it specifies

a. Methionine
b. Valine
c. Lysine
d. Isoleucine

Ans. (a) Methionine

225. New strand formation on a DNA template can be initiated only by

a. DNA polymerase I
b. DNA polymerase III
c. RNA primer
d. DNA primer

Ans. (c) RNA primer

226. What is true about *ori*

a. One in all organisms
b. Several in all organisms
c. One in eukaryotes and several in prokaryotes
d. One in prokaryotes and several in eukaryotes

Ans. (d) One in prokaryotes and several in eukaryotes

227. DNA has alternate grooves

a. One major and one minor
b. Two major and one minor
c. One major and two minor
d. Two major and two minor

Ans. (a) One major and one minor

228. Number of DNA coils of a nucleosome is

a. 2 ¾
b. 2 ¼
c. 1 ¾
d. 1 ¼

Ans. (c) 1 ¾

229. Energy for activation of amino acids during protein synthesis comes from

a. ATP
b. GTP
c. CTP
d. UTP

Ans. (a) ATP

230. AUG initiation codon occurs over

a. 3′ end of mRNA
b. 5′ end of mRNA
c. Short arm of tRNA
d. Long arm of tRNA

Ans. (b) 5′ end of mRNA

231. Central dogma is not directly connected with synthesis of

a. mRNA
b. Polypeptide
c. Both a and b
d. Amino acids

Ans. (d) Amino acids

232. In *Streptococcus pneumoniae*

a. Virulent form is smooth
b. Virulent form is rough
c. Nonvirulent form is capsulated
d. All forms are rough

Ans. (a) Virulent form is smooth

233. Codon is triplet of

a. Template strand of DNA
b. Non-template strand of DNA
c. mRNA
d. tRNA

Ans. (b) Non-template strand of DNA

234. Enzyme required during DNA replication is

a. DNA polymerase
b. DNA ligase
c. Both a and b
d. Sigma factor

Ans. (c) Both a and b

235. A codon is read in

a. 3 → 5′ direction
b. 5 → 3′ direction
c. 3 → 6′ direction
d. 6 → 3′ direction

Ans. (b) 5 → 3′ direction

236. All nonsense codons have first base

a. Adenine
b. Cytosine
c. Uracil
d. Guanine

Ans. (c) Uracil

237. First triplet codon to be deciphered was

a. UUU
b. AAA
c. CTA
d. CCC

Ans. (a) UUU

238. Triplet pair deciphered by Khorana was

a. Serine and Threonine
b. Threonine and Histidine
c. Cysteine and Valine
d. Phenylalanine and Isoleucine

Ans. (c) Cysteine and Valine

239. The codon for anticodon 3′ UUUA - 5′ is

a. 5′ AAAU - 3′
b. 5′ UAAA - 3′
c. 3′ UAAD - 5′
d. 3′ AAAU - 5′

Ans. (a) 5′ AAAU - 3′

240. Central dogma of modern genetics is

a. RNA → RNA → DNA → Protein
b. DNA → DNA → RNA → Protein
c. DNA → RNA → Protein
d. RNA → DNA → RNA → Protein

Ans. (b) DNA → DNA → RNA → Protein

241. What is true of Watson and Crick's model of DNA. It is duplex with

a. 10 base pairs and 34 Å distance for every turn
b. 10 base pairs and 3.4 Å distance for each turn of spiral
c. 20 base pairs and 34 Å for each turn
d. None of the above

Ans. (a) 10 base pairs and 34 Å distance for every turn

242. Protein cover of virus is

a. Capsid
b. Virion
c. Viroid
d. Mucopeptide

Ans. (a) Capsid

243. A gene is

a. Three letter code in DNA
b. Equivalent to chromosome
c. Part of chromosome producing a set of enzymes (protein)
d. Part of chromosome producing only one enzymes (protein)

Ans. (d) Part of chromosome producing only one enzymes (protein)

244. tRNA recognizes ribosome by

a. TΨC loop
b. DHU loop
c. Anticodon
d. AA-site

Ans. (a) TΨC loop

245. tRNA recognizes amino acyl synthetase enzyme by

a. Anticodon
b. DHU loop
c. TΨC loop
d. AA-site

Ans. (b) DHU loop

246. Amino acid binding site of tRNA is

a. 5′ end
b. Anticodon loop
c. DHU loop
d. –CCA 3′-end

Ans. (d) –CCA 3′-end

247. Type of coiling in DNA is

a. Right handed
b. Left handed
c. Zigzag
d. Opposite

Ans. (a) Right handed

248. Hereditary characteristics are passed on from parent to the offspring mainly through

a. Enzymes
b. Genes
c. Mutants
d. Centrosomes

Ans. (b) Genes

249. The pneumococcus experiment proves that

a. RNA sometimes controls the production of DNA and proteins
b. Bacteria under go binary fission
c. DNA is the genetic material
d. Bacteria do not reproduce sexually

Ans. (c) DNA is the genetic material

250. The strongest evidence that DNA is the genetic material comes from

a. The fact that chromosomes are made of DNA
b. Studies on the transformation of bacterial cells
c. The knowledge that DNA is present in the nucleus
d. The findings that DNA is present in the cytoplasm

Ans. (b) Studies on the transformation of bacterial cells

251. When DNA is transformed from a culture of capsulated bacteria to a culture of non-capsulated bacteria converting the latter into the former type, the process is known as

a. Transcription b. Translocation
c. Transduction d. Transformation

Ans. (d) Transformation

252. A gene is made up of

a. DNA b. RNA
c. Either DNA or RNA d. Amino acids

Ans. (c) Either DNA or RNA

253. Genes are chemically

a. Polynucleotides b. Histones
c. Iipoproteins d. Hydrocarbons

Ans. (a) Polynucleotides

254. Which is entirely responsible for the transfer of hereditary traits

a. DNA b. RNA
c. Chloroplast d. Aestivation

Ans. (a) DNA

255. A link between generations is provided precisely by

a. Chromosomes b. Nucleic acids
c. Nucleus d. Cytoplasm

Ans. (b) Nucleic acids

256. The first undoubted evidence about DNA being the genetic material came from

a. Transformation of rough-coated strain of *Diplococcus pneumonia* into smooth coated strain
b. The establishment of DNA as the chief chemical constituent of chromosomes
c. The establishment of DNA as a self-replicating substance
d. Transduction of bacteria by action of bacteriophage

Ans. (a) Transformation of rough-coated strain of *Diplococcus pneumonia* into smooth coated strain

257. Duplication of DNA is called

a. Replication b. Transduction
c. Transcription d. Translation

Ans. (a) Replication

258. The usual method of DNA replication is

a. Conservative b. Dispersive
c. Non-conservative d. Semi-conservative

Ans. (d) Semi-conservative

259. A DNA molecule in which both strands have radioactive thymidine is allowed to duplicate in an environment containing non-radioactive thymidine. What will be the exact number of DNA molecules that contain some radioactive thymidine after 3 duplications?

a. One b. Two
c. Four d. Eight

Ans. (b) Two

260. A bacterium containing 100% N^{15} nitrogen bases is allowed to replicate in a medium containing N^{14} bases. After one round of duplication, the result would be

a. All individuals would be identical to parents
b. All individuals would be radioactive but the percentage of radioactivity in DNA would be 50%
c. Only 50% individuals would be radioactive
d. All individuals would be similar to parents but different among themselves

Ans. (b) All individuals would be similar to parents but different among themselves

261. A bacterium *E. coli* with completely radioactive DNA was allowed to replicate in a non-radioactive medium for two generations. What % of the bacteria should contain radioactive DNA

a. 100% b. 50%
c. 25% d. 12.5%

Ans. (b) 50%

262. Semi-conservative mode of replication of chromosome was demonstrated by (or experimental demonstration of the semi-conservative model of DNA replication was given by)

a. Messelson and Stahl
b. Watson and Crick
c. Stahl and Urey
d. Bawden and Ririe

Ans. (a) Messelson and Stahl

263. If one wants to obtain precise information regarding the exact time and location of synthesis of new DNA, which of the following methods would be most effective for such a study

a. Electron microscopy
b. Carbon dating
c. Isolating and extracting DNA after regular intervals and estimating DNA amount
d. Using radioactive precursors of nucleic acids

Ans. (d) Using radioactive precursors of nucleic acids

264. The experimental system used in studies of the discovery of replication of DNA has been (or DNA replication was conducted in)

a. *Drosophila melanogaster*
b. *Pneumococcus*
c. *Escherichia coli*
d. None of these

Ans. (c) *Escherichia coli*

265. Experiments using ^{15}N (heavy nitrogen) to confirm the semi-conservative replication of DNA were carried out by

a. Messelson and Stahl
b. Hershey and Chase
c. Beadle and Tatum
d. Watson and Crick

Ans. (a) Messelson and Stahl

266. A DNA molecule of *Escherichia coli* is heavy (full labeled with N^{15}) and is allowed to duplicate in a medium containing N^{14}. After one generation, the two daughter strands molecules

a. Have same density but do not resemble their parent DNA
b. Have different densities but resemble their parent DNA
c. Have different densities and also do not resemble the parent DNA
d. Both the strands differ in density, but resemble their parent DNA

Ans. (a) Have same density but do not resemble their parent DNA

267. Replication of DNA takes place with the help of

a. DNA polymerase
b. Lyase
c. RNAase
d. DNAase

Ans. (a) DNA polymerase

268. The following is needed during DNA replication

a. DNA polymerase and DNA ligase
b. RNA polymerase and translocase
c. DNA polymerase only
d. DNA ligase only

Ans. (a) DNA polymerase and DNA ligase

269. DNA polymerase is needed for

a. Replication of DNA
b. Synthesis of DNA
c. Elongation of DNA
d. All the above

Ans. (a) Replication of DNA

270. DNA polymerase is required for the synthesis of

a. DNA from DNA
b. DNA from RNA
c. DNA from nucleotides
d. DNA from nucleosides

Ans. (c) DNA from nucleotides

271. The enzyme DNA polymerase can add nucleotide to the

a. 3′ carbon position
b. 5′ carbon position
c. Both 3′ and 5′ carbon positions
d. 4′ carbon position

Ans. (a) 3′ carbon position

272. The enzyme(s) responsible for unwinding of DNA helix during replication is/are

a. Helicases
b. Topisomerases
c. DNA polymerase
d. Primase

Ans. (a) Helicases

273. The enzyme topoisomerase is helpful in

a. Unwinding of DNA strand
b. Breaking of DNA strand
c. Proof reading of replicating DNA
d. Synthesis of primer

Ans. (a) Unwinding of DNA strand

274. The expected frequency of introduction of a wrong base during DNA replication is

a. 1:100
b. 1:1000
c. 1:1 million
d. 1:1 billion

Ans. (d) 1:1 billion

275. Ligase enzyme is used for

a. Denaturation of DNA
b. Splitting of DNA into small bits
c. Joining bits of DNA
d. Digestion of lipids

Ans. (c) Joining bits of DNA

276. The bits of DNA segments formed are joined with each other by an enzyme

a. Polymerase
b. Ligase
c. Lipase
d. Kinase

Ans. (b) Ligase

277. Okazaki segments are

a. DNA segments capable of free replication
b. DNA segments formed during replication
c. Nucleotide segments formed during transcription
d. Segments of genes which undergo mutation and recombination

Ans. (b) DNA segments formed during replication

278. DNA polymerase enzyme was discovered by

a. Konberg b. Nirenberg
c. Watson d. Crick

Ans. (a) Konberg

279. Synthesis of DNA takes place by

a. Transduction b. Transcription
c. Transformation d. Replication

Ans. (d) Replication

280. Replication of DNA in eukaryotes commences from

a. One end of the chromatid extending to the other end
b. Both ends of the chromatid simultaneously
c. The centromere to either of the ends of chromatids
d. Several sites along the DNA of the chromatid simultaneously

Ans. (d) Several sites along the DNA of the chromatid simultaneously

281. The modern concept of gene is that it is

a. A segment of DNA capable of crossing over
b. A functional unit of DNA
c. A segment of DNA
d. A segment of chromosome

Ans. (b) A functional unit of DNA

282. Eukaryotes differ from prokaryotes in the mechanism of DNA replication due to

a. Different enzymes (instead of same enzyme) for synthesis of lagging and leading strands
b. Discontinuous rather than semi-discontinuous replication
c. Use of DNA primers rather than RNA primers
d. Unidirectional rather than bidirectional replication

Ans. (a) Different enzymes (instead of same enzyme) for synthesis of lagging and leading strands

283. These are special proteins which help to open up DNA double helix in front of the replication fork. These proteins are

a. DNA gyrase b. DNA polymerase I
c. DNa ligase d. DNA topoisomerase

Ans. (a) DNA gyrase

284. The nuclease enzyme which begins its attack from a free end of a polynucleotide is

a. Exonuclease b. Kinase
c. Polymerase d. Endonuclease

Ans. (a) Exonuclease

285. One gene-one polypeptide hypothesis was proposed by

a. Linus Pauling b. V. Ingram
c. Yanofsky d. Brenner

Ans. (c) Yanofsky

286. A functional unit of gene which specifies the synthesis of one polypeptide is known as

a. Recon b. Clone
c. Codon d. Cistron

Ans. (d) Cistron

287. The smallest gene affected by mutation is

a. Exon b. Recon
c. Cistron d. Muton

Ans. (d) Muton

288. The smallest unit of DNA which is capable of undergoing crossing over and recombination is called

a. Recon b. Muton
c. Cistron d. Intron

Ans. (a) Recon

289. The terms cistron, recon and muton were proposed by

a. W. Ingram b. Bateson
c. J. Lederberg d. S. Benzer

Ans. (d) S. Benzer

290. Gene is

a. A segment of DNA
b. A segment of DNA and histone
c. A segment of DNA, RNA and Histone
d. All of the above

Ans. (a) A segment of DNA

291. The idea that genes control the production of enzyme was given by

a. EL Tatum
b. TH Morgan
c. AE Garrod
d. RS Kornberg

Ans. (c) AE Garrod

292. One gene one enzyme theory (hypothesis) was proposed by

a. Beadle and Tatum
b. Avery and McCarty
c. Jacob and Monad
d. Luria and Delburck

Ans. (a) Beadle and Tatum

293. Co-linearity between genes and polypeptides was established by

a. Linus Pauling
b. V. Ingram
c. Yanofsky
d. Brenner

Ans. (c) Yanofsky

294. Garrod's views on the relationship between genes and enzymes can be best stated as

a. One mutant gene-one metabolic block concept
b. One gene-one enzyme hypothesis
c. One gene-one polypeptide hypothesis
d. One cistron-one polypeptide hypothesis

Ans. (a) One mutant gene-one metabolic block concept

295. Gene controls

a. Protein synthesis but not heredity
b. Protein synthesis and heredity
c. Heredity but not protein synthesis
d. Biochemical reaction of some enzymes

Ans. (b) Protein synthesis and heredity

296. Beadle and Tatum worked on genetics of *Neurospora* which resulted in the development of a new science called

a. Genetic engineering
b. Biochemical genetics
c. Biotechnology
d. Dendrochronology

Ans. (b) Biochemical genetics

297. The chief advantage of the linear arrangement of the ascospores in *Neurospora* is that, in genetic studies, it permits

a. Easy inference of the orientation of chromatids during meiosis
b. Ready conservation of mutant phenotype
c. Accurate counting of spores
d. Easy collection of ascospores

Ans. (b) Ready conservation of mutant phenotype

298. In *Neurospora*, 8 ascospores are formed. These are 2a, 4A, 2a…it shows that

a. First generation division
b. Second generation division
c. No crossing over
d. Some meiosis occurs

Ans. (b) Second generation division

299. RNA and DNA were artificially synthesized *in vitro* by

a. Ochoa and Nirenberg
b. Ochoa and Kornberg
c. Kornberg and Nirenberg
d. Nirenberg and Khorana

Ans. (b) Ochoa and Kornberg

300. Who suggested that an intermediate RNA molecule would be needed to read the codons on messenger RNA?

a. M. Nirenberg
b. H.G. Khorana
c. F. Crick
d. Kornberg

Ans. (c) F. Crick

301. The process of RNA synthesis on the DNA template is

a. Transduction
b. Translation
c. Transcription
d. Transformation

Ans. (c) Transcription

302. Transcription is synthesis of

a. Protein
b. mRNA
c. tRNA
d. rRNA

Ans. (b) mRNA

303. Transcription is the process by which

a. RNA molecule is synthesized on a DNA strand (or template)
b. Two daughter strands of DNA are synthesized
c. Amino acids are joined to form polypeptides
d. RNA molecule is synthesized within a ribosome

Ans. (a) RNA molecule is synthesized on a DNA strand (or template)

304. Genetic code determines

a. Structural pattern of an organism
b. Sequence of amino acid in protein chain
c. Variation in offsprings
d. Constancy of morphological trait

Ans. (b) Sequence of amino acid in protein chain

305. Genetic code was discovered by

a. Nirenberg and Mathei
b. Novick and Szilard
c. Kornberg
d. Willkins

Ans. (a) Nirenberg and Mathei

306. Site of protein synthesis

a. Lysosome
b. Peroxisome
c. Ribosome
d. Splisosome

Ans. (c) Ribosome

307. Dr. Hargobind Khorana has been awarded Noble Prize for research on

a. Oral contraceptives b. Hormones
c. Genetic code d. Immunology

Ans. (c) Genetic code

308. There are 64 codons in genetic code dictionary because

a. There are 64 type of tRNAs found in the cell
b. There are 44 meaningless and 20 codons for amino acids
c. There are 64 amino acids to be coded
d. Genetic code is triplet

Ans. (d) Genetic code is triplet

309. Genetic code was deciphered through chemical synthesis of trinucleotides by

a. Watson and Crick b. Beadle and Tatum
c. Briggs and King d. M.W. Nirenberg

Ans. (d) M.W. Nirenberg

310. Nirenberg synthesized a mRNA containing 34 poly-adenine (A-A-A-A-A-A……) and found a polypeptide formed of 11 polylysine. It proved that the genetic code for lysine is

a. Lone adenine b. A-A doublet
c. A-A-A triplet d. Many adenines

Ans. (c) A-A-A triplet

311. Khorana and his colleagues synthesized an RNA molecule with ripening sequence of UG N-bases (UGUGUGUGUGUG). It produced a tetrapeptide with altering sequence of cystien and valine. It proves that codon for cysteine and valine is

a. UGG and GUU b. UUG and GGU
c. UGU and GUG d. GUG and UGU

Ans. (c) UGU and GUG

312. Dr. H.G. Khorana deciphered first the triplet codon of

a. Serine and isoleucine
b. Phenylalanine and methionine
c. Threonine and histidine
d. Tyrosine and tryptophan

Ans. (a) Serine and isoleucine

313. 5′-end of the tRNA always ends in the base

a. Adenine b. Guanine
c. Cytosine d. Thymine

Ans. (b) Guanine

314. UGA in the yeast mitochondria codes for

a. Stop signal b. Tryptophan
c. Glutamine d. Aspartic acid

Ans. (d) Aspartic acid

315. The amount of which of these is least in a cell

a. mRNA
b. rRNA
c. tRNA
d. Nothing can be said definitely

Ans. (a) mRNA

316. The genetic code is

a. Universal
b. Nearly universal
c. Similar in the members of a genus
d. Different for every species

Ans. (b) Nearly universal

317. The minimum length of cistron in base pair which synthesizes a polypeptide of 50 amino acids is

a. 50 bp b. 100 bp
c. 150 bp d. 200 bp

Ans. (c) 150 bp

318. Considering that we have four nucleotides A, G, C, T, the number of base substitutions that can occur in the amino acid codons are

a. 549 b. 535
c. 261 d. 264

Ans. (a) 549

319. In the DNA codons are ATG ATG ATG and a cytosine base is inserted at the beginning, which of the following will result

a. A non-sense mutation b. CA TGA TGA TG
c. CAT GAT GAT G d. C ATG ATG ATG

Ans. (c) CAT GAT GAT G

320. Genetic code consists of

a. Adenine and guanine b. Guanine and cytosine
c. Cytosine and uracil d. All

Ans. (d) All

321. A single anticodon can recognize more than one codon of mRNA. This phenomenon is termed as

a. Richmond and lang effect
b. Gene flow hypothesis
c. Wobble hypothesis
d. Template hypothesis

Ans. (c) Wobble hypothesis

322. What becomes established from the Wobble hypothesis?

a. Process of peptide chain elongation
b. Economy of the number of tRNA molecules
c. Process of peptide chain initiation
d. Process of chain termination

Ans. (b) Economy of the number of tRNA molecules

323. In a codon, wobbling is generally restricted to

a. First N base
b. Second N base
c. Third N base
d. Aromatic amino acids

Ans. (c) Third N base

324. DNA is the major source of genetic information which is transmitted by transcription into RNA molecules. These RNA molecules are responsible to get this genetic information translated into proteins and thus the central dogma of molecular biology is

a. RNA → DNA → Proteins
b. DNA → RNA → Proteins
c. RNA → Proteins
d. RNA → Proteins → DNA

Ans. (b) DNA → RNA → Proteins

325. Which of the following is called amber?

a. AUG
b. UAA
c. UAG
d. UGA

Ans. (c) UAG

326. Transcription is

a. Assembly of amino acids by mRNA in the form of polypeptides
b. Recognition of amino acids by RNA synthesis
c. Transfer of genetic information from DNA to mRNA
d. Recognition of base sequence on mRNA

Ans. (c) Transfer of genetic information from DNA to mRNA

327. The genetic information if carried by long chain molecules of

a. Enzymes
b. Amino acids
c. Nucleotides
d. Chromosomes

Ans. (c) Nucleotides

328. tRNA is also known is

a. Microsomal RNA
b. Messenger RNA
c. Soluble RNA
d. Ribosomal RNA

Ans. (c) Soluble RNA

329. In order to enable a chemical to serve as a genetic code, it is essential that the chemical should be

a. Able to duplicate itself
b. Able to form itself into long spiral molecules
c. A compound of pyrimidines and purines
d. Easily changed

Ans. (a) Able to duplicate itself

330. *E. coli* RNA polymerase consists of different polypeptide chains which are

a. Two in number
b. Three in number
c. Four in number
d. Five in number

Ans. (d) Five in number

331. The core enzyme constituting the *E. coli* RNA polymerase consists of following subunits

a. $\beta, \beta', \sigma, \alpha$
b. $\beta, \beta' \alpha, \omega$
c. $\beta, \beta', \sigma, \omega$
d. $\beta, \sigma, \alpha, \omega$

Ans. (b) $\beta, \beta', \alpha, \omega$

332. How many different types of RNA polymerases catalyse the synthesis of RNA in eukaryotes?

a. Two
b. Three
c. Four
d. Five

Ans. (b) Three

333. Formation of RNA from DNA is known as

a. Translation
b. Translocation
c. Transformation
d. Transcription

Ans. (d) Transcription

334. The process by which DNA of the nucleus passes genetic information to mRNA is called

a. Transcription
b. Transportation
c. Translocation
d. Translation

Ans. (a) Transcription

335. Transcription is

a. Synthesis of DNA on RNA
b. Synthesis of RNA on DNA
c. Production of proteins on RNA
d. Replication of DNA

Ans. (b) Synthesis of RNA on DNA

336. Enzyme necessary for transcription is (or transcription of DNA is aided by)

a. DNA polymerase
b. RNA polymerase
c. Endonuclease
d. RNAase

Ans. (b) RNA polymerase

337. A DNA strand is directly involved in the synthesis of all the following *except*

a. tRNA molecule
b. mRNA molecule
c. Another DNA strand
d. Protein synthesis

Ans. (d) Protein synthesis

338. The mRNA is formed

a. In the nucleus
b. By free ribosomes
c. From the ribosomes on endoplasmic reticulum
d. From DNA in nucleus

Ans. (d) From DNA in nucleus

339. In which of the following places, messenger RNA is found in a living cell?

a. Inside the endoplasmic reticulum
b. Inside the mitochondria
c. Inside the nucleus but outside the nucleolus
d. Inside the nucleolus

Ans. (c) Inside the nucleus but outside the nucleolus

340. Which site of a tRNA molecule hydrogen bonds to a mRNA molecule?

a. Anticodon
b. Codon
c. 5′-end of the tRNA molecule
d. 3′-end of a tRNA molecule

Ans. (d) Anticodon

341. The formation of polyribosomes from ribosomes is done in the presence of

a. Na^+ ions
b. K^+ ions
c. Ca^{++} ions
d. Mg^{++} ions

Ans. (d) Mg^{++} ions

342. In protein synthesis, the codon used as a start signal is

a. AUG
b. UGA
c. GUA
d. UAG, UAA

Ans. (a) AUG

343. If the DNA strand has the nitrogenous base sequence ATT GCC, the mRNA will have

a. ATT GCA
b. ATC GCC
c. UGG ACC
d. UAA CGG

Ans. (d) UAA CGG

344. If the sequence of bases in DNA is ATTCGATG, then the sequence of bases in its transcript will be

a. GUAGCUUA
b. UAAGCUAC
c. CAUCGAAU
d. AUUCGAUG

Ans. (b) UAAGCUAC

345. From a DNA template with the sequence CTGATAGC, the mRNA sequence formed would be

a. GUCTUTCG
b. GACUAUCG
c. UACTATCU
d. GAUTATUG

Ans. (b) GACUAUCG

346. The function of a non-sense codon is

a. To release polypeptide chain from tRNA
b. To form an unspecified amino acid
c. To terminate the message of gene controlled protein synthesis
d. To convert a sense DNA into non-sense DNA

Ans. (c) To terminate the message of gene controlled protein synthesis

347. Termination of chain growth in protein synthesis is brought about by

a. UUG, UGC, UCA
b. UCG, GCG, ACC
c. UAA, UAG, UGA
d. UUG, UAG, UCG

Ans. (c) UAA, UAG, UGA

348. Each codon present on mRNA and anticodon present on tRNA is composed of

a. One N base only
b. A set of two N base
c. A set of three N base
d. A set of three out of U, C, A, G

Ans. (d) A set of three out of U, C, A, G

349. The process by which proteins are synthesized in a cell is called

a. Transcription
b. Translation
c. Translocation
d. Transduction

Ans. (b) Translation

350. During protein synthesis, amino acids recognize and get attached to tRNA with the help of

a. Ribosomes; Sigma and Rho factors
b. mRNA
c. Amino acyl tRNA synthetase
d. tRNA

Ans. (c) Amino acyl tRNA synthetase

351. Khorana synthesized a biologically functional tyrosine suppressor tRNA of *E. coli* in 1979 it contained

a. 77 nucleotide pairs b. 207 nucleotide pairs
c. 312 nucleotide pairs d. 333 nucleotide pairs

Ans. (b) 207 nucleotide pairs

352. An antibiotic which inhibits translation in eukaryotes is

a. Chloromycetin b. Penicillin
c. Puromycin d. Tetracycline

Ans. (c) Puromycin

353. Initiation of polypeptide chain in protein synthesis is induced by

a. Methionine b. Glycine
c. Leucine d. Lysine

Ans. (a) Methionine

354. Who among the following established that RNA is the genetic material?

a. Lederberg b. Griffith
c. Nirenberg and Holley d. Frankel Conrat

Ans. (d) Frankel Conrat

355. Which one of the following chemical characteristics is not common to all living beings?

a. Similar triplet codes for amino acids
b. Energy is store by high energy-rich phosphate bonds
c. Types of protein present in the body
d. Ribosomes act as sites for protein synthesis

Ans. (c) Types of protein present in the body

356. The functional unit in the protein synthesis is

a. Peroxisome b. Dictyosome
c. Lysosome d. Polysome

Ans. (d) Polysome

357. In protein synthesis, polymerization of amino acids involves three steps. Which one of the following is not involved in protein synthesis?

a. Elongation b. Transcription
c. Termination d. Initiation

Ans. (b) Transcription

358. Reverse transcriptase is

a. RNA dependent RNA polymerase
b. DNA dependent rRNA polymerase
c. DNA dependent DNA polymerase
d. DNA dependent RNA polymerase

Ans. (d) DNA dependent RNA polymerase

359. Genes which are inactive for long periods, have the tendency to be bound to

a. Each other b. Methyl groups
c. Actin and myosin d. Nucleolus

Ans. (b) Methyl groups

360. The percentage of DNA in a eukaryotic cell expressed at a given time is about

a. 1% b. 20%
c. 50% d. 80%

Ans. (a) 1%

361. The scientist who first synthesized DNA *in vitro* was

a. A. Kornberg b. A. Garrod
c. J.D. Watson d. H.G. Khorana

Ans. (a) A. Kornberg

362. Artificial synthesis of DNA was done by

a. Nirenberg b. Kornberg
c. Khorana d. Watson and Crick

Ans. (b) Kornberg

363. Nobel prize to A. Kornberg and S. Ochoa was given for

a. Artificial synthesis of DNA and RNA
b. Theory of natural selection
c. One gene one enzyme theory
d. Mutation theory

Ans. (a) Artificial synthesis of DNA and RNA

364. In 1980, F. Sanger was awarded Nobel prize second time to be shared by Gilbert and Moseum for their work on

a. Genetic mapping of chromosomes
b. Determining amino acid sequence of insulin
c. Determining the base sequences of DNA of a virus
d. Determining the structure of DNA

Ans. (c) Determining the base sequences of DNA of a virus

365. Operon model for enzyme activity (or the concept of operon) was proposed by

a. Jacob b. Monod
c. Boveri d. Jacob and Monod

Ans. (d) Jacob and Monod

366. The *lac* operon in an example of

a. Arabonise operon b. Inducible operon
c. Repressible operon d. Overlapping gene

Ans. (b) Inducible operon

367. In *E. coli*, "*Lac*" operon is induced by

a. β-galactosidase
b. Lactose
c. 'I' gene
d. Promoter gene

Ans. (b) Lactose

368. Wild type *E. coli* cells are growing in normal medium with glucose. They are transferred to a medium containing lactose only as the sugar. Which one of the following changes take place?

a. The lac operon is repressed
b. All operons are induced
c. *E. coli* cells stop dividing
d. The lac operon is induced

Ans. (d) The lac operon is induced

369. In an *E. coli* cell, according to the operon theory an operator gene combines with

a. Inducer gene to "switch on" structural gene transcription
b. Regulator gene "switch off" structural gene transcription
c. Regulator protein to "switch off" structural gene transcription
d. Regulator protein to "switch on" structural gene transcription

Ans. (c) Regulator protein to "switch off" structural gene transcription

370. According to operon concept, the regulatory gene regulates biochemical reaction in a cell by

a. Inhibiting transcription
b. Inactivating enzymes
c. Inactivating substrate
d. Inhibiting migration of mRNA

Ans. (a) Inhibiting transcription

371. Rapid transcription of *lac* operon in *E. coli* requires

a. Presence of lactose
b. Presence of glucose
c. Presence of glucose but absence of lactose
d. Presence of lactose but absence of glucose

Ans. (d) Presence of lactose but absence of glucose

372. A gene which synthesizes a repressor protein is

a. Regulator gene
b. Promoter gene
c. Operator gene
d. Structural gene

Ans. (a) Regulator gene

373. In an operon, the RNA polymerase binds to

a. Regulator
b. Promoter gene
c. Operator gene
d. Constitutive gene

Ans. (b) Promoter gene

374. Lac operon is related to

a. Synthesis of enzyme of lactose anabolism
b. Synthesis of enzyme of lactose catabolism
c. Synthesis of lac by lac insect
d. Degradation of lac in the body of lac insect

Ans. (b) Synthesis of enzyme of lactose catabolism

375. The genes are responsible for growth and differentiation in an organism through regulation of

a. Translocation
b. Transformation
c. Transduction and translation
d. Translation and transcription

Ans. (d) Translation and transcription

376. The lac operon requires a 'helper' protein which, by binding to the promoter and by facilitating the attachment of RNA polymerase, accelerates the rate of transcription. The protein is

a. Amino acid activating enzyme
b. Essential metabolite
c. Inactive repression protein
d. Catabolite activator protein

Ans. (d) Catabolite activator protein

377. Which of the following is first recombinant DNA?

a. DNA of one bacteria with another bacteria
b. DNA of a virus and a bacterium
c. DNA of bacteria and man
d. DNA of two viruses

Ans. (b) DNA of a virus and a bacterium

378. Which of the following is employed in recombinant DNA technology?

a. Plastids
b. Plasmids
c. Ribosomes
d. Histones

Ans. (b) Plasmids

379. Which one of the following unit is unrelated to DNA or gene?

a. Rishon
b. Recon
c. Cistron
d. Operon

Ans. (a) Rishon

380. Genetic engineering would not have been possible if one of these were absent

a. DNA polymerase
b. Reverse transcriptase
c. DNA ligase
d. RNA synthetase

Ans. (c) DNA ligase

381. Which of the following is associated with genetic engineering?

a. Plastid
b. Plasmids
c. Mutations
d. Hybrid vigour

Ans. (b) Plasmids

382. In genetic engineering, for cutting DNA segment, which of the enzyme is used

a. Restriction nuclease
b. Ligase
c. ATPase
d. DNA polymerase

Ans. (a) Restriction nuclease

383. In *Rous sarcoma* virus, the flow of information is

a. DNA → RNA → Protein
b. DNA → Protein → RNA
c. RNA → DNA → RNA → Protein
d. RNA → DNA → Protein

Ans. (c) RNA → DNA → RNA → Protein

384. What is cDNA?

a. Circular DNA
b. Cloned DNA
c. DNA produced from reverse transcription of RNA
d. Cytoplasmic DNA

Ans. (c) DNA produced from reverse transcription of RNA

385. Teminism, i.e. the synthesis of DNA on RNA template was observed in

a. TMV
b. Rice dwarf virus
c. Reovirus
d. Rous sarcoma virus

Ans. (d) Rous sarcoma virus

386. *Lac* operon in *E. coli* consists of three structural genes. Out of these, one codes for transacetylase. The function of transacetylase is

a. To carry lactose into the cell
b. To convert lactose into glucose
c. To convert lactose into galactose
d. Not known

Ans. (d) Not known

387. In split genes, the coding sequence are called

a. Cistrons
b. Operons
c. Exons
d. Introns

Ans. (c) Exons

388. Restriction enzyme are used in genetic engineering because

a. They can cut DNA at specific base sequence
b. They are proteolytic enzymes which can degrade harmful proteins
c. They are nucleases that cut DNA at variable sites
d. They can join different DNA fragments

Ans. (a) They can cut DNA at specific base sequence

389. A piece of DNA, cut by a restriction enzyme, forms bonds with other DNA molecules which have

a. Been fragmented by the same restriction enzyme
b. Unpaired bases
c. Plasmid components
d. Methyl groups attached to them

Ans. (a) Been fragmented by the same restriction enzyme

390. It is preferable to use yeasts rather than bacteria as recipient cells for recombination of eukaryotic DNA because

a. Yeast can produce restriction enzymes
b. Yeast can excise introns from the RNA transcript
c. Yeast can remove methyl groups
d. Yeast can reproduce at a faster rate

Ans. (b) Yeast can excise introns from the RNA transcript

391. A bacterium modifies its DNA by adding methyl groups to the DNA. It does so to

a. Clone its DNA
b. Be able to transcribe many genes simultaneously
c. Turn its gene on
d. Protect its DNA from its own restriction enzymes

Ans. (d) Protect its DNA from its own restriction enzymes

392. The operon model of gene regulation and organization in prokaryotes was proposed by

a. Jacob and Monod
b. Beadle and Tatum
c. Meselson and Stahl
d. Wilkins and Franklin

Ans. (a) Jacob and Monod

393. Which site of a tRNA molecule hydrogen binds to an mRNA molecule?

a. Codon
b. Anticodon
c. 5′ end of the tRNA molecule
d. 3′ end of the tRNA molecule

Ans. (b) Anticodon

394. An environmental agent that triggers transcription from an operon is a

a. Derepressor
b. Inducer
c. Regulator
d. Controlling element

Ans. (b) Inducer

395. Alternative excision repair system is specialized for removal of thymine dimmers in

a. Human
b. Archaea
c. *Saccharomyces pombe*
d. *Caenorhabditis elegans*

Ans. (c) *Saccharomyces pombe*

396. Chromosome diminution in somatic cell can be displayed by

a. Yeast
b. Ascaris
c. Drosophila
d. *Caenorhabditis elegans*

Ans. (b) Ascaris

397. Vertebrates cells internalize insulin through

a. Facilitated diffusion
b. Receptor mediated endocytosis
c. Carriers
d. Simple diffusion

Ans. (b) Receptor mediated endocytosis

398. Which of the following statements is not correct?

a. Eukaryotic DNA replicates birectionally
b. Okazaki fragments of eukaryotes are larger than prokaryotes
c. Licencing factor must be attached at replication origin sites in eukaryotes before replication to occur
d. None of these

Ans. (b) Okazaki fragments of eukaryotes are larger than prokaryotes

399. 18S RNA is synthesized by

a. RNA polymerase I
b. RNA polymerase II
c. RNA polymerase III
d. Both RNA polymerase I and III

Ans. (a) RNA polymerase I

400. Calmodulin, a calcium binding protein, is found in living organisms *except*

a. Prokaryotes
b. Eukaryotes
c. Plant
d. Animals

Ans. (a) Prokaryotes

401. cAMP has

a. Always positive control on lac operon
b. Always negative control on lac operon
c. No role in operon control
d. None of these

Ans. (a) Always positive control on lac operon

402. cAMP is directly involved in regulation of

a. GTP
b. ATP
c. PFK
d. Protein kinase A

Ans. (d) Protein kinase A

403. Cancer drug vinblastin is obtained from

a. *Podophyllum*
b. *Taxus baccata*
c. *Catharanthus roseus*
d. None of these

Ans. (c) *Catharanthus roseus*

404. Codominant markers, such as RFLPs, are useful for

a. Marker assisted selection
b. Evolutionary studies
c. Linkage mapping
d. All of these

Ans. (d) All of these

405. The saturated molecular linkage maps initially developed in tomato. Potato and maize used which of the following molecular marker systems

a. AFLP
b. RFLP
c. SNP
d. DAF

Ans. (b) RFLP

406. The first strategy used for molecular mapping was based on

a. Recombinant inbred lines
b. Bulked segregant analysis
c. Near isogenic line
d. F2 population

Ans. (c) Near isogenic line

407. The first cloning of a gene and its expression in a foreign organism were achieved in

a. 1972
b. 1971
c. 1973
d. 1969

Ans. (c) 1973

408. The same genome of the virus lambda when cleaved with the restriction endonuclease BstE II can be sued as DNA markers between the size of

a. 2 and 20 kb
b. 700 and 8 kb
c. 200 bases to 8 kb
d. None of these

Ans. (b) 700 and 8 kb

409. The first reported purification of chromosomal DNA was in

a. 1943 b. 1944
c. 1945 d. 1946

Ans. (b) 1944

410. For most genetic engineering experiments which is most important

a. Messenger RNA b. Messenger DNA
c. D-RNA d. C-DNA

Ans. (a) Messenger RNA

411. The human genome contain

a. 10000–20000 b. 20000–30000
c. 30000–40000 d. 40000–50000

Ans. (c) 30000–40000

412. Which of the most critical in marker assisted Selection?

a. Their inherent repeatability
b. Map position
c. Linkage with economically important traits
d. All of these

Ans. (c) Linkage with economically important traits

413. Blood groups deciding antigens are

a. Glycolipids b. Glycoproteins
c. Phospholipids d. Peripheral proteins

Ans. (a) Glycolipids

414. Button like points of intercellular contact that serve as anchoring sites of intermediate filaments and help to hold adjacent cells together are called

a. Cadherins b. Desmosomes
c. Connection d. Gap junction

Ans. (b) Desmosomes

415. Which one of the following is not an example of active transport?

a. Transcytosis
b. Transport through ion channel
c. Transport through ABC transporter
d. Transport of mRNA from nucleus to cytosol

Ans. (b) Transport through ion channel

416. Ca^{+2} ATPase transports

a. Two Ca^{+2} from the inside of cells to the outside while returning two H^+ from outside per ATP
b. Two Ca^{+2} from the inside of cells to the outside per ATP
c. One Ca^{+2} from the inside of cells to the outside while returning one H^+ from outside per ATP
d. None of these

Ans. (a) Two Ca^{+2} from the inside of cells to the outside while returning two H^+ from outside per ATP

417. Dominant markers supply as much information as codomiant marker in

a. Doubled haploids
b. One of the two backcross population in coupling phase
c. RILs
d. All of these

Ans. (d) All of these

418. What is the order of the following steps in western blotting?

A. Protein denaturation
B. Hydrogen peroxide reduction
C. Primary antibody binding
D. Transfer onto membrane

a. A, D, C, B b. A,B,C,D
c. A, C, D, B d. B,C,D,A

Ans. (a) A, D, C, B

419. In *E.coli*, which of the following codons are reorganized by the release factor RF1?

a. UAG and UGA
b. UAA and UGG
c. UAG and UAA
d. UAG and UUA

Ans. (c) UAG and UAA

420. cAMP has

a. Always positive control on lac operon
b. Always negative control on lac operon
c. No role in operon control
d. None of these

Ans. (a) Always positive control on lac operon

421. Which of the following statement is/are correct about leucine zipper motif?

A. A DNA binding motif
B. Homodimer or heterodimer
C. Present in transcription factors-Fos and Jun
D. Present in steroid receptors

a. A only b. C only
c. A, B and C d. None of these

Ans. (c) A, B and C

422. Cancer drug vinblastin is obtained from

a. *Podophyllum* b. *Taxus baccata*
c. *Catharanthus roseus* d. Non of these

Ans. (c) *Catharanthus roseus*

423. Caspases are involved in apoptosis. They are found in

a. Chloroplast b. Mitochondria
c. ER lumen d. Cytosol

Ans. (d) Cytosol

424. Which one of the following Transcription factor is involved in promoter recognition in eukaryotes

a. TFII F b. TFII B
c. TFII D d. TFII E

Ans. (c) TFII D

425. Cdc2 in cell cycle acts at

a. G 1-phase b. G 2-phase
c. S-phase d. M-phase

Ans. (d) M-phase

426. Cdk is a kinase which is important for

a. Cell division
b. Signal transduction
c. Transcription
d. Genetic engineering

Ans. (a) Cell division

427. How many loci can be detected from a single cross through AFLP?

a. > 25 b. >400
c. >70 d. >1000

Ans. (c) >70

428. The single primer amplification reaction is also called as

a. MP-PCR b. RAMP
c. SSLP d. All of these

Ans. (d) All of these

429. The shine dalgarno sequence is responsible for

a. Binding of RNA polymerase to gene during transcription
b. Binding of DNA polymerases to origin of replication during DNA replication
c. Binding of ribosomes to mRNA during initiation of translation
d. Binding of snurps during splicing

Ans. (c) Binding of ribosomes to mRNA during initiation of translation

430. Cell division primarily regulated at

a. G1- stage b. G2-stage
c. S-stage d. G0-stage

Ans. (a) G1- stage

431. Cell fusion is an essential phenomenon in development of

a. Nerve b. Muscle
c. Spleen d. Liver

Ans. (b) Muscle

432. Cell membrane is

a. A lipid bilayer
b. A protein bilayer sandwiched between two lipid layers
c. Protein in lipid is mosaic mixture
d. A lipid bilayer sandwiched between two protein layer

Ans. (a) A lipid bilayer

433. Cell size is determined by

a. Surface area: volume ratio
b. Volume: surface area ratio
c. Surface area: weight
d. Volume: weight ratio

Ans. (a) Surface area: volume ratio

434. Cell-cell recognition is achieved by

a. Glycoproteins b. Phosphatidates
c. Glycolipids d. Peripheral protein

Ans. (a) Glycoproteins

435. Cells uptake iron trough

a. Transcytosis
b. Phagocytosis
c. Receptor mediated endocytosis
d. None of these

Ans. (c) Receptor mediated endocytosis

436. β-1,4 glycosidic linkage is not found in

a. Sucrose b. Fructose
c. Maltose d. Lacose

Ans. (a) Sucrose

437. α-helix is stabilized through

a. Hydrogen bond
b. Hydrophobic bond
c. Ionic bond
d. None of these

Ans. (a) Hydrogen bond

438. Cellular proteins are degraded by

a. Cyclosomes
b. Chymotripsins
c. Proteasomes
d. Lysosomes

Ans. (c) Proteasomes

439. cellulose and hemicelluloses, which are the constituents of cell wall, are synthesized by

a. Lysosome
b. Golgi body
c. SER
d. RER

Ans. (b) Golgi body

440. Change from purine to pyrimidine or pyrimidine to purine is

a. Transversion
b. Transitition
c. Deletion
d. Frame-shift

Ans. (a) Transversion

441. Chiasmata are formed in meiosis

a. After metaphase I
b. Before metaphase I
c. During prophase I
d. During metaphase II

Ans. (b) Before metaphase I

442. Chitin is found in the exoskeleton of

a. Insect
b. Bryozoans
c. Echinoderms
d. Annelids

Ans. (a) Insect

443. Chitin occurs in cell wall of fungus. It is polymer of

a. Amino acid
b. Sucrose
c. Galactose
d. Glucose

Ans. (a) Amino acid

444. Cholera toxin causes diarrhea because it

a. Inhibits adenylate cyclase
b. Blocks conformational change in trimeric G-protein
c. Inhibits GTPase activity of G's, by ADP ribosylation
d. None of these

Ans. (c) Inhibits GTPase activity of G's, by ADP ribosylation

445. Cholesterol occurs in most of the membranes of organelles, *except*

a. Endoplasmic reticulum
b. Golgi body
c. Inner membrane of mitochondria and chloroplast
d. Outer membrane of mitochondria and chloroplast

Ans. (c) Inner membrane of mitochondria and chloroplast

446. Chromosomal translocation and inversions are readily detectable in

a. Polytene chromosomes
b. Lampbrush chromosomes
c. B-chromosomes
d. All of the above

Ans. (a) Polytene chromosomes

447. Clathrin coated vesicles are usually involved in the

a. Transport of cargo form trans- Golgi to Lysosomes
b. Transport of cargo from ER to Golgi complex
c. Endocytosis
d. Both a and c

Ans. (d) Transport of cargo from ER to Golgi complex

448. Clathrin is a

a. Conserved coat protein
b. Variable coat protein
c. Virus coat protein
d. None of these

Ans. (a) Conserved coat protein

449. Coated vesicles in the cell gives rise to

a. Ribosome
b. Mitochondria
c. ER
d. Endosome

Ans. (d) Endosome

450. Which one of the following is the weakest bond found in protein?

a. Hydrogen bond
b. Ionic bond
c. Hydrophobic bond
d. Disulphide bond

Ans. (c) Hydrophobic bond

451. The 10 nm thick fibre of chromatin is called

a. Chromosome
b. Nucleosome
c. Nucleolus
d. Solenoid

Ans. (b) Nucleosome

452. The acidic environment of lysosome is regulated by?

a. B-type ATPase
b. V-type ATPase
c. P-type ATPase
d. F-type ATPase

Ans. (c) P-type ATPase

453. Which one of the following is not a second messenger?

a. PIP_3
b. Mn^{+2}
c. cAMP
d. Ca^{+2}

Ans. (a) PIP_3

454. Which one of the following is not associated with eukaryotic transcription?

a. RNA polymerase III
b. RNA polymerase II
c. Poly (a) polymerase
d. None of these

Ans. (c) Poly (a) polymerase

455. Which one of the following is not the component of extra cellular matrix?

a. Major histocompatibilty complex
b. Glycoproteins
c. Proteoglycoans
d. Collagens

Ans. (a) Major histocompatibilty complex

456. The basic structural unit of the metaphase chromosome is

a. 10 nm filament
b. 50 nm filament
c. 300 nm filament
d. 30 nm filament

Ans. (d) 30 nm filament

457. The basis for the blocking action of the alkaloid colchicines on the division is

a. G_1 phase
b. S phase
c. M phase
d. G_0 phase

Ans. (c) M phase

458. The biologically active proteasome is

a. 20S
b. 30S
c. 26S
d. 50S

Ans. (c) 26S

459. The biologically predominant form of DNA is

a. Left handed B-DNA
b. Right handed A-DNA
c. Left handed A-DNA
d. Right handed B-DNA

Ans. (d) Right handed B-DNA

460. The protein complex "dicer" is involved in

a. Gene silencing
b. Transcription
c. Translation
d. Protein sorting

Ans. (a) Gene silencing

461. The protein of Golgi complex which contain irregular cisternae and tubules is known as

a. Intercisternal golgi
b. Cis golgi
c. Trans golgi
d. Medial golgi

Ans. (d) Medial golgi

462. The region where RNA polymerase binds to promoter in prokaryotes is called

a. Hogness box
b. Homeo box
c. Pribnow box
d. Shine-dalgrano box

Ans. (c) Pribnow box

463. The shortening of eukaryotic chromosome during replication is prevented by

a. Telomerase
b. Ligase
c. Reverse transcriptase
d. RNA polymerase

Ans. (a) Telomerase

464. Which one of the following hormones binds to intracellular receptor?

a. Insulin
b. Estrogen
c. Glucagon
d. Growth hormone

Ans. (b) Estrogen

465. The Tm of DNA can be calculated using the formula: Tm = 69.1 + 0.41 (GC) where GC is the percent of guanine + cytosine. A double stranded DNA has 27% adenine. Its Tm is

a. 79°C
b. 80.73°C
c. 95.50°C
d. 88°C

Ans. (d) 88°C

466. The type of intercellular signalling in which one cell can communicate with another over long distances is called

a. Autocrine
b. Paracrine
c. Juxtacrine
d. Endocrine

Ans. (d) Endocrine

467. The uptake of cholesterol by mammalian cells can be explained by

a. Pinocytosis
b. Phagocytosis
c. Transcytosis
d. Receptor mediated endocytosis

Ans. (d) Receptor mediated endocytosis

468. The Z-DNA helix

a. Tends to be found at the 3′ end of genes
b. Is favoured by an alternating GC sequence
c. Has fewer base pair per turn than the B-DNA
d. None of these

Ans. (b) Is favoured by an alternating GC sequence

469. Thymine dimers in eukaryotes are repaired by

a. Mismatch repair mechanism
b. Nucleotide excision repair mechanism
c. Base excision repair mechanism
d. Direct repair mechanism

Ans. (b) Nucleotide excision repair mechanism

470. To achieve active conformation calmodulin protein binds minimum

a. Three Ca^{+2} ions
b. One Ca^{+2} ions
c. Six Ca^{+2} ions
d. Four Ca^{+2} ions

Ans. (b) One Ca^{+2} ions

471. Which one of the following enzyme is involved in translation step in protein biosynthesis?

a. RNA polymerase
b. Ribozyme
c. Reverse transcriptase
d. Aminoacyl–tRNA synthetase

Ans. (d) Aminoacyl–tRNA synthetase

472. Toll-like receptor play a central role in the signalling process which result is

a. Humoral immunity
b. Cell-mediated immunity
c. Innate immunity
d. Artificial passive immunity

Ans. (c) Innate immunity

473. Tonofilaments are the structural units of

a. Microfilaments
b. Intermediate filament
c. Micro tubules
d. Flagella

Ans. (b) Intermediate filament

474. Transcription coupled DNA repair is an example of

a. Mismatch repair
b. Excision repair
c. SOS response
d. Direct repair

Ans. (b) Excision repair

475. Which one of the following components of the plasma membrane of eukaryotic cells is not found in the membrane of prokaryotes?

a. Cholesterol
b. Glycoprotein
c. Sphingolipids
d. Glycerophospholipids

Ans. (a) Cholesterol

476. Transport of mRNA from nucleus to cytosol is

a. Simple diffusion
b. Facilitated diffusion
c. Secondary active process
d. Primary active process

Ans. (d) Primary active process

477. Transport of sodium ions from outer side to the inner side of an eukaryotic cells is

a. Primary active
b. Facilitated diffusion
c. Simple diffusion
d. Secondary active

Ans. (b) Facilitated diffusion

478. Rice genome sequencing project, India contributed in sequencing

a. 12th chromosome
b. 8th chromosome
c. 11th chromosome
d. 6th chromosome

Ans. (c) 11th chromosome

479. Transport vesicles involved in retrograde transport are coated with

a. COP I
b. COP II
c. Clathrin
d. Caveolin

Ans. (a) COP I

480. Transposons cause mutation in plants, animal and bacteria. These are

a. Retroviruses
b. Mutagenic viruses
c. Infective protein molecule
d. Mobile genetic element

Ans. (d) Mobile genetic element

481. Trehalose is found in the exoskeleton of insects, it is

a. Polysaccharide
b. Disaccharide
c. Trisaccharide
d. Oligosaccharide

Ans. (b) Disaccharide

482. Two sisters chromatids are separated at anaphase by the action of

a. Seprarin
b. Cohesion
c. APC
d. MAD2

Ans. (a) Seprarin

483. Tyrosine kinase is activated by

a. Methylatioon
b. Acetylation
c. Dephosphorylation
d. Phosphorylation

Ans. (d) Phosphorylation

484. Ubiquitination of proteins is marked for all of the following *except*

a. Chromatin remodelling
b. Protein degradation
c. Correct folding of protein
d. Endocytosis

Ans. (c) Correct folding of protein

485. UGA is a stop codon, but in mitochondrial genome it codes for

a. Trp
b. Met
c. Try
d. Asp

Ans. (a)

486. Under what thermodynamic conditions will a reaction proceed spontaneously?

a. "H < 0
b. "S < 0
c. "G < 0
d. "S = 0

Ans. (a) "H < 0

487. UV rays usually causes

a. Gene mutation
b. Genome mutation
c. Chromosome mutation
d. Both a and c

Ans. (d) Both a and c

488. Vascular ATPases are

a. Ca^{+2} pumps
b. K^+ pumps
c. H^+ pumps
d. Na^+ pumps

Ans. (c) H^+ pumps

489. Vertebrates achieved terrestrial habit due to presence of

a. Aminiotic egg
b. Vivipary
c. Thermoregulation
d. Internal fertilization

Ans. (a) Aminiotic egg

490. Viagra is used in the treatment of erectile dysfunction because it

a. Inhibits NO synthase
b. Inhibits diesterase
c. Increase half-life of guanyly cyclase
d. Stimulates nitric oxide synthesis

Ans. (b) Inhibits diesterase

491. *Vibrio cholera* causes diahorrea by

a. Destroys cells of intestinal lining
b. Closing absorption of water from gut epithelium
c. Constitutive expression of adenylate cyclase
d. Opening ion channel

Ans. (c) Constitutive expression of adenylate cyclase

492. Vinblastin is used as anticancerous drug because it

a. Causes cell death
b. Blocks cell division and functions as antimitotic drug
c. Promotes cell growth
d. Stimulates DNA synthesis

Ans. (b) Blocks cell division and functions as antimitotic drug

493. Vincristine is an anticancerious drug. It is obtained from

a. *A*tropa
b. Colchicum
c. *Catharanthus roseus*
d. *Taxus baccata*

Ans. (c) *Catharanthus roseus*

494. Viral encoded 'ras' oncogene transforms normal mammalian cells in to cancer cells. Viral Ras protein differs from its normal counterpart by

a. Diminished ATPase activity
b. Increased ATPase activity
c. Increased GTPase activity
d. Diminished GTPase activity

Ans. (d) Diminished GTPase activity

495. Viruses can cross biological membranes with the help of

a. Integral membrane proteins
b. Glycocalyx
c. Pores
d. Lipid bilayer

Ans. (b) Glycocalyx

496. What cellular connection is "leak-proof"?

a. Tight junction
b. Gap junction
c. Plasmodesmata
d. Anchoring junction

Ans. (a) Tight junction

497. What happens to the Cdk-cycA complex at metaphase?

a. Only cyclin A is degraded
b. Both cyclin A and Cdk remain under graded
c. Both cyclin A and Cdk are degraded
d. Only Cdk is degraded

Ans. (a) Only cyclin A is degraded

498. What is fate of most duplicated genes?

a. Gene activation
b. They become orthologous
c. They are transferred to a new organism using lateral gene transfer
d. Gain of a novel function through subsequent mutation

Ans. (d) Gain of a novel function through subsequent mutation

499. What is the maximum number of hydrogen bonds that can be formed by each molecule of water?

a. 3 b. 5
c. 4 d. 2

Ans. (c) 4

500. When a cell expands energy to move a solute across its membrane against a concentration gradient, the process is called

a. Active transport
b. Passive transport
c. Facilitated duffusion
d. Osmosis

Ans. (a) Active transport

501. When a mutation changes a termination codon in to codon specifying an amino acid, it is called

a. Read through mutation
b. Synonymous mutation
c. Reverse nonsense mutation
d. Back mutation

Ans. (a) Read through mutation

502. When bcl-2 gene is mutated it results in tumor, like chronic lymphoblastic leukemia (CLL). Normally this gene regulates

a. Cell differentiation
b. Cell division
c. Programmed cell death
d. Synthesis of growth factor

Ans. (c) Programmed cell death

503. When one amino acid is replaced by another by another owing to a mutation, it is called

a. Silent mutation
b. Missense mutation
c. Frame shift mutation
d. Synonymous mutation

Ans. (b) Missense mutation

504. When release factor binds to stop codon on m-RNA during translation, the synthesized peptide chain is transferred to

a. H^+ b. Water
c. Amino acids d. t-RNA

Ans. (b) Water

505. When repressor protein binds to operator of an operon which of the following process is regulated?

a. Translation b. Transcription
c. Replication d. None of the above

Ans. (b) Transcription

506. When the forces arise from the electrostatic attraction between the positively charged nucleus of one atom and the negatively charged electrons of the other it is called

a. Hydrogen bonding b. Stacking force
c. Vanderwaals force d. Ionic bonding

Ans. (c) Vanderwaals force

507. Which element is present in diatoms?

a. Si b. Ca
c. Mg d. Na

Ans. (a) Si

508. Which enzyme is exclusively involved in DNA repair mechanism

a. DNA polymerase
b. Photolyase
c. RNA polymerase
d. Restriction endonuclease

Ans. (b) Photolyase

509. Which group of bacteria on sporulation show cell coordination and social behaviour?

a. Actino bacteria b. Archaebacteria
c. Myxobacteria d. Bacillus species

Ans. (d) Bacillus species

510. Which GTPases regulates intracellular transport in mammalian cells through vesicle fusion?

a. Rab b. Ran
c. Ras d. Rho

Ans. (a) Rab

511. Which is crossing over suppressor?

a. Translocation b. Deletion
c. Duplication d. Inversion

Ans. (b) Deletion

512. Which is responsible for cytoplasmic streaming?

a. Microtubules
b. Endoplasmic reticulum
c. Intermediate filament
d. Microfilament

Ans. (a) Microtubules

513. Which is true for gap junction?

a. It is made of connexion protein
b. Allows free movement of large molecules across cells
c. Made up of two subunit of connexions
d. None of these

Ans. (a) It is made of connexion protein

514. Which of the following amino acids can easily be ionized at cellular pH?

a. Histidine b. Tryptophan
c. Lysine d. Arginine

Ans. (d) Arginine

515. Which one of the following components of cytoskeleton plays a crucial role in vesicular transport?

a. Molecular motors b. Microtubules
c. Intermediate filaments d. Microfilaments

Ans. (b) Microtubules

516. Which of the following antibiotics causes misincorportation of amino acid in synthesizing polypeptide?

a. Streptomycin b. Polymixin B
c. Chloramphenicol d. Bacitracin

Ans. (a) Streptomycin

517. Which of the following antibiotic occasionally cause death when administered to persons who are allergic to them?

a. Penicillin b. Streptomycin
c. Polymixin d. Bacitracin

Ans. (a) Penicillin

518. Which of the following anticancerous drugs does not act on microtubules?

a. Taxol b. Methotrexate
c. Thiabendazole d. Colchicines

Ans. (b) Methotrexate

520. PCR was invented by

a. A. Kornberg (1952) b. Nirenberg (1879)
c. Kary Mullis (1984) d. Watson and Crick (1953)

Ans. (c) Kary Mullis (1984)

521. The temperature needed to denature DNA would also denature normal DNA polymerase. The polymerase used in PCR is

a. Taq DNA polymerase
b. Pwo DNA polymerase
c. RNA polymerase
d. Both a and b

Ans. (d) Both a and b

522. Taq DNA Polymerse is isolated from

a. *Mycobacterium tuberculosis*
b. *Bacillus thermophillus*
c. *Thermos aquaticus*
d. *Bacillus thermophillus*

Ans. (c) Thermos aquaticus

523. DNA sequencing method is

a. Kary mullis method
b. Sanger dideoxy method
c. Maxam gilbert method
d. Both b and c

Ans. (d) Both b and c

524. Which of the following technique is used to separate the proteins?

I. Ion exchange chromatograph
II. Isoelectric focusing
III. Gel electorphoresis
IV. Gel filtration chromatography

Choose the correct answer

a. I, II, III only b. II and III only
c. I and II only d. I, II, III, IV

Ans. (d) I, II, III, IV

525. Protoplasm fusion can be achieved by which of the following method

I. PEG
II. Electric current
III. Sandi virus
IV. Ph and temperature shock

a. III and IV only
b. II and III only
c. I and II only
d. I, II, III and IV

Ans. (b) II and III only

526. Restriction endonuclease is

a. *Hind-III* b. *EcoR-1*
c. *Bamb-H_1* d. All of these

Ans. (d) All of these

527. pBR 322 is a

a. Plasmid b. Cosmid
c. Phage d. Bacteriophage

Ans. (a) Plasmid

528. Edman's degradation technique is used for sequencing

a. Fats b. Proteins
c. Carbohydrates d. Nucleic acids

Ans. (b) Proteins

529. The most commonly used to detected the presence of HIV is

a. FIA b. RIA
c. ELISA d. HPLC

Ans. (c) ELISA

530. Template dependent enzyme is

a. RNA polymerase b. DNA- polymerase
c. DNA ligase d. Oligonucleotide

Ans. (b) DNA-polymerase

531. Polymerase chain reaction is used for

a. DNA-amplification b. DNA recombination
c. DNA-repair d. DNA identification

Ans. (a) DNA-amplification

532. Individual cells can be indentified by using

a. Rate zonal centrifugation
b. Flow cytometry
c. Marker enzyme
d. Equilibrium density gradient centrifugation

Ans. (b) Flow cytometry

533. Biolistic PDS-1000 is

a. An antibiotic
b. A gene therapy operation
c. An important cell fusion technique
d. An instrument used to transfer DNA to wide range of cells and tissues

Ans. (d) A gene therapy operation

534. The recognition site for EcoR-I a restricted endonuclease enzyme is

a. 5′ GTT AAC 3′
b. 5′ AAG CTT 3′ 3′ CAA TTG 5′ 3′ TTC GAA 5′
c. 5′ GAA TCC 3′
d. l5′ CC GG 3′ 3′ CTT AAG 5′ 3′GG CCS 5′

Ans. (c) 5′ GAA TCC 3′

535. Polyacrylamide gel electrophoresis is used for

a. Joining the two DNA fragments
b. Separation of fragments differing by a few base pairs
c. Separation of large DNA molecules (whole chromosomes)
d. Joining the two amino acids

Ans. (b) Separation of fragments differing by a few base pairs

536. PFGE stands for

a. Pigment fragmented gel electrophoresis
b. Pulsed field gel electrophoresis
c. Poly fragment gel electrophoresis
d. Pulsed fragmented gel electrophoresis

Ans. (b) Pulsed field gel electrophoresis

537. RIA stands for

a. Repeated Immuno Assay
b. Regulated Immuno Assay
c. Radio Immuno Assay
d. Regular Immuno Assay

Ans. (c) Radio Immuno Assay

538. NMR stand for

a. Nuclear magnetic resonance
b. Nuclear mobidity rate
c. Nuclear management region
d. Nuclear material resource

Ans. (a) Nuclear magnetic resonance

539. CHEFE stands for

a. Charged change homogeneous electric field Electrophoresis
b. Charged hanger electron field electrophoresis
c. Contour clamped homogeneous electric field electrophoresis
d. All of the above

Ans. (c) Contour clamped homogeneous electric field electrophoresis

540. DNA bands are blotted in

a. Western blotting b. Southern blotting
c. Northern blotting d. PCR

Ans. (b) Southern blotting

541. Which of the following is not a cloning vector?

a. Ti-plasmid b. pBR-322
c. Puc-8 d. EcoR-I

Ans. (d) EcoR-I

542. Which of the following set is related with cloning vector ?

I. Charon-34, charon-35
II. EMBL-3, EMBL-4
III. λgt-10, gt-11
IV. M-13, YACs, MP-13

Choose the correct answer

a. I, II, III only
b. III and IV only
c. I and II only
d. I, II, III and IV

Ans. (d) I, II, III and IV

543. RELPs stands for

a. Rapid fragment length polymorphism
b. Random fragment length polymorphism
c. Restriction fragment length polymorphism
d. Red fragment length polymorphism

Ans. (c) Restriction fragment length polymorphism

544. RELPs, RAPD, VNTRs and SSRs are

a. Restriction exonucleases
b. Restricition endonucleases
c. Molecular markers
d. Cloning vectors

Ans. (c) Molecular markers

545. Choose the incorrect statement

a. RAPD = Random amplified polymorphic DNA
b. VNTRs = variable number of tandem repeats
c. SSRs = Simple sequence repeats
d. RAPD is also called minisatellites

Ans. (d) RAPD is also called minisatellites

546. Simple sequence repeats (SSRs) also called

a. Microsatellites
b. Satellites
c. Minisatellites
d. Polymerase chain reaction

Ans. (a) Microsatellites

547. DIG based technique is used for the detection of certain known DNA in an animal cell. It is preferred over radio labeling techniques due to

I. Stability
II. Easy handling
III. Safety
IV. Quick result

Choose the correct answer :

a. I, III
b. I, II, III
c. I, II, III, IV
d. I, II

Ans. (c) I, II, III, IV

548. Gel filtration chromatography separates proteins on the basis of

a. Size
b. Charge
c. Mass
d. Structure

Ans. (a) Size

549. Pregnancy can be detected with in very few days of conception by immune assaying urine for the presence of

a. Follicle stimulating hormone
b. Lutinizing hormone
c. HCGH
d. Progesterone

Ans. (c) HCGH

550. DNA finger printing technique is a method of

a. Northern blotting
b. Southern blotting
c. Eastern blotting
d. Western blotting

Ans. (b) Southern blotting

551. The method of detecting a very small sample of proteins by immune assay technique is called as

a. Southern blotting
b. Eastern blotting
c. Western blotting
d. Northern blotting

Ans. (c) Western blotting

552. Sucrose gradient centrifugation method can be used to estimate the size of

a. Ribosomes
b. Proteins
c. RNA molecules
d. All of these

Ans. (d) All of these

553. Ion exchange chromatography can be used to separate the protein mixture which differ in over all

a. Charge
b. Structure
c. Mass
d. Molecular weight

Ans. (c) Mass

554. R-bands of chromosomes are visualized as green with the help of staining

a. Ninhydrin
b. Cotton blue
c. Safranin
d. Acetocarmine

Ans. (a) Ninhydrin

555. Which of the following dye is used in-banding technique of chromosomes staining?

a. Acridine organe
b. Quinacrine
c. Giemsa
d. Acridine

Ans. (b) Quinacrine

556. Feulgen stain is used for identification of

a. Nucleolus
b. Chromosomes/DNA
c. Nucleus
d. Unicellular organisms

Ans. (b) Chromosomes/DNA

651. PCR based DNA amplification is an essential feature of which of the following combination of molecular markers?

a. RFLP, AFLP and SSR
b. AFLP, SSR and RAPD
c. RFLP, RAPD and SSR
d. RAPD, RFLP and SSR

Ans. (b) AFLP, SSR and RAPD

558. Biosensors are

a. Devices that can convert biological or biochemical signal or response into a quantifiable electrical signal
b. Simple enzyme like proteinaceous substance
c. Chemical substances that used in pollution controlling
d. Substance that cause bioremediation

Ans. (a) Devices that can convert biological or biochemical signal or response into a quantifiable electrical signal

559. CsCI gradient centrifugation helps in separation of DNA fragments the basic principle involved is , that of

a. DNA fragments can move and accumulated at a position where the density of the two (CsCI and DNA) is same
b. Only smaller fragments of DNA can bind with CsCl
c. DNA binds firmly to CsCl
d. CsCl degrades DNA

Ans. (a) DNA fragments can move and accumulated at a position where the density of the two (CsCI and DNA) is same

560. In electron microscope, the specimen has to be mounted in vacuum because

a. Vacuum increase the size of specimen
b. Vacuum increases the power of electromagnetic lenses
c. Electrons can be absorbed by atoms in the air
d. None of these

Ans. (c) Electrons can be absorbed by atoms in the air

561. The resolution power of transmission electron microscope (TEM) is 0.10 nm whereas scanning electron microscope (SEM) is

a. 100 fold less than that of TEM
b. 10 fold higher than that of TEM
c. 10 fold less that of TEM
d. 100 fold higher than that of TEM

Ans. (a) 100 fold less than that of TEM

562. SEM produce

a. Three dimensional image of the specimen
b. Two dimensional image of the specimen
c. One dimensional image of the specimen
d. Four dimensional image of the specimen

Ans. (a) Three dimensional image of the specimen

563. Purines and pyrmidines are cleaved by

a. Dimethly sulphate
b. Piperazine
c. Hydrazine
d. Dimethyl sulphates and hydrazine respectively

Ans. (d) Dimethyl sulphates and hydrazine respectively

564. The term cistorn, muton and recon were introduced by

a. Watson and crick
b. Benzer
c. Meselson
d. Morgan

Ans. (b) Benzer

565. The chemical used to prevent RNAase contamination during RNA isolation is

a. DEEPP
b. DEPCE
c. DCPPE
d. DEPC

Ans. (d) DEPC

566. Introduction of a gene or DNA fragment from one organism into another organism in such a form, so that it is maintained, replicated and expressed in the new host is known as

a. DNA fingerprinting
b. DNA cloning
c. RNA fingerprinting
d. RNA cloning

Ans. (b) DNA cloning

567. Adenine pairs with thymine with

a. Phosphodiester bond
b. Glycosidic bond
c. 4 hydrogen bond
d. 2 hydrogen bond

Ans. (d) 2 hydrogen bond

568. Guanine pairs with thymine with

a. Phosphodiester bond b. Glycosidic bond
c. 3 hydrogen bond d. 2 hydrogen bond

Ans. (c) 3 hydrogen bond

569. The DNA sequence which appear to have no function is called as

a. Satellite DNA b. Selfish DNA
c. Palindrome DNA d. Ct DNA

Ans. (b) Selfish DNA

570. Each strand in a chain of nucleotides are held together by

a. Phosphodiester bonds b. 2 hydrogen bond
c. Glycosidic bond d. 3 hydrogen bond

Ans. (a) Phosphodiester bonds

571. The set of bases in a t-RNA that pairs with a codon of a mRNA is known as

a. Cistron b. Codon
c. Exon d. Anti-codon

Ans. (d) Anti-codon

572. The technique that is generally used for the identification of criminals from blood strains. Semen, etc. and for establishing parentage in case of dispute is called

a. DNA fingerprinting b. RNA fingerprinting
c. DNA cloning d. RNA cloning

Ans. (a) DNA fingerprinting

573. Purine and pyramidines are joined with de oxyribose by

a. 2 hydrogen bond b. 4 hydrogen bond
c. Glycosidic bond d. Phosphodiester bonds

Ans. (c) Glycosidic bond

574. All the reaction in the translational process from the formation of the first peptide bond to that of the last peptide bond of the polypeptide chain is called as

a. Deformation b. Elongation
c. Transition d. Transition

Ans. (b) Elongation

575. The enzyme that calalyses the covalent joining of okazaki fragments is called

a. DNA polymerase b. DNA ligase
c. DNA helicase d. DNA gyrase

Ans. (b) DNA ligase

576. The coding region of split genes is divided in to few to several small segments; each segment which is having the expressed sequences are called as

a. Recon b. Anti-codon
c. Exons d. Codon

Ans. (c) Exons

577. In eukaryotic transcription units, a conserved sequence located upstream of start point and recognized by a large group of transcriptional factors is called.

a. TTAA box b. TATA box
c. CAAT box d. CCTT box

Ans. (c) CAAT box

578. The DNA in which the base pair sequence can be read same in both the directions is called.

a. Satellite DNA b. Selfish DNA
c. Ct DNA d. Palindrome DNA

Ans. (d) Palindrome DNA

579. Which of the following is a mode of replication?

a. Semiconservative b. Dispersive
c. Conservative d. All of the above

Ans. (d) All of the above

580. The semi-conservative mechanism of replication was demonstrated by

a. Watson and Crick b. Mendel
c. Hershey and Chase d. Meselson and Stahal

Ans. (d) Meselson and Stahal

581. In meselson and stahl experiment, the *E. coli* cells were labelled with isotope of

a. Nitrogen b. Sulphur
c. Uranium d. Potassium

Ans. (a) Nitrogen

582. The modification of RNA polymerase in such a way that it does not recognize specific terminator sequences and continues transcription beyond the regular terminators is know is

a. Termination b. Annotation
c. Bioconversion d. Anti-termination

Ans. (d) Anti-termination

583. The point at which separation of the strands and synthesis of new DNA takes place is known as

a. Initiation b. Replication fork
c. Origin d. Template

Ans. (b) Replication fork

584. The enzyme that catalyses the formation of supercoils is

a. DNA ligase b. DNA polymerase
c. DNA gyrase d. DNA helicase

Ans. (c) DNA gyrase

585. The initiation of DNA replication within a replicon always occurs at a fixed point called as

a. Initiation b. Origin
c. Template d. Replication fork

Ans. (b) Origin

586. Among the following, the example for highly repetitive DNA is

a. Histone cluster
b. Dispersed repetitive DNA
c. DNA minisatelites
d. DNA microsatellites

Ans. (c) DNA minisatelites

587. The enzyme that can relieve super coiling in DNA by creating transitory breaks in some or both strands of helicase backbone is called as

a. Topoisomerase b. Gyrase
c. Helicase d. Ligase

Ans. (a) Topoisomerase

588. The concept of central dogma was given by

a. Watson b. Crick
c. Jones d. Korenbeg

Ans. (a) Watson

589. The enzyme that is responsible for transcription is

a. Polynuclease b. RNA polymerase
c. DNA polymerase d. Endonuclease

Ans. (b) RNA polymerase

590. An enzyme that separate the two strand of a DNA duplex, usually using the energy from hydrolysis of ATP, is called

a. Ligase b. Helicase
c. Gyrase d. Topoisomerase

Ans. (b) Helicase

591. The sequence that consists of self complementary regions form a stem loop/hairpin structure in RNA product is

a. Regulator b. Terminator
c. CAAT box d. TATA box

Ans. (b) Terminator

592. The enzyme that is responsible of heterogeneous nuclear RNA, the precursor of m-RNA is

a. DNA polymerase I b. RNA polymerase I
c. RNA endonuclease d. All of the above

Ans. (c) RNA endonuclease

593. Removal of the topological strain by inducting the negative super coiling, which is carried out by

a. DNA gyrase b. DNA polymerase
c. RNA polymerase d. RNA gyrase

Ans. (a) DNA gyrase

594. Genomic imprinting is a kind of epistasis which occurs due to

a. DNA polyI b. DNA gyrase
c. DNA methylation d. RNA polymerase

Ans. (c) DNA methylation

595. The strand that is used as a template to which ribonucleotides base pair for the synthesis of the RNA is called as

a. Sense strand
b. Antisense strand
c. Template strand
d. Both b and c

Ans. (d) Both b and c

596. The scientist, who had worked out fine structure of gene through cis- trans complementation test is

a. Fleming b. Benzer
c. Jones d. Shull

Ans. (c) Jones

597. The temperature at which of the *E.coli* RNA polymerase performs elongation reaction is

a. 37°C b. 30°C
c. 40°C d. 45°C

Ans. (a) 37°C

598. Reverse transcription enzyme was discovered by

a. Fleming and Shull b. Shull and Jones
c. Watson and Crick d. Vilmorin and Jones

Ans. (c) Watson and crick

599. A construct that joins the coding region of two open reading frames such that expression of the product results in a chimeric protein is called as

a. Gene cloning b. Gene family
c. Gene fusion d. Gene construct

Ans. (c) Gene fusion

600. The enzyme that can synthesize a new DNA strand on a template DNA strand is called

a. DNA pol III
b. DNA gyrase
c. DNA polymerase
d. All of the above

Ans. (c) DNA polymerase

601. DNA replicating enzyme in bacteria is called is

a. DNA gyrases
b. DNA poly III
c. DNA polymerase
d. DNA methylation

Ans. (b) DNA poly III

602. How many type of RNA polymerase were found in prokaryotes?

a. 4
b. 3
c. 2
d. 6

Ans. (b) 3

603. The distance between sites of initiation and termination by RNA polymerase is called as

a. Transcription unit
b. Transition unit
c. Transformation unit
d. Transduction unit

Ans. (a) Transcription unit

604. The DNA strand that is used as template during transcription is called as

a. Antisense RNA
b. Antisense DNA
c. CAT box
d. CPT box

Ans. (b) Antisense DNA

605. In eukaryotes, DNA methylation is mainly concerned with regulation of

a. Gene pairing
b. Gene amplification
c. Gene index
d. Genetic imprinting

Ans. (a) Gene pairing

606. The attachment point for the catabolite activator protein is called as

a. CAT box
b. CAC box
c. CAP box
d. CATT box

Ans. (c) CAP box

607. A series of DNA sequence fixed as distinct spots on a suitable solid support, such as a glass chip is called as

a. DNA array
b. DNA foot printing
c. DNA sequencing
d. All of the above

Ans. (a) DNA array

608. An RNA copy of a gene is described as

a. RNA replicase
b. RNA polymerase
c. RNA transcript
d. RNA splicing

Ans. (c) RNA transcript

609. The presence of a gene in multiple copies due to polyploidy, polytenic chromosomes, gene amplification, or chromosomal duplication is called

a. Gene redundancy
b. Gene splicing
c. Gene stacking
d. All of the above

Ans. (a) Gene redundancy

610. The removal of large non-coding sequence from the primary RNA transcript followed by rejoining of coding sequences to produce the functional m-RNA is called

a. RNA polymerase
b. RNA editing
c. RNA splicing
d. RNA transcript

Ans. (c) RNA splicing

611. A polymerase enzyme that catalyses self replication of single stranded RNA is called

a. RNA replicase
b. RNA ligase
c. RNA polymerase
d. DNA polymerase

Ans. (a) RNA replicase

612. The sequence 3′AAAAAAT5′ in sense strand of DNA is called as

a. Transcribed spacer
b. Transcriptional unit
c. Terminator sequence
d. Translational unit

Ans. (c) Terminator sequence

613. A genetic marker that is detected as differential mobility of a protein/DNA fragment is known as

a. Molecular marker
b. Molecular breeding
c. Molecular genetics
d. All of the above

Ans. (a) Molecular marker

614.The nucleotide sequence in DNA downstream of the of the termination codon of a gene which is transcribed and not translated is called as

a. Antitrailer
b. Transcribed spacer
c. Terminator sequence
d. Transcriptional unit

Ans. (a) Antitrailer

615. The labelling of a gene by a marker gene or specific DNA sequence closely kinked with the gene in question is called

a. Genetic code
b. Gene tagging
c. Gene therapy
d. Gene translation

Ans. (b) Gene tagging

616. A part of an RNA transcription unit, i.e. transcribed but discarded during maturation is called as

a. Transcribed spacer
b. Transcriptional unit
c. Terminator sequence
d. None of these

Ans. (a) Transcribed spacer

617. A group of gene that are related by sequence homologies usually are also related by their functions are called as

a. Multi-gene family
b. Multiple-cloning site
c. Multicistronic message
d. Multi locus probe

Ans. (c) Multicistronic message

618. The codon, usually but not exclusively 5′ AUG 3′ which indicates the point at which translation of an mRNA should begin is

a. Initiation complex
b. Initiation codon
c. Termination factor
d. Translation factor

Ans. (b) Initiation codon

619. The transfer or movement of a gene or gene fragment from the chromosomal location to another location is called

a. Gene translocation
b. Gene coding
c. Gene tagging
d. Gene therapy

Ans. (a) Gene translocation

620. The protein molecule that play an ancillary role in the initiation stage of translocation is called as

a. Initiation factor
b. Termination factor
c. Transcription factor
d. Translation factor

Ans. (a) Initiation factor

621. The protein required to obtain release of the newly synthesized polypeptide chain from t-RNA is called as

a. Termination factor
b. Initiation factor
c. Initiation codon
d. Initiation complex

Ans. (a) Termination factor

622. A region of DNA at one end of an operon that acts as a binding site for a specific repressor protein and so controls the functioning of adjacent cistrons is termed as

a. Operon
b. Promoter gene
c. Operator gene
d. Reporter gene

Ans. (c) Operator gene

623. A group of structural genes whose transcription is regulated by the coordinated action of a regulator gene, promoter, and operator elements is known as

a. Operon fusion
b. Operator gene
c. Operon
d. Reporter gene

Ans. (c) Operon

624. The largest element within a gene, which is a unit of function, is called

a. Exon
b. Recon
c. Muton
d. Cistron

Ans. (d) Cistron

625. In case of repressible operons, the repressor can bind DNA only when it is associated with the effector; in such cases, the effector is called

a. Operator
b. Reporter
c. Co-repressor
d. Terminator

Ans. (c) Co-repressor

626. The enzymes that produce internal cuts, called cleavage, in DNA molecules are called

a. Endonucleases
b. Kinases
c. Ligase
d. Galactase

Ans. (a) Endonucleases

627. When a single pre-mRNA molecule is processed in two or more ways to yield more than one type of mature m-RNA is called

a. Direct splicing
b. Alternative splicing
c. Destructive splicing
d. Alienation

Ans. (b) Alternative splicing

628. Premature aging due to loss a DNA repair enzyme, perhaps a ligase in human beings are the symptoms of the disease is called

a. Edward syndrome
b. Patau's syndrome
c. Progeria
d. Klinfelter syndrome

Ans. (c) Progeria

629. Nick translation is useful in labelling of molecules like

a. Protein sequence
b. Nucleotide sequence
c. ds-DNA molecules
d. None of these

Ans. (c) ds-DNA molecules

630. The chemical, which is used for breaking the plasma membrane during DNA isolation is known as

a. DNAase
b. Ligase
c. CTAB/SDS
d. Helicase

Ans. (c) CTAB/SDS

631. The absolute radical requirement for both RNA synthesis and DNA replication in the organisms is

a. Free 3′-CH4
b. Free 3′-OH
c. Free 5′-OH
d. Free 3′-H

Ans. (b) Free 3′-OH

632. A sequence of DNA nucleotide which codes for specific polypeptide chian is called as

a. Genome
b. Gene
c. Genetic code
d. Genetic marker

Ans. (b) Gene

633. The bond between sugar and nitrogenous base in case of DNA is known as

a. Hydrophobic bond
b. Glycosidic bond
c. Hydrogen bond
d. Wander wall bond

Ans. (b) Glycosidic bond

634. Restriction site for cloning should be

a. Palindromic in nature
b. Repeated sequence
c. Hexanucleotide
d. Tandemly tepeated

Ans. (d) Tandemly tepeated

635. GAATTC is restriction sequence of CTTAAG indicates

a. Bam HI
b. Sam I
c. Eco RI
d. Null

Ans. (c) Eco RI

636. For cloning Eukaryotic gene in prokaryotic, genes should be isolated from

a. Genomic library
b. Eukaryotic host
c. cDNA library
d. None of these

Ans. (c) cDNA library

637. Which enzyme play important role in reverse transcription?

a. Ribonuclease
b. DNA polymerase
c. RNA polymerase
d. Reverse transciptase

Ans. (d) Reverse transciptase

638. A term used to describe the excess DNA which is present in the genome beyond that required to encode protein is called as

a. Split gene
b. Active DNA
c. Junk DNA
d. Dead DNA

Ans. (c) Junk DNA

639. Micro-satellite are also known as

a. STRs
b. RAPDs
c. ISSR
d. RFLP

Ans. (a) STRs

640. Mini-satellites are also known as

a. RFLPs
b. RAPD
c. STS
d. VNTRs

Ans. (d) VNTRs

641. Protein involved for joining the DNA during replication is

a. Topoisomerase
b. Ligase
c. Gyrase
d. Helicase

Ans. (b) Ligase

642. The use of DNA marker for indirect selection of difficult to select traits like yield, etc. is known as

a. Marker assisted selection
b. Yield selection
c. DNA selection
d. RNA selection

Ans. (a) Marker assisted selection

643. The cDNA libraries can be prepared by isolating

a. mRNA
b. tRNA
c. rRNA
d. All of the above

Ans. (a) mRNA

644. Actinomycin-D, rifampicin and 5-bromouracil are inhibitors to the synthesis of

a. tRNA
b. mRNA
c. rRNA
d. All of the above

Ans. (b) mRNA

645. A CsCl gradient will separate DNA molecule by

a. Resorption b. Density
c. Adhesion d. Absorption

Ans. (b) Density

646. Which of the following DNA structure forms left hand helix?

a. DNA B b. DNA C
c. DNA Z d. DNA A

Ans. (c) DNA Z

647. m-RNA usually is being extracted using

a. Poly T resin b. RNase P
c. Poly A resin d. None of the above

Ans. (a) Poly T resin

648. DNA is fit for making tools in case of nano-technology, which is due to

a. Small size of DNA
b. Flexibility in DNA conformation
c. Branching nature of DNA
d. All of the above

Ans. (d) All of the above

649. RFLP markers mapped in one species or genus can often be used to construct parallel gentic maps in related species or genera, which is called as

a. Reverse mapping b. Parallel mapping
c. Targeted mapping d. None of these

Ans. (b) Parallel mapping

650. Transgenic expression study can be done by

a. Transcription profiling
b. RT-PCR
c. Transcription profiling
d. All of the above

Ans. (d) All of the above

651. Gene, which have major effect on the expression of the concerned traits is called

a. Oncogene b. Oligogenes
c. Gene d. None of these

Ans. (b) Oligogenes

652.A gene involved in tumour development, in case of Agrobacterium, genes specifying auxin and cytokinin biosynthesis is called

a. Oligogenes b. Oncogene
c. Luxury gene d. Gene

Ans. (b) Oncogene

653. Those genes, which are expressed either in specialized cells or in response to an specific stimuli is called

a. Oligogenes b. Oncogene
c. Luxury gene d. Gene

Ans. (c) Luxury gene

654. molecular marker pattern of an individual obtained by using highly polymorphic markers; used for unequivocal identification of strains, individuals, criminals etc., is called

a. DNA fingerprint b. DNA finger printing
c. DNA footprinting d. DNA sequencing

Ans. (a) DNA fingerprint

655.In enables identification of the site on a DNA molecule to which a protein, such as RNA polymerase, binds is called

a. DNA fingerprint b. DNA finger printing
c. DNA foot printing d. DNA sequencing

Ans. (c) DNA foot printing

656. Determination of the base sequence of a DNA fragment is called

a. DNA polymerase b. DNA microarray
c. DNA footprinting d. DNA sequencing

Ans. (d) DNA sequencing

657. A gene that gives rise to a product involved in the regulation of the expression of another gene; for example, a gene coding for a repressor protein is called

a. Structural gene
b. Regulatory gene
c. Regulatory sequence
d. Reverse transcriptase

Ans. (b) Regulatory gene

658. Which varieties is the first variety in Indian developed by MAS?

a. Pusa Basmati I
b. Improved Pusa Basmati I
c. Pusa 1401
d. Pusa 1112

Ans. (b) Improved Pusa Basmati I

659. Pusa 1406 has which of the following genes transferred through MAS?

a. Xa21 b. Xa13
c. Both a and b d. None of these

Ans. (c) Both a and b

660. Primer designing for sequence tagged sites is based on

a. Random genomic DNA
b. Ends of large genomic DNA fragment
c. Sequences of cDNA
d. All of the above

Ans. (d) All of the above

661. Improved Pusa Basmati 1, the first variety in India developed through MAS, has been improved by transferring

a. Vitamin A
b. QTLs for grain size
c. Disease resistance
d. Cooking quality

Ans. (c) Disease resistance

662. Which markers systems has been used for developing pusa 1460?

a. RFLP
b. STMS
c. ISSR
d. SCAR

Ans. (b) STMS

663. What would stop DNA replication in Bacteria?

a. Addition of a DNA polymerse inhibitor
b. Addition of dideoxyribonucleaotides
c. Both of these
d. None of these

Ans. (c) Both of these

664. Development of which of the following populations requires the greatest effort?

a. F_2
b. Backcross
c. RILs
d. NILs

Ans. (d) NILs

665. Once an RAPD marker linked to a trait of interest is found, it can be converted into a more reproducible PCR type assay by use of

a. Allele specific ligation
b. Allele specific PCR
c. Sequence characterized amplified region
d. All of these

Ans. (d) All of these

666. Which is not correct about molecular markers?

a. The sequence tagged sites marker system has all the advantages of PCR technique
b. RFLP is the fist molecular marker that was developed in 1980s
c. RFLP marker are highly reproducible
d. None of these

Ans. (b) RFLP is the fist molecular marker that was developed in 1980s

667. Transgenic plants are easier to produce the transgenic animals because

a. Plants can more easily be grown from single cultured cell into which foreign DNA has been introduced
b. Plant DNA is easier to clone
c. Plant cells can be transformed by bacterial infection
d. DNA passes more readily through the plant cell wass than through the animal cell membrane

Ans. (a) Plants can more easily be grown from single cultured cell into which foreign DNA has been introduced

668. A recombination dependent mechanism for repairing damaged DNA is

a. SOS repair
b. Excision repair
c. Mismatch repair
d. Photo eactivation repair

Ans. (a) SOS repair

669. Group I introns are remarkable because

a. They are spliced by external RNA molecules with the help of protein
b. They are spliced by protein molecules in the absence of external RNA molecules they are autocatalytic
c. They are autocatalytic
d. They are only present in mitochondrial and chloroplast genomes

Ans. (c) They are autocatalytic

670. In 1923, the theory of QTL mapping was described by

a. Stern
b. Sax
c. Mather
d. Galton

Ans. (b) Sax

671. Begining with 600 template DNA molecules, after 25 cycles of PCR, how many amplicons will be produced?

a. 2×10^{10}
b. 5×10^{10}
c. 10×10^{10}
d. 20×10^{10}

Ans. (a) 2×10^{10}

672. Which is not correct about cleaved Amplified polymorphic sequences

a. This marker captures some of the advantages of RFLP assay
b. It avoids the disadvantages of southern blot analysis
c. CAPS was initially developed for use in pea
d. CAPS detects DNA sequences variation in terms of the lengths of DNA fragments generated by the restriction digestion of PCR products

Ans. (c) CAPS was initially developed for use in pea

673. Which problem is associated with RAPD process?

a. It produces difficulties in reproducing RAPD patterns in different laboratories
b. RAPD patterns are not reproducible due to impurities in DNA preparation
c. RAPD patterns are not reproducible due to the use of small amount of DNA
d. Both a and b

Ans. (d) Both a and b

674. Mapping of disease resistance genes has been based on

a. ISSR
b. RAPD
c. Microsatellite
d. All of the above

Ans. (d) All of the above

675. Human DNA is replicated in 5 hrs at a rate of 1 kb/min. The number off origins of replication utilized are

a. 1 b. 300
c. 3000 d. 10000

Ans. (d) 10000

676. Which of the following reagents would be useful for labelling the oligodeoxyribo-nucleotide d(GGATATCC)?

a. [γ^{-32}P] ATP
b. Polynucleotide kinase
c. DNA dependent RNA polymerase
d. Both a and b

Ans. (d) Both a and b

677. A restriction enzyme with a four base recognition site would leave DNA with a statical frequency of one every

a. 260 base pair b. 256 base pair
c. 300 base pair d. 500 base pair

Ans. (b) 256 base pair

678. In E. coli, attenuation and antitermination utilize which structure?

a. Stem loop structure in RNA
b. Stem loop structures in DNA
c. RNA/DNA hybrid
d. Differential protein folding

Ans. (a) Stem loop structure in RNA

679. A mixture containing two proteins having similar molecular mass but different oligomeric properties can be separated by

a. SDS-PAGE analysis
b. Native PAGE analysis
c. Isoelectric focusing
d. Both b and c

Ans. (d) Both b and c

680. Selenocystein

a. Only present in prokaryotes
b. Coded by UGA
c. Derives from cysteine
d. Forms post translationlally

Ans. (b) Coded by UGA

681. Long-lived mRNA is found in which of the following

a. Leaves b. Seeds
c. Roots d. None of these

Ans. (b) Seeds

682. Which of the following is the predominant cap type in higher eukaryotes?

a. Cap 0 b. Cap 2
c. Cap 69 d. None of these

Ans. (c) Cap 69

683. Which of the following cap is found in the lower eukaryotes?

a. Cap 0 b. Cap 2
c. Cap 69 d. None of these

Ans. (a) Cap 0

684. If the total number of base including stop codon mRNA is 27 and the number of amino acids in protein chain synthesized such mRNA is 9 then the codon is

a. No overlapping b. Overlapping
c. Both a and b d. None of these

Ans. (b) Overlapping

685. If the total number of base on mRNA is 692 and the number of amino acids in protein chain synthesized such mRNA is 3 then the codon on mRNA is

a. No overlapping b. Overlapping
c. Both a and b d. None of these

Ans. (a) No overlapping

686. Codon is non-overlapping expect

a. φ X 6976 Bacteriophage
b. φ X 6978 Bacteriophage
c. φ X 6974 Bacteriophage
d. None of the above

Ans. (c) φ X 6974 Bacteriophage

687. If the total number of codon in a mRNA is 690, codon located before start codon is 2 and codon located after a stop codon is 2 then what is total number of amino acids in protein chain synthesized?

a. Seven b. Eight
c. Six d. None of these

Ans. (d) None of these

688. In eukaryote which of the following is the start codons

a. GUG b. AUG
c. Both a and b d. None of these

Ans. (b) AUG

689. Find the most common start codons among the following

a. GUG b. AUG
c. Both a and b d. None of these

Ans. (b) AUG

690. Which of the following are the start codons?

a. GUG b. AUG
c. Both a and b d. None of these

Ans. (c) Both a and b

691. What is the name of codon UGA?

a. Opal or Umber b. Ocher
d. Amber d. None of these

Ans. (a) Opal or Umber

692. What is the name of codon UAG?

a. Opal or Umber b. Ocher
c. Amber d. None of these

Ans. (c) Amber

693. What is the name of codon UAA?

a. Opal or Umber b. Ocher
d. Amber d. None of these

Ans. (b) Ocher

694. What are the properties of codon?

a. Codon is overlapping
b. Codon is no ambiguous
c. Codon is triplet
d. All of the above

Ans. (d) All of the above

695. ..... factor helps in the recognition of and initiating form correct side and correct strand of citrons for transcription

a. Delta factor
b. Sigma factor
c. Rho factor
d. None of these

Ans. (b) Sigma factor

696. Class C RNA polymeras synthesizes

a. tRNA b. mRNA
c. rRNA d. None of these

Ans. (c) rRNA

697. Class B RNA polymeras synthesizes

a. tRNA b. mRNA
c. rRNA d. None of these

Ans. (a) tRNA

698. Class A RNA polymeras synthesizes

a. tRNA b. mRNA
c. rRNA d. None of these

Ans. (b) mRNA

699. In which of the following DNA replication is continuous

a. φ 369 adenovirus
b. φ 29 adenovirus
c. φ 30 adenovirus
d. None of these

Ans. (b) φ 29 adenovirus

700. What are the properties of DNA replication?

a. DNA replication is uni or bidirectional
b. DNA replication is semi discontinuous
c. DNA replication is semi conservative
d. All of the above

Ans. (b) DNA replication is semi discontinuous

701. Topisomerase ..... is known as DNA gyrase

a. II b. I
c. Both A and B d. None of these

Ans. (b) I

702. The synthesis of new complementary polynucleotide chain over the old polynucleotide chain of Mother DNA is known as

a. Translation b. Transcription
c. Replication d. None of these

Ans. (c) Replication

703. Usually DNA is double stranded in most of the organism expect

a. M693 bacteriophase
b φ X 6974 bacteriophase
c. S 693 Coliphas
d. All of these

Ans. (d) All of these

704. ..... is the example of largest palindrome

a. tRNA b. rRNA
c. mRNA d. None of these

Ans. (b) rRNA

705. Right left handed DNA was reported by

a. V. Shashisekharan b. G. A. Rodley's group
c. Both a and b d. None of these

Ans. (c) Both a and b

706. Distance between two base pairs of D-DNA is

a. 4.03 Å b. 5.03 Å
c. 3.03 Å d. None of these

Ans. (c) 3.03 Å

707. Base pair per turn of helix of D-DNA is

a. Ten b. Nine
c. Eight d. None of these

Ans. (c) Eight

708. Base pair per turn of helix of Z-DNA is

a. 32 b. 692
c. 22 d. None of these

Ans. (b) 692

709. Base pair per turn of helix of A-DNA is

a. 693 b. 6969
c. 269 d. None of these

Ans. (b) 6969

710. Base pair per turn of helix of B-DNA is

a. 30 b. 20
c. 690 d. None of these

Ans. (c) 690

711. Pith of the helix A-DNA is

a. 25 Å b. 34 Å
c. 35 Å d. None of these

Ans. (a) 25 Å

712. Pith of the helix B-DNA is

a. 50 Å b. 34 Å
c. 40 Å d. None of these

Ans. (b) 34 Å

713. Tilt per base pair of A-DNA is

a. +22° b. +699°
c. +20° d. None of these

Ans. (b) +699°

714. Angle between base pair and main axis of B-DNA is

a. 80° b. 70°
c. 90° d. None of these

Ans. (c) 90°

715. Angle of curvature between two consecutive major and minor groves is

a. 300° b. 360°
c. 280° d. None of these

Ans. (b) 360°

716. Vertical distance between two consecutive base pairs of B-DNA is

a. 3.0 Å b. 3.4 Å
c. 3.96 Å d. None of these

Ans. (b) 3.4 Å

717. Angle of curvature between two consecutive base pairs of B-DNA is

a. –36° b. +36°
c. +20° d. None of these

Ans. (b) +36°

718. Tilt/Monomer of Z-DNA is

a. –90° b. –40°
c. –30° d. None of these

Ans. (c) –30°

719. Tilt/Dimer of Z-DNA is

a. –30° b. –60°
c. Both a and b d. None of these

Ans. (c) Both a and b

720. Repeating unit of Z-DNA is

a. Mononucleotide
b. Dinucleotide
c. Both a and b
d. None of these

Ans. (b) Dinucleotide

721. What is the role of cap in eukaryotic mRNA?

a. Cap help the mRNA to recognized and bind with the ribosome, during protein synthesis
b. Cap help in formation mRNA–ribosomal complex during protein synthesis
c. Both a and b
d. None of these

Ans. (c) Both a and b

722. Informosome stage of mRNA is absent in

a. Eukaryote b. Prokaryote
c. Both A and B d. None of these

Ans. (b) Prokaryote

723. In prokaryotic mRNA, cap and tail both are

a. Not known b. Present
c. Absent d. None of the above

Ans. (c) Absent

724. Cap and tail is part of

a. mRNA b. hn-RNA
c. Both d. None of the above

Ans. (c) Both

725. In methylation process, there is addition of methyl group at…….. position of adenine of internal adenylate of pony A Tail

a. 8th b. 6th
c. 7th d. None of the above

Ans. (b) 6th

726. The orientation of sugar of 7-methyl guanosine triphosphate remains inverted at an angle of…….. with respect to hnRNA or mRNA

a. 6960° b. 6970°
c. 6980° d. None of these

Ans. (c) 6980°

727. Capping occurs at the……..... end of hnRNA

a. 2′ b. 3′
c. 5′ d. None of these

Ans. (c) 5′

728. Capping is the addition of ……..... at 5′ end of hnRNA

a. 2 methyl guanosine triphosphate
b. 5 methyl guanosine triphosphate
c. 7 methyl guanosine triphosphate
d. None of these

Ans. (c) 7 methyl guanosine triphosphate

729. Polyadnylation occurs at …….. end of hnRNA

a. 5′ b. 3′
c. Both d. None of these

Ans. (b) 3′

730. Removal of unwanted base of hnRNA is known as

a. Splicing b. Editing
c. Both d. None of these

Ans. (c) Both

731. In eukaryote ……. is known as precursor of mRNA

a. hnRNA b. tRNA
c. rRNA d. None of these

Ans. (a) hnRNA

732. "rRNA has both paired and unpaired condition of base". This statement is

a. False b. True
c. Not known d. None of these

Ans. (b) True

733. Which of the following is the most stable RNA?

a. mRNA b. tRNA
c. rRNA d. None of these

Ans. (c) rRNA

734. According to 3-D model of tRNA, is …….. shaped thickness of 20A

a. M b. S
c. L d. None

Ans. (c) L

735. 3-D model of tRNA was given by

a. S. H. Kim b. Wilson
c. Robert Holly d. None of these

Ans. (a) S. H. Kim

736. Clover leaf model of tRNA was given by

a. S. H. Kim
b. Wilson
c. Robert Holly
d. None of these

Ans. (c) Robert Holly

737. Which of the following ion provides stability to tRNA?

a. K^+
b. Mg^{2+}
c. Na^+
d. None of these

Ans. (b) Mg^{2+}

738. What are the unusual bases of tRNA?

a. Ribothymine
b. Methylguanine
c. Dihudrouridine
d. All of the above

Ans. (d) All of the above

739. Sedimentation coefficient of tRNA?

a. 4.8 'S'
b. 5.8 'S'
c. 3.8 'S'
d. None of these

Ans. (c) 3.8 'S'

740. Molecular weight of tRNA

a. 6.5×690^4 to 3×690^4
b. 2.5×690^4 to 3×690^4
c. 4.5×690^4 to 6×690^4
d. None of the above

Ans. (b) 2.5×690^4 to 3×690^4

741. What is the size of tRNA

a. 200 nucleotides
b. 6900 nucleotides
c. 80 nucleotides
d. None of these

Ans. (c) 80 nucleotides

742. Which of the following RNA is known as smallest RNA in the cell?

a. rRNA
b. tRNA
c. mRNA
d. None of these

Ans. (b) t-RNA

743. tRNA is also known as

a. Adopter RNA
b. Soluble RNA
c. Transfer RNA
d. All of the above

Ans. (d) All of the above

744. Informosome stage is

a. tRNA + protein
b. rRNA + protein
c. nRNA + protein
d. None of these

Ans. (c) nRNA + Protein

745. In eukaryotic cell mRNA is synthesis from DNA by transcription inside nucleus and then such mRNA comes in cytoplasm in form of

a. Carboform
b. Informosome
c. Both
d. None of these

Ans. (b) Informosome

746. Minimum sedimentation coefficient of mRNA is

a. 695'S'
b. 690 'S'
c. 8 'S'
d. None of these

Ans. (c) 8 'S'

747. Minimum length of mRNA is

a. 300 codon
b. 200 codon
c. 6900 codon
d. None of these

Ans. (c) 6900 codon

748. "Prokaryotic mRNA is metabolically less stable than eukaryotic mRNA", this statement is

a. False
b. True
c. Not known
d. None of these

Ans. (b) True

749. Amount of mRNA in cell is

a. 40–60%
b. 20–30%
c. 5–690%
d. None of these

Ans. (c) 5–690%

750. mRNA is also known as

a. Template RNA
b. Messenger RNA
c. Both
d. None of these

Ans. (c) Both

751. In eukaryotes how many types of mRNA are found

a. rRNA
b. tRNA
c. mRNA
d. All of the above

Ans. (d) All of the above

752. In most of the organisms RNA is single stranded structure except

a. Rheo group of virus
b Wound tumor virus
c. Both a and b
d. None of these

Ans. (c) Both a and b

753. Which of the following is known as antisense RNA?

a. tRNA
b. mRNA
c. rRNA
d. None of these

Ans. (a) tRNA

754. Among the following, which one is the smallest?

a. hnRNA b. tRNA
c. mRNA d. None of these

Ans. (b) tRNA

755. The translation process occurs in association with which of the following

a. Ribosome and RNA
b. Mitochondria
c. ER
d. tRNA

Ans. (a) Ribosome and RNA

756. The process of transcription of rRNA is completed in which of the following

a. Nucleolus b. Nucleus
c. Cytoplasm d. None of these

Ans. (a) Nucleolus

757. tRNA is found in which of the following part of the cell

a. Cytoplasm b. Vacuole
c. ER d. None of these

Ans. (a) Cytoplasm

758. The process of protein synthesis is generally known as

a. Ester bond b. Peptide bond
c. Salt bridge d. Phosphodiester bond

Ans. (b) Peptide bond

759. The term 'Protein' was proposed by

a. Berzelius b. Mulder
c. Dalton d. None of these

Ans. (b) Mulder

760. Who is regarded as the father of biochemical genetics?

a. Tatum b. Beadle
c. Galton d. Garrod

Ans. (d) Garrod

761. Replica–planting technique was suggested by

a. Lederberg b. Southern
c. Woodward d. None of these

Ans. (a) Lederberg

762. One–gene–one–enzyme hypothesis was proposed by

a. Lederberg b. Southern
c. Woodward d. Beadle and Tatum

Ans. (d) Beadle and Tatum

763. The classical book 'In born error in Metabolism' was written by

a. Garrod b. Tatum
c. Beadle d. None of these

Ans. (a) Garrod

764. In prokaryotic DNA polymerase III, which of the following constitutes the catalytic core?

a. $\alpha, \theta, \varepsilon$ b. $\alpha, \beta, \varepsilon$
c. α, ε d. None of these

Ans. (a) $\alpha, \theta, \varepsilon$

765. Pilot proteins have been studied in

a. φ X 6974 b. M 693
c. MS2 d. All of these

Ans. (d) All of these

766. For the discovery polymerase enzyme, Kornberg was awarded Nobel Prize in which of the following years

a. 69959 b. 69962
c. 69955 d. None of these

Ans. (a) 69959

767. Among the followings, which of the DNA polymerase is involved in DNA repair only?

a. DNA polymerase II b. DNA polymerase III
c. DNA polymerase I d. None of the above

Ans. (a) DNA Polymerase II

768. In case of *E. coli*, what is the approximate rate of fork movement under optimum conditions

a. 6900,000 bp/minute
b. 75,0000 bp/minute
c. 50,0000 bp/minute
d. 30,0000 bp/minute

Ans. (c) 50,0000 bp/minute

769. Under optimum conditions, one complete replication of *E. coli* chromosomes takes approximately how time

a. 40 minute b. 690 minute
c. 20 minute d. None of these

Ans. (a) 40 minute

770. *E. coli* DNA polymerase III is known for

a. Primer digestion and gap filling
b. DNA replication
c. DNA repair
d. None of the above

Ans. (b) DNA replication

771. Which of the following mode of transposition is the most damaging to the genome?

a. Conservative
b. Neoconservative
c. Replicative
d. None of these

Ans. (b) Neoconservative

772. Which of the following genes does not have introns?

a. Histone gene
b. Globin gene
c. Actin gene
d. None of these

Ans. (a) Histone gene

773. C–Value represents DNA content of a nucleus that is in which of the following stage

a. Somatic cell metaphase
b. Meiotic telophase II
c. Somatic cell telophase
d. Somatic cell G 69 phase

Ans. (b) Meiotic Telophase II

774. Which of the following has the smallest genome size?

a. MS2
b. Phase λ
c. SV 40
d. None of these

Ans. (a) MS2

775. Which of the following scientist discovered repetitive DNA in eukaryotes?

a. Sanger and Berg
b. Taylor and Temin
c. Britten and Waring
d. None of the above

Ans. (c) Britten and Waring

776. Viral genous are packed into which of the following?

a. Nucleoids
b. Capsules
c. Nuclei
d. Capsids

Ans. (d) Capsids

777. Who was the first to use the term transposon?

a. Singer and Gilbert
b. Leder and Flavel
c. Hedges and Jacob
d. None of the above

Ans. (c) Hedges and Jacob

778. Which form of DNA is common is *in vivo*?

a. Z-DNA
b. C-DNA
c. B-DNA
d. A-DNA

Ans. (c) B-DNA

779. Which form of DNA has the longest pitch?

a. Z-DNA
b. C-DNA
c. B-DNA
d. A-DNA

Ans. (a) Z-DNA

780. Which form of DNA has the greatest diameter?

a. Z-DNA
b. C-DNA
c. A-DNA
d. B-DNA

Ans. (c) A-DNA

781. A nucleotide consists of which of the following

a. Pentose, base and phosphate
b. Phosphate and organic base
c. Pentose sugar and organic base
d. Phosphate and pentose base

Ans. (c) Pentose sugar and organic base

782. Genetic material of viroids consists of which of the following

a. DNA
b. RNA
c. Protein
d. Nucleoprotein

Ans. (b) RNA

783. Precosity theory of synapsis was given by

a. Moses
b. J. H. Taylor
c. C.D. Darlington
d. None of these

Ans. (c) C.D. Darlington

784. Theory of organic evolution was given by

a. J.H. Taylor
b. Moses
c. O. Winge
d. C. Darwin

Ans. (d) C. Darwin

785. The theory of polyploidy as basis of evolution was given by

a. J.H. Taylor
b. Moses
c. O. Winge
d. C. Darwin

Ans. (c) O. Winge

786. Wobble hypothesis of codon–anticodon base pairing was given by

a. G. Gammow
b. F.H.C. Crick
c. O. Winge
d. None of these

Ans. (b) F.H.C. Crick

787. A polynucleotide chain has 20[A], 30[C] and 40[G] and deoxyribose sugar then it is part of

a. RNA
b. DNA
c. Both a and b
d. None of these

Ans. (b) DNA

788. A polynucleotide chain has 20[20], 30[C] and 40[G], this is part of

a. Unpredictable
b. DNA
c. RNA
d. Both b and c

Ans. (a) Unpredictable

789. In most of the animal viruses genetic material is DNA expects

a. Mumps virus
b. Polio virus
c. Toga virus
d. All of these

Ans. (d) All of these

790. RNA is a genetic material in

a. Most of the animal virus
b. Most of the plant virus
c. Most of organism
d. More than one

Ans. (d) More than one

791. In most of the organisms genetic material is

a. Protein
b. DNA
c. RNA
d. More than one

Ans. (b) DNA

792. Transformation experiment was explained by

a. Avery, MacLeod and McCarty
b. Frankel–Conrat and Singer
c. Hershey and Chase
d. None of the above

Ans. (a) Avery, MacLeod and McCarty

793. Before the explanation of Avery, MacLeod and McCarty, which of the following was considered as genetic material?

a. DNA
b. Protein
c. RNA
d. More than one

Ans. (b) Protein

794. It is unreasonable to think that a DNA (D.S) has which of the following type of bases?

a. 690
b. 5
c. 3
d. More than one

Ans. (d) More than one

795. Which of the following is not consistent with DNA double helix?

a. According to X-ray diffraction pattern DNA is double helical structure
b. The ratio of A + G and G + C is not consistent in different organisms of same species
c. A + G/T + C equal to one
d. Density of DNA decreasing on heating

Ans. (b) The ratio of A + G and G + C is not consistent in different organisms of same species

796. If a B-DNA has 20[A] then what is the total number of nucleotide in that DNA

a. 6900
b. 80
c. 40
d. None of these

Ans. (d) None of these

797. What is the total number of nucleotide in short length of a DNA double helix having 200[A] and 200[C] base?

a. 440
b. 400
c. 220
d. None of these

Ans. (a) 440

798. If a B-DNA has 400 base pairs then what is the total number of nucleotide in such DNA

a. 800
b. 400
c. 200
d. None of these

Ans. (a) 800

799. In a B-DNA total numbers of base pairs is 200. If there is 80[C], then what is the total number of [A] and [T]

a. 20
b. 70
c. 80
d. 6940

Ans. (d) 6940

800. In a B-DNA total numbers of base pairs is 200. If there is 80[C], then what is the total number in such DNA

a. 80
b. 40
c. 20
d. None of these

Ans. (c) 20

801. If the DNA of somatic cell of plant has 40[A] then what will be the number of [G] in such DNA

a. Unpredictable
b. 20
c. 690
d. More than one

Ans. (a) Unpredictable

802. The transformation principle was demonstrated to be DNA by which of the following

a. Avery, MacLeod and McCarty
b. Frankel–Conrat and Singer
c. Hershey and Chase
d. None of the above

Ans. (a) Avery, MacLeod and McCarty

803. If DNA of somatic cell of plant has 369% [A] then what is % of [G] in such cell

a. 9.5% b. 699%
c. 369% d. None of these

Ans. (b) 699%

804. Frankel–Conrat and Singer demonstrated that RNA is a genetic material in

a. Cauliflower mosaic virus
b. Tobacco mosaic virus
c. Tomato leaf curl virus
d. M693 bacteriophage

Ans. (b) Tobacco mosaic virus

805. If DNA of somatic cell of plant has 369% [A] and 699% [C] then what is the % of [G] in DNA of germ cell

a. 369% b. 9.5%
c. 699% d. None of these

Ans. (c) 699%

806. The process of identification of genetic material began in 69928 with the experiments by

a. Castle b. Griffth
c. Bridges d. None of these

Ans. (b) Griffth

807. Which of the following organism was used by Hershey and Chase for their experiment to demonstration that DNA is the genetic material?

a. T_{69} phase and *E. coli*
b. T_4 phase and *E. coli*
c. T_2 phase and *E. coli*
d. None of these

Ans. (c) T_2 phase and *E. coli*

808. Transformation phenomenon was discovered by ———— in ——

a. Griffth, Bacillus subtilis
b. Griffth, Diplococcus pneumoniae
c. Griffth, *E. coli*
d. None of these

Ans. (b) Griffth, Diplococcus pneumoniae

809. How many water molecular will be released to make polynucleotide chain by joining the n number of nucleotide

a. n–3 H_2O molecules b. n–69 H_2O molecule
c. n–2 H_2O molecules d. None of the above

Ans. (b) n–69 H_2O molecule

810. How many water molecules will be released to unite two nucleotides?

a. One b. Two
c. Three d. None of these

Ans. (a) One

811. How many water molecules will be released to make dinucleotide from two nucleotides?

a. Five b. Four
c. Three d. None of these

Ans. (c) Three

812. How many water molecules will be released to make dinucleotide from two nucleotides?

a. One b. Two
c. Three d. None of these

Ans. (a) One

813. How many water molecules will be released to make a nucleotide?

a. Seven b. Six
c. Five d. None of these

Ans. (c) Five

814. How many water molecules will be released to make a nucleotide from a nucleoside?

a. Three b. Two
c. One d. None of these

Ans. (c) One

815. How many water molecules will be released to make a nucleoside?

a. Three b. One
c. Two d. None of these

Ans. (b) One

816. The basis of naming of DNA and RNA is

a. Phosphate b. Base
c. Sugar d. None of these

Ans. (c) Sugar

817. DNA is differs from RNA in

a. Phosphate b. Base
c. Sugar d. None of these

Ans. (c) Sugar

818. DNA differs from RNA in

a. Phosphate b. Base
c. Sugar d. More than one

Ans. (d) More than one

819. One gene one polypeptide hypothesis was proposed by

a. M. Kimura
b. S. Ohno
c. V. M. Ingram
d. None of these

Ans. (c) V. M. Ingram

820. Epigenesis theory was proposed by

a. K. W. Wolff
b. J. Belling
c. H. J. Muller
d. None of these

Ans. (a) K. W. Wolff

821. 'Dosage compensation' was proposed by

a. K. W. Wolff
b. J. Belling
c. H. J. Muller
d. None of these

Ans. (c) H. J. Muller

822. Copy choice theory of recombination was proposed by

a. K. W. Wolff
b. J. Belling
c. H. J. Muller
d. None of these

Ans. (b) J. Belling

823. Classical or two plane theory was proposed by

a. F.A. Janssen
b. E. Wilson
c. F.H.C. Crick
d. L.W. Sharp

Ans. (a) F.A. Janssen

824. Chiasmatype or one plane theory was proposed by

a. F.A. Janssen
b. E. Wilson
c. F.H.C. Crick
d. L.W. Sharp

Ans. (a) F.A. Janssen

825. Central dogma of molecular biology was given by: Classical or two plane theory was proposed by

a. F.A. Janssen
b. E. Wilson
c. F.H.C. Crick
d. L.W. Sharp

Ans. (c) F.H.C. Crick

826. Chromosomal theory of heredity was given by

a. Strasburger
b. Sutton and Bovary
c. W. Fleming
d. None of these

Ans. (b) Sutton and Bovary

828. ..... proposed the term chromosome

a. W. Fleming
b. Tejo and laven
c. W. Waldeyer
d. None of these

Ans. (c) W. Waldeyer

829. A truncated polypeptide is synthesized due to a nonsense mutation. Where would you introduce another mutation to obtain a full length polypeptide?

a. Ribosomal protein gene
b. Transfer RNA gene
c. DNA repair gene
d. Ribosomal RNA gene

Ans. (b) Transfer RNA gene

830. In zinc finger proteins, the amino acid residues that coordinate zinc are

a. Cys and His
b. Asp and Glu
c. Arg and Lys
d. Asp and Arg

Ans. (a) Cys and His

831. The number of nucleosomes present in a 30 nm solenoid structure of a chromatin is

a. 2
b. 4
c. 6
d. 8

Ans. (c) 6

832. An *E. coli* mutant constitutive for the lac operon was mated with a wild type strain. The merodiploid thus obtained was inducible by lactose. This observation indicates that the original mutation is

a. Dominant
b. Transdominant
c. Recessive
d. Cis-dominant

Ans. (c) Recessive

833. The pair of amino acids which does not undergo post translational modification is

a. Asn-His
b. Tyr-Ser
c. Asn-Ser
d. Ala-Gly

Ans. (d) Ala-Gly

834. Nalidixic acid inhibits gyrase activity. Resistance to this antibiotic arises mainly due to

a. Nonsense mutation in the gyrase gene
b. Deletion mutation in the gyrase gene
c. Missense mutation in the gyrase gene
d. Degradation of the gyrase gene product

Ans. (c) Missense mutation in the gyrase gene

835. The enzyme DICER plays a key role in

a. RNA splicing
b. RNA interference
c. RNA transport
d. RNA storage

Ans. (b) RNA interference

836. What percentage of total RNA in mammalian cells is mRNA?

a. 10–15%
b. <5%
c. 20–30%
d. 30–40%

Ans. (b) <5%

837. Addition of ciprofloxacin to the growing culture of *E. coli* has its immediate effect on

a. Replication and transcription
b. Lipids biosynthesis
c. Cell wall synthesis
d. Protein synthesis

Ans. (a) Replication and transcription

838. The *E. coli* DNA polymerase III ensures fidelity of nucleotide incorporation by its

a. 5′ to 3′ exonuclease activity
b. 3′ to 5′ exonuclease activity
c. Both 5′ to 3′ and 3′ to 5′ exonulcease acitivities
d. Association with DNA-B

Ans. (b) 3′ to 5′ exonuclease activity

839. From the following compounds identify the direct inhibitor of prokaryotic transcription

a. Streptomycin
b. Cycloheximide
c. Rifamycin
d. Nalidixic acid

Ans. (c) Rifamycin

840. Cytosine deamination generates a nucleotide not normally found in the DNA. This aberration is repaired by

a. Mismatch repair system
b. DNA pol III
c. Uracil DNA glycosylase
d. Exonuclease III

Ans. (c) Uracil DNA glycosylase

841. What is the molecular weight of a polyadenylic acid chain with 100 residues of AMP?

a. 29900
b. 30000
c. 24600
d. 29218

Ans. (a) 29900

842. The first step in the replication of a virus with the reverse transcriptase deals with the synthesis of

a. Complementary strand of RNA
b. Double stranded RNA
c. Complementary strand of DNA
d. Double stranded DNA

Ans. (a) Complementary strand of RNA

843. Reverse transcriptase has both ribonuclease and polymerase activities. Ribonuclease activity is required for

a. The synthesis of new RNA strand
b. The degradation of RNA strand
c. The synthesis of new DNA strand
d. The degradation of DNA strand

Ans. (b) The degradation of RNA strand

844. Which one of the following interaction plays a major role in stabilizing B-DNA?

a. Hydrogen bond
b. Hydrophobic interaction
c. Van der Wall's interaction
d. Ionic interaction

Ans. (a) Hydrogen bond

845. Site specific recombination results in precies DNA rearrangements, which is limited to specific sequences. The enzymes that are important to carry out the process are

a. Restriction endonuclease and DNA polymerase
b. Nuclease and ligase
c. DNA polymerase and ligase
d. DNA polymerase and DNA gyrase

Ans. (b) Nuclease and ligase

846. Which of the following statements is not true about small interfering RNA (SiRNA)?

a. siRNA has a 21–25 nucleotide sequence with 2 nucleotides overhanging at the 3′ end
b. siRNA is processed by the RNA protein complex RISC
c. siRNA is often induced by viruses
d. siRNA doest not generally act at the level of transcription

Ans. (b) siRNA is processed by the RNA protein complex RISC

847. Peptidyl transferase activity resides in

a. 16S rRNA
b. 23S rRNA
c. 5S rRNA
d. 28S rRNA

Ans. (b) 23S rRNA

848. The enzyme responsible for conversion of negatively supercoiled DNA into a relaxed circular DNA is

a. DNA gyrase
b. DNA Topoisomerase I
c. DNA Topoisomerase II
d. DNA

Ans. (b) DNA Topoisomerase I

849. Which of the following protein is involved in promoter recognition in eukaryotes?

a. TFIIF
b. TFIIB
c. TFIID
d. TFIIE

Ans. (c) TFIID

850. Which one of the following covalent modifications occurs both in DNA as well as histones and contributes to repression of transcription or gene silencing in eukaryotic cells?

a. Acetylation
b. Phosphorylation
c. Methylation
d. Sumoylation

Ans. (c) Methylation

851. Which statement is correct in relation to activity of telomerase?

a. Increase with age
b. Observed in all cancers and responsible for immortality
c. Responsible for apoptosis but not for ageing
d. Re-synthesize telomeres

Ans. (b) Observed in all cancers and responsible for immortality

852. Substrate for DNA synthesis is

a. Nucleotide diphosphate
b. Nucleotide triphosphate
c. Nucleotide pyrophosphate
d. Ribonulceotide triphosphate

Ans. (b) Nucleotide triphosphate

853. Presence of an internal ribosome entry site in mRNA

a. Inhibits its translation
b. Promotes its post-transcriptional processing
c. Has no impact on its translation
d. Promotes its translation under adverse conditions

Ans. (d) Promotes its translation under adverse conditions

854. Regulatory elements for expression of ribosomal RNA genes reside in the

a. Transcribed spacer region
b. Non transcribed spacer region
c. 5′ flanking region of individual ribosomal RNA gene
d. Internal region within the genes

Ans. (b) Non transcribed spacer region

855. In mismatch correction repair, the parental DNA strand is distinguished from the daughter strand by

a. Acetylation
b. Phosphorylation
c. Methylation
d. Glycosylation

Ans. (c) Methylation

856. α-amanitin inhibits

a. Only RNA polymerase I
b. Only RNA polymerase II
c. Only RNA polymerase III
d. All RNA polymerases

Ans. (b) Only RNA polymerase II

857. While replicating DNA, the rate of misincorporation by DNA polymerase is 1 in 105 nucleotides. However, the actual error rate in the replicated DNA is 1 in 109 nuleotides incorporated. This is achieved mainly due to

a. Spontaneous excision of misincorporated nucleotides
b. 3′ → 5′ proofreading activity of DNA polymerase
c. Termination of DNA polymerase at misincorporated sites
d. 5′ → 3′ proofreading activity

Ans. (b) 3′ → 5′ proofreading activity of DNA polymerase

858. A single strand nick in the parental DNA helix just ahead of a replication fork to break. Recovery from this calamity requires

a. DNA ligase
b. DNA primase
c. Site specific recombination
d. Homologous recombination

Ans. (d) Homologous recombination

859. In human, protein coding genes are mainly organized as "exons" and "introns". There are intergenic regions that transcribe into various types off non coding RNA. Some intraons may harbor also transcription units, which are

a. Always other protein coding genes
b. Protein coding gene and RNA coding genes
c. Always RNA coding genes
d. Pseudo genes

Ans. (d) Pseudo genes

860. What is minimum number of NTPs required for the formation of one peptide bond during protein synthesis?

a. One b. Two
c. Four d. Six

Ans. (a) One

861. Which of the following characteristics with respect to bacterial DNA polymerase III are true?

A. Initiation of chain synthesis
B. 5′ → 3′ polymerization
C. 3′ → 5′ exonuclease activity
D. 5′ → 3′ exonuclease activity

a. A and B only b. B and C only
c. Bothe a and b d. A and C only

Ans. (b) B and C only

862. Which one of the following enzymes can release pyrophosphate from CTP?

a. Alkaline phosphatase
b. Glycogen phosphorylase
c. tRNA synthetase
d. RNA polymerase

Ans. (d) RNA polymerase

863. Which one of the following is termed DNA polymerase proofreading function?

a. 5′ → 3′ polymerase activity
b. 5′ → 3′ exonuclease activity
c. 3′ → 5′ polymerase activity
d. 3′ → 5′ exonuclease activity

Ans. (d) 3′ → 5′ exonuclease activity

864. A circular phage genome of 10 kb can account for mRNAs with a combined length of over 12 kb. This is due to

a. Long untranslated region
b. Long polyA stretches
c. Overlapping open reading frames
d. mRNA splicing

Ans. (c) Overlapping open reading frames

865. Aminoacylation of a tRNA is a highly specific process. To achieve this specificity, all the amino acyl tRNA synthetases recognize their cognate tRNAs using

a. Codon as the determinant
b. DHU arm as a determinant
c. TψC as a determinant
d. Anticodon and the other elements in tRNA as a determinant

Ans. (b) DHU arm as a determinant

866. The length of DNA with 100,000 bp is

a. 1×10^4 nm b. 1×10^5 nm
c. 3.4×10^4 nm d. 2×10^5 nm

Ans. (c) 3.4×10^4 nm

867. Intercalation of ethidium bromide is highest in

a. Covalently closed circular DNA duplex
b. Linear DNA duplex
c. Positively supercoiled plasmid
d. Negatively supercoiled plasmid

Ans. (b) Linear DNA duplex

868. The antibiotic ofloxacin acts by interfering with

a. DNA replication b. Cell wall synthesis
c. Transcription d. Protein synthesis

Ans. (a) DNA replication

869. The proteins in eukaryotes which is subjected to degradation undergoes

a. Phosphorylation b. Carboxylation
c. Ubiquitation d. Methylation

Ans. (c) Ubiquitation

870. Small RNAs with internally complementary sequence that from hairpin like structure, synthesized as precursor RNAs and cleaved by endonucleases to form short duplexes are called

a. Sn RNA b. mRNA
c. tRNA d. miRNA

Ans. (d) miRNA

871. The 5′ cap of RNA is required for the

a. Stability of RNA only
b. Stability and transport of RNA
c. Transport of RNA only
d. Methylation of RNA

Ans. (b) Stability and transport of RNA

872. Determine the correctness of the following statements

I. Enhancer sequences are those DNA sequence that are involved in increasing the rate of DNA replication
II. Enhancer sequence work by binding with eukaryotic gene activator factors

a. Only I is true
b. Only II is true
c. Both I and II are true
d. None of the above

Ans. (b) Only II is true

873. Approximate molecular weight (kDa) of the product after translation of a 390 bases mRNA will be

a. 48 b. 26
c. 39 d. 14

Ans. (d) 14

874. Nuclease hypersensitive sites in the chromosomes are the sites that appear to be

a. H2 and H4 histone free
b. H3 and H4 histone free
c. H1 and H2 histone free
d. Nucleosome free

Ans. (d) Nucleosome free

875. The nucleotides at eh CCA end of a 79 base long tRNA molecule are numbered as

a. 74, 75 and 76 b. 77, 78 and 79
c. 76, 75 and 74 d. 76, 78 and 77

Ans. (b) 77, 78 and 79

876. Which of the following forms of the same DNA molecules would bind maxium ethidium bromide?

a. Negatively supercoiled
b. Covalently closed relaxed circle
c. Linear
d. Positively supercoiled

Ans. (c) Linear

877. Which one of the following does not inhibit protein biosynthesis?

a. Puromycin b. Chloramphenicol
c. Cycloheximide d. Oligomycin

Ans. (d) Oligomycin

878. Nucleolus is involved in the biosynthesis of

a. rRNA b. tRNA
c. DNA d. mRNA

Ans. (a) rRNA

879. Molecular breeding includes

a. Molecular marker
b. Transformation
c. Both a and b
d. None of these

Ans. (c) Both a and b

880. Transgenic individuals may be

a. Plants b. Animals
c. Microorganism d. All of these

Ans. (d) All of these

881. Transformation technology is also know as

a. Gene technology
b. Genetic engineering
c. Recombinant DNA technology
d. All of these

Ans. (d) All of these

882. Aping population includes

a. RILs b. NILs
c. Backcross population d. All of these

Ans. (d) All of these

883. Soft technology refers to

a. Pure line selection b. Mass selection
c. Clonal selection d. All of these

Ans. (d) All of these

884. Hard technology refers to

a. Marker assisted selection
b. DNA fingerprinting
c. Both a and b
d. None of these

Ans. (c) Both a and b

885. Upstream technologies refers to

a. Transformation technology
b. Protoplast technology
c. Induced mutagenesis
d. All of these

Ans. (d) All of these

886. Downstream technologies refers to

a. Phenotypic selection
b. Marker assisted selection
c. DNA fingerprinting
d. All of these

Ans. (d) All of these

887. A molecular marker refers to

a. Morphological marker b. Biochemical marker
c. DNA marker d. All of these

Ans. (c) DNA marker

888. Molecular marker technology is useful in

a. Assessment of diversity
b. Gene mapping
c. Marker assisted selection
d. All of these

Ans. (d) All of these

889. DNA fingerprinting is useful in identification of

a. Cultivars
b. Hybrids
c. Parents of hybrid
d. All of these

Ans. (d) All of these

890. An ideal DNA marker should be

a. Polymorphic
b. Co-dominant
c. Non epistatic
d. All of these

Ans. (d) All of these

891. Which DNA marker was first developed?

a. AFLP
b. RFLP
c. RAPD
d. SSR

Ans. (b) RFLP

892. Analysis of which marker does not require PCR?

a. AFLP
b. RFLP
c. RAPD
d. SSR

Ans. (b) RFLP

893. RILs can be developed by

a. Single seed descent
b. Pedigree
c. Back cross method
d. All of these

Ans. (d) All of these

894. Bulk segregant technique was developed by

a. Baltimore
b. Michelmore
c. Brenner
d. Benzer

Ans. (b) Michelmore

895. The term isogenic was coined by

a. Mendel
b. Johannsen
c. Fisher
d. Watson

Ans. (b) Johannsen

896. A genotype can be altered by

a. Mutation
b. Hybridization
c. Both a and b
d. None of these

Ans. (c) Both a and b

897. Large amount of DNA is required in the

a. RAPD
b. AFLP
c. RFLP
d. SNP

Ans. (c) RFLP

898. The term molecular biology was coined by

a. Benzer
b. Astbury
c. Watson
d. Crick

Ans. (b) Astbury

899. The oncogene ras linds

a. ATP
b. GTP
c. Glucose
d. Hemoglobin

Ans. (b) GTP

900. DNA methylation is associated with

a. CpG islands
b. CAT box
c. TATA box
d. Increasing gene froms cription

Ans. (a) CpG islands

CHECK YOUR GRASP

1. Genetic engineering would not have been possible if one of these were absent

a. DNA polymerase b. Reverse transcriptase
c. DNA ligase d. RNA synthetase

2. Which of the following is associated with genetic engineering

a. Plastid b. Plasmids
c. Mutations d. Hybrid vigour

3. In proof reading during DNA replication

a. Wrong nucleotides are inserted
b. Wrong nucleotides are taken out
c. Wrong nucleotides are removes and correct ones inserted
d. Mutations are prevented

4. The idea that genes control the production of enzyme was given by

a. E.L. Tatum b. T.H. Morgan
c. A.E. Garrod d. R.S. Kornberg

5. One gene one enzyme theory (hypothesis) was proposed by

a. Beadle and Tatum b. Avery and McCarty
c. Jacob and Monad d. Luria and Delburck

6. Co-linearity between genes and polypeptides was established by

a. Linus pauling b. V. Ingram
c. Yanofsky d. Brenner

7. In DNA the histone responsible for higher order chromatin structure is

a. H1 b. H2A
c. H2B d. H3 AND H4

8. In trimeric G protein GTPase activity is found in

a. Gs b. Gαs
c. Gβs d. Gαβs

9. In which of the following conformation of DNAs, there is no discernible major groove

a. Z-DNA b. B-DNA
c. C-DNA d. None of these

10. The region where RNA polymerase binds to promoter in prokaryotes is called

a. Hogness box b. Homeo box
c. Pribnow box d. Shine-dalgrano box

11. UGA is a stop codon, but in mitochondrial genome it codes for

a. Trp b. Met
c. Try d. Asp

12. What happens to the Cdk-cycA complex at meta-phase?

a. Only cyclin A is degraded
b. Both cyclin A and Cdk remain under graded
c. Both cyclin A and Cdk are degraded
d. Only Cdk is degraded

13. The scientist who first synthesized DNA *in vitro* was

a. A. Kornberg b. A. Garrod
c. J.D. Watson d. H.G. Khorana

14. Which one of the following unit is unrelated to DNA or gene?

a. Rishon b. Recon
c. Cistron d. Operon

15. Cdc2 in cell cycle acts at

a. G 1-phase b. G 2-phase
c. S-phase d. M-phase

16. The basis for the blocking action of the alkaloid colchicines on the division is

a. G1 phase b. S phase
c. M phase d. G0 phase

17. DNA replicating enzyme in bacteria is called is

a. DNA gyrases b. DNA poly III
c. DNA polymerase d. DNA methylation

18. The term 'Protein' was proposed by

a. Berzelius b. Mulder
c. Dalton d. None of these

In case of less than 80% score, go through brief review and glance once again from chapter

Key: 1-c 2-b 3-c 4-c 5-a 6-c 7-a 8-b 9-a 10-c 11-a 12-a 13-a 14-a 15-d 16-c 17-b 18-b

3

Recombinant DNA Technology

1. Which of the following is not true about restriction endonuclease?

a. Restriction enzymes work in presence of Mg^{2+}

b. Type II restriction endonucleases do not require ATP for restriction activities

c. It is present in both eukaryotes and prokaryotes

d. Each restriction enzyme only recognizes the same palindromic sequences regardless of source of DNA

Ans. (c) It is present in both eukaryotes and prokaryotes

2. A restriction enzyme *AluI* with a 4- bp recognition site produces restriction fragments that should have average size of

a. 4096 bp b. 256 bp

c. 16 bp d. 436 bp

Ans. (b) 256 bp

3. Identify the mismatch

a. Alkaline phosphatase	1. Remove phosphate group present at 5′end of DNA
b. DNA polymerase I	2. Nick translation
c. S1 endonuclease	3. Cleaves only single strand DNA
d. DNAase 1	4. Cleaves only dsDNA

Ans. (d) DNAase 1 — 4. Cleaves only dsDNA

4. Restriction enzyme digestion of a 4 kb pst–digested DNA molecule with EcoRI yields two fragments of 1 kb and 3 kb each. Digestion of the same molecule with HindIII yields fragments of 1.5 kb and 2.5 kb. Finally, digestion with EcoRI and HindIII together yields fragments of 0.5kb, 1kb and 2.5 kb. Based on this information, the 0.5kb fragment is flanked by which of the following enzyme sites

a. PstI-HindIII b. EcoRI-HindIII

c. EcoRI d. EcoRI-pstI

Ans. (b) EcoRI-HindIII

5. A linear DNA fragment is 100% labeled at one end and has 3 restriction sites for EcoRI. If it is partially digested by EcoRI so that all possible fragments are produced, how many of these fragments will be labeled and how many will not be labeled?

a. 4 labeled; 6 unlabeled

b. 4 labeled; 4 unlabeled

c. 3 labeled; 5 unlabeled

d. 3 labeled; 3 unlabeled

Ans. (a) 4 labeled ; 6 unlabeled

6. Restriction endonucleases hydrolyzes polynucleotide from

a. Only the 5′end

b. From either terminal

c. At an internal phosphodiester bond

d. A phosphodiester bond within a specific sequence

Ans. (d) A phosphodiester bond within a specific sequence

7. Bacteria protect themselves from viruses by fragmenting viral DNA upon entry with

a. Methylase

b. Endonucleases

c. Ligases

d. Exonucleases

Ans. (b) Endonucleases

8. Which of the following tools of recombinant DNA technology is incorrectly paired with its use?

a. Restriction enzyme-production of RFLPs

b. DNA ligase-enzyme that cuts DNA, creating the sticky ends of restriction fragments

c. DNA polymerase-used in a polymerase chain reaction to amplify section of DNA

d. Reverse transcriptase-production of cDNA from mRNA

Ans. (b) DNA ligase-enzyme that cuts DNA, creating the sticky ends of restriction fragments

9. Match list I (Enzyme) with list II (Characteristic/ activity) and select the correct using the codes given below the lists

a. Terminal transferases ,	1. Stable above 90°C
B. Polynucleotide kinases	2. Cleave the ends of linear DNA
c. Taq DNA polymerases	3. Adds phosphate to 5′OH end of DNA or RNA
D. Exonucleases	4. Adds a number of nucleotides to 3′end of DNA/RNA

Ans. (A-4, B-3, C-1, D-2)

10. Restriction endonuccleases are

a. Used for *in vitro* DNA synthesis
b. Synthesized by bacteria as part of their defense mechanism
c. Present in mammalian cells for degradation of DNA when the cells dies
d. Used in genetic engineering for ligating two DNA molecules

Ans. (b) Synthesized by bacteria as part of their defense mechanism

11. Which of the following sequences along a double–stranded DNA molecule may be recognized as a cutting site for a particular restriction enzyme?

a. A A G G
T T C C
b. A G T C
T C A G
c. G G C C
C C G G
d. A C C A
T G G T

Ans. (c) G G C C
C C G G

12. Restriction-modification systems of bacteria exists to

a. Protect bacteria from invading foreign DNA
b. Promote conjugation
c. Help the bacterial chromosome to replicate
d. Encourage recombination of new genetic material

Ans. (a) Protect bacteria from invading foreign DNA

13. Which of the following processes require energy?

a. Ligation
b. Transformation
c. Restriction digestion
d. Hybridization

Ans. (a) Ligation

14. The restriction endonuclease Eco521 recognizes the sequence C/GGCGG and cuts between the first C and the first G, indicated by the slash. DNA cut by which of the following enzymes (given with their recognition sequences and cut sites) could be cloned into a plasmid digested with Eco521?

a. EcoRI (G/AATTC)
b. XmaIII (C/GGCGG)
c. SmaI (CCC/GCG)
d. SacII (CCGC/GG)

Ans. (b) XmaIII (C/GGCGG)

15. T4 polynucleotide kinase is used for

a. Labelling 3′ends of DNA
b. Labelling 5′ends of DNA
c. Creating blunt ends of DNA
d. Dephosphorylation of DNA

Ans. (b) Labeling 5′ends of DNA

16. You have cut the genome of a double–stranded viral genome with a restriction endonuclease and electrophoresed the products on an agarose gel. You observe only one band on the gel, equivalent to the size of the genome. This is because

a. There are no introns in the genome
b. The introns contain the recognition sites and have already been spliced out
c. All of restriction fragments are too small to detect
d. Restriction endonucleases do not cut RNA, and this virus has a dsRNA genome

Ans. (d) Restriction endonucleases do not cut RNA, and this virus has a dsRNA genome

17. A southern transfer of *E. coil* DNA after complete digestion with EcoRI was probed with labeled cDNA probe of a gene which occurs only once in the E.coil genome. If the gene contains one EcoR1 cleavage site near its center, the number of radioactive bands you are most likely to find on autoradiography would be

a. 0
b. 1
c. 2
d. 3

Ans. (c) 2

18. The substrate for restriction enzyme is

a. Single stranded RNA
b. Partially double stranded RNA
c. Cell wall proteins
d. Double stranded DNA

Ans. (d) Double stranded DNA

19. If you discovered a bacterial cell that contained no restriction enzymes, which of the following would you expect to happen?

a. The cell would be unable to replicate its DNA
b. The cell would create incomplete plasmids
c. The cell would be easily infected and lysed by bacteriophages
d. The cell would become an obligate parasite

Ans. (c) The cell would be easily infected and lysed by bacteriophages

20. Mung bean nuclease could be used for

a. DNA synthesis
b. Nucleotide hydrolysis
c. Trimming single stranded region in DNA
d. Removal of phosphate groups from the end of the DNA

Ans. (c) Trimming single stranded region in DNA

21. DNA of a bacterium is not cleaved by its own restriction enzymes the recognition DNA sequences are

a. Methylated
b. Deleted
c. Bound by inhibitory proteins
d. Not accessible to restriction enzymes

Ans. (a) Methylated

22. Two restriction enzymes A and B have eight and four base pairs as their recognition sites respectively .The ratio of the number of fragments that they will generate on restriction digestion of a genomic DNA of *E. coli* is approximately

a. 4 : 8 b. 8 : 4
c. 1 : 64 d. 1 : 256

Ans. (d) 1 : 256

23. Restriction endonucleases are enzymes that

a. Cleave the 5′terminal nucleotides from duplex DNA molecules
b. Make sequence-specific cuts in both strands of duplex DNA molecules
c. Promote circularization of the duplex DNA molecule by removal of the 5′ terminal nucleotides
d. Generate 3′-hydroxyl and 5′- phosphate ends in the cut DNA strands

Ans. (b) Make sequence-specific cuts in both strands of duplex DNA molecules
(d) Generate 3′-hydroxyl and 5′- phosphate ends in the cut DNA strands

24. Correct statements regarding the enzyme reverse transcriptase include which of the following?

a. It requires a primer
b. It requires an RNA template
c. It synthesizes an RNA - DNA hybrid molecule
d. It can be extracted from retroviruses

Ans. (a, b, c, d)

25. If the linear double stranded genomic DNA of bacteriophage T4 is heated and cooled, one gets both liner and circular molecule because

a. All liner DNA on heating and cooling attain circular shape
b. The DNA molecule are circularly permuted
c. The DNA molecule has cohesive terminal ends
d. The RNA component of the genomes gets hydrolyzed to result in the circularization

Ans. (c) The DNA molecule has cohesive terminal ends

26. Terminal transferase is used _____ .

a. To add base at the 3′ end of the DNA
b. To add base at the 5′ end of the DNA
c. To carry out nick translation
d. To transfer phosphate at the 3′ end of the DNA

Ans. (a) To add base at the 3′ end of the DNA

27. Which statement about restriction enzymes are false?

a. Restriction enzymes cut DNA at specific sequence called recognition sites
b. A restriction enzymes always cut DNA to leave the same sequence at the ends
c. Some restriction enzymes cut the two DNA strands at slightly different points within their recognition site to make a 'sticky' end
d. Restriction enzymes are exonucleases rather than endonucleases

Ans. (d) Restriction enzymes are exonucleases rather than endonucleases

28. If a transcript of a given gene is degraded when mixed with DNA encoding the same gene, one could conclude that the RNA solution is contaminated with

a. RNAse A
b. RNAse T
C. RNAse H
d. DNAse III

Ans. (c) RNAse H

29. A gene that does not contain introns has an EcoRI site just down stream of the translational termination codon in the 3' untranslated region . The size of the gene is 4 Kbp. The length of 3′UTR is 2 k bp, the 5' UTR is 1 Kbp and that the open reading frame is 1 Kbp. Upon probing a southern blot of an Eco RI digested genomic DNA with the radioactively labeled fragment containing only the open reading frame the size of the band detected by hybridization would be

a. 1 Kbp
b. > 2 Kbp
c. 0.5 Kbp
d. 1.5 Kbp

Ans. (b) > 2 Kbp

30. Which of the following sequences is most likely to be a restriction enzyme recognition site?

a. CGGCTT
b. CGCCGC
c. GTAATG
d. GTCGAC

Ans. (d) GTCGAC

31. You are attempting to clone a gene. You cut a vector with the restriction enzyme EcoRI .You mix your cleaved plasmid with an EcoRI fragment carrying the gene of interest , carry out a ligation reaction transform the ligation mix and plate the bacteria. When you examine plasmids from individual colonies what do you primarily find?

a. Plasmids that contain the EcoRI
b. Plasmids that contain concatamers of the EcoRI fragment carrying the gene (i.e. multiple copies of the gene)
c. Plasmids that do not contain the EcoRI fragment carrying the genes
d. Plasmid dimers held together by the EcoRI fragment carrying the gene

Ans. (c) Plasmids that do not contain the EcoRI fragment carrying the genes

31a. To be cloning vector, a plasmid does not require

a. An origin of replication
b. An antibiotic resistance marker
c. A restriction site
d. To have a high copy number

Ans. (d) To have a high copy number

32. In recombinant DNA methods, the term vector refers to _____ .

a. The enzyme that cuts DNA into restriction fragments
b. The sticky of a DNA fragment
c. Plasmid used to transfer DNA into a living cell
d. A DNA probe used to identify a particular gene

Ans. (c) Plasmid used to transfer DNA into a living cell

33. Which of the following is a desirable characteristic for a cloning plasmid?

a. A site at which replication can be initiated
b. One or more unique restriction endonuclease sites
c. One or more antibiotic-resistance or drug resistance genes
d. All of the above

Ans. (d) All of the above

34. A multiple cloning copies of a cloned gene

a. Contains many copies of a cloned restriction enzymes for cloning
b. Allows flexibility in the choice of restriction enzymes for cloning
c. Allows flexibility in the choice of organism for cloning
d. Contains many copies of the same restriction enzyme site

Ans. (b) Allows flexibility in the choice of restriction enzymes for cloning

35. Many plasmids have ampicillin marker this implies

a. The plasmids contain genes for ampicillin biosynthesis
b. Ampicillin is required for bacterial growth after transformation
c. The plasmid contains the gene encoding β-lactamase
d. Ampicillin is essential for cell survival

Ans. (c) The plasmid contains the gene encoding β-lactamase

36. BAC, which can be used to clone large DNA fragments, is derived from

a. CoIE plasmid
b. F plasmid
c. 2μ plasmid
d. Mu phage

Ans. (b) F plasmid

37. A cloning vector consisting of cos site inserted in a plasmid, used to clone DNA fragments of lambda phage is

a. Phagemid
b. Cosmid
c. Plasmid
d. YAC

Ans. (b) Cosmid

38. Which of the following is not component of yeast artificial chromosome?

a. Centromere
b. Telomere
c. Origin of replication
d. Cos site

Ans. (d) Cos site

39. Identify the incorrect statement for cosmids

a. Cosmids are hybrid between a phage DNA and bacterial plasmid
b. Cosmids are basically a plasmid that carries a cos site
c. Cosmids can be used to clone DNA of 30-40 Kb
d. Cosmids produce plaques

Ans. (d) Cosmids produce plaques

40. Bacterial artificial chromosomes (BACs), cosmids phage plasmids, and yeast artificial chromosomes (YACs) are all commonly used cloning vectors that differ in their cloning capacities with a range from approximately 100 bp to 3000 kb. Which of the following is the proper order for these vector in terms of increasing cloning capacity?

a. BAC, cosmid, phage, plasmid, YAC
b. YAC, BAC, cosmid, phage, plasmid
c. Plasmid, phage, cosmid, BAC, YAC
d. Plasmid, cosmid, phage, BAC, YAC

Ans. (c) Plasmid, phage, cosmid, BAC, YAC

41. Choose the mismatch

a. Phagemid	1. Part of M13 genome with plasmid DNA
b. P1 -derived artificial chromosome	2. Combine features of P1 vector and BACs
c. Shuttle vector	3. Yeast episomal plasmids
d. Ti plasmid	4. *Agrobacterium rhizogenes*

Ans. (d) Ti plasmid

42. Match list I (cloning vector) with list II (character) and select the correct answer using the codes given below the lists

List I (cloning vector)	**List II (character)**
A. yeast episomal plasmid (YE_P)	1. Integrates with host chromosome for replication
B. Yeast integrative plasmid (YI_P)	2. Carries a chromosomal origin of replication
C. Yeast replication plasmid (YR_P)	3. Carries origin of replication of the 2µ plasmid

Ans. a-3, b-1, c-2

43. pBR322 which is frequently used as a vector for cloning gene in *E.coli* is

a. An original bacterial plasmid
b. A modified bacterial plasmid
c. A viral genome
d. A transposon

Ans. (b) A modified bacterial plasmid

44. Phage T7 promoter containing plasmids are used for over expression of cloned genes because of _____.

a. Their convenient size
b. Their single stranded nature
c. Exquisite specificity of T7 RNA polymerase to phage promoters
d. T7 infects *E.coli* and lysogenizes the cell

Ans. (c) Exquisite specificity of T7 RNA polymerase to phage promoters

45. Yeast artificial chromosomes (YAC) is used for

a. Cloning large segments of genomic DNA
b. Cloning only yeast genomic sequences
c. Cloning of only cDNA sequences
d. All DNA except plant DNA sequences

Ans. (a) Cloning large segments of genomic DNA

46. For cloning a DNA fragment larger than 100 Kb, which of the following vector system would be suitable?

a. Plasmid
b. Cosmid
c. Yeast artificial chromosome
d. Lambda bacteriophage

Ans. (c) Yeast artificial chromosome

47. Expression vector contain a sequence, not normally found in other vector that is known as

a. A ribosome-binding site
b. An ori site
c. A multiple-cloning site
d. An antibody-resistant marker

Ans. (a) A ribosome-binding site

48. What is the difference between a PAC and a BAC?

a. One has ampicillin and another has kanamycin resistance marker
b. One is plasmid-based vector and the other is derived a yeast chromosome
c. One is derived from the *E. coli* F-plasmid and other is derived from bacteriophage P1
d. One is derived from bacteriophage P1 and other is derived from bacteriophage

Ans. (c) One is derived from the *E. coli* F-plasmid and other is derived from bacteriophage P1

49. For a plasmid to be a cloning vector, the minimum numbers of elements required are

a. Origin of replication, multiple cloning site, selection marker
b. Origin of replication, multiple cloning site, selection marker, promoter

c. Origin of replication, multiple cloning site, selection marker, translation start site
d. Origin of replication, multiple cloning site, promoter

Ans. (a) Origin of replication, multiple cloning site, selection marker

50. What is the most logical sequence of steps for splicing foreign DNA into a plasmid and inserting the plasmid into a bacterium?

a. Transform bacteria with recombinant DNA molecule
b. Cut the plasmid DNA using restriction enzymes
c. Extract plasmid DNA from bacterial cells
d. Hydrogen–bond the plasmid DNA to nonplasmid DNA fragments
e. Use ligase to seal plasmid DNA to nonplasmid DNA

Ans. c, b, d, e, a

51. Eukaryotic genes may not function properly when cloned into bacteria because of

a. Inability to excise introns
b. Destruction by native endonucleases
c. Failure of promoter to be recognized by bacterial RNA polymerase
d. All of the above

Ans. (a) Inability to excise introns

52. The presence of a plasmid in a bacterial culture is usually determined by

a. Blue- white screening
b. Growth in the presence of an antibiotic
c. A restriction enzyme digests
d. Agarose gel electrophoresis

Ans. (b) Growth in the presence of an antibiotic

53. Blue–white selection is used

a. To test for the presence of a plasmid in bacteria
b. To reveal the identity of a cloned DNA fragment
c. To express the product of a cloned gene
d. To test for the presence of a cloned insert in a plasmid

Ans. (d) To test for the presence of a cloned insert in a plasmid

54. Infection of *E.coli* by bacteriophage λ is normally detected by

a. Resistance of the bacteria to an antibiotic
b. The growth of single bacterial colonies on an agar plate
c. The appearance of areas of lysed bacteria on an agar plate
d. Restriction digest of the bacterial DNA

Ans. (c) The appearance of areas of lysed bacteria on an agar plate

55. Which of the following statements gives a correct explanation for the use of vectors containing drug resistance genes in the cloning of recombinant DNA (cDNA) molecules?

a. The products of the drug resistance genes protect the cDNA from destruction by the host cells
b. The drug resistance genes provide additional base sequences that enable the vector to accommodate larger inserts of cDNA
c. Entry of the vector containing the DNA and the drug resistance genes into the host cell renders the later identifiable as it is now resistance to antibiotic drugs
d. The cloned cDNA imparts drug resistance upon any cellular system with which it is used

Ans. (c) Entry of the vector containing the DNA and the drug resistance genes into the host cell renders the later identifiable as it is now resistance to antibiotic drugs

56. What is the approximate length of DNA between two COS sites that can be packed by a lambda packing extract?

a. 10 Kb
b. 15 Kb
c. 25 Kb
d. 45 Kb

Ans. (d) 45 Kb

57. Which statement correctly describes sequential steps in cDNA in DNA cloning?

a. Reverse transcription of mRNA, second strand synthesis, cDNA end modification, ligation to vector
b. mRNA preparation, cDNA synthesis using reverse transcription, second strand synthesis using terminal transferase, ligation to vector
c. mRNA synthesis using RNA polymerase ,reverse transcription of mRNA, second strand synthesis ligation to vector
d. Double stranded cDNA synthesis, restriction enzyme digestion, addition of linkers, ligation to vector

Ans. (a) Reverse transcription of mRNA, second strand synthesis, cDNA end modification, ligation to vector

58. The PCR is used to

a. Amplify a small amount of DNA
b. Cleave bacteria plasmids
c. Seal sticky ends
d. Identify target plasmids

Ans. (a) Amplify a small amount of DNA

59. The polymerase enzyme used in PCR is

a. DNA polymerase I
b. Taq polymerase
c. Reverse transciptase
d. DNA polymerase

Ans. (b) Taq polymerase

60. The first step in the PCR is

a. Denaturation
b. Primer extension
c. Annealing
d. Cooling

Ans. (a) Denaturation

61. Polymerase chain reaction is considered as a revolutionary because all of the following, *except*

a. It enables an unlimited production of a DNA fragment *in vitro*
b. It is a highly sensitive technology
c. Its experimental protocol is simple
d. It enables the direct production of a synthetic gene that did not exist before

Ans. (d) It enables the direct production of a synthetic gene that did not exist before

62. PCR amplification cycle involves

a. Template denaturation
b. Primer annealing
c. DNA polymerization
d. Reaction mixture containing target DNA, prime thermostable DNA polymerase and dNTPs

Ans. d, a, b, c

63. The amplification product of a PCR reaction is defined by the sequence of the PCR primers. Several general rules follow to design primer. Select the following rules commonly used to design primers

a. Length of primers
b. Tm of both primers
c. G + C content of both primers
d. Complementarity between the primers

Ans. a, b, c, d

64. Choose the correct statement (s) about thermostable DNA polymerase used in PCR

a. Taq Pol has no proof reading ability
b. Taq Pol has $5' \rightarrow 3'$ exonuclease activity
c. p*fu* pol has $3' \rightarrow 5'$ exonuclease activity
d. T*li* Pol has no $3' \rightarrow 5'$ exonuclease activity

Ans. (a, b, c)

65. Which of the following would be eliminated by hot start PCR?

a. Aerosol contamination from the barrel of pipetors
b. Addition of a nucleotide to the terminal end of PCR products
c. Infidelity of DNA copying by Taq DNA polymerase
d. Formation of primer–dimers

Ans. (d) Formation of primer–dimers

66. The annealing temperature, at which the primers attach to the template, can be calculated by determining the melting temperature (Tm)of the primer template hybrid .What will be Tm of the primer 5′-AGACTCAGAGAGAACCC-3′

a. 50°C
b. 52°C
c. 102°C
d. 43°C

Ans. (b) 52°C

67. Efficient expression of a heterologous protein product is influenced by

a. Transcriptional efficiency
b. Copy number of the plasmid
c. Codon bias
d. All of the above

Ans. (d) All of the above

68. Which of the following is not a potential problem associated with expressing a eukaryotic protein coding nuclear gene in prokaryotic cells?

a. Lack of an intron-splicing mechanism in prokaryotes
b. Differences in the translation intiation codons used by eukaryotic cells and prokaryotic cells
c. Stability of mRNA in prokaryotic cells
d. Differences in transcriptional signals between eukaryotic cells and prokaryotic cells

Ans. (b) Differences in the translation intiation codons used by eukaryotic cells and prokaryotic cells

69. Which of the following conditions prevent efficient expression of foreign gene cloned in *E.coli*?

a. The foreign gene might contain introns
b. Foreign gene might contain sequence that act as termination signals in *E.coli*
c. Codon bias
d. Nature of nitrogenous bases in nucleotides

Ans. a, b, and c

70. A reporter gene

a. A acts as repressor
b. Allows gene expression to be readily measured
c. Enhances mRNA stability
d. Interacts with RNA polymerase

Ans. (b) Allows gene expression to be readily measured

71. Most common reporter whose product can be directly visualized in transformed cells is

a. NPTII (Neomycim phosphotransferase)
b. CAT (choramphniol acetyl transferase)
c. β-galactosidase
d. GFP (green fluorescent protein)

Ans. (c) β-galactosidase

72. Which of the following statement is false about reporter genes?

a. Replace the coding region of a gene of interest with a coding region that is easily assayed
b. Replace the promoter region of a gene of interest with a promoter region that is easily assayed
c. Can be used to measure the activity of a promoter
d. Can be used to determine when and where a promoter is active

Ans. (b) Replace the promoter region of a gene of interest with a promoter region that is easily assayed

73. Which of the following is incorrect about reporter gene?

a. Gene whose phenotype can be assayed in a transformed organism
b. β-galactosidase gene is an example of reporter gene
c. Test gene that is fused to the upstream region of the cloned gene
d. None

Ans. (d) None

74. The principle behind the yeast two-hybrid system is

a. The detection of protein and DNA interaction from yeast hydrid strains
b. The detection of protein-protein interactions by assembling a functional transcription factor from two fusion proteins
c. The detection of protein-protein interaction by studying the hybridization of two cDNA sequence
d. The detection of protein-protein interactions in a pair of hybrid yeast strains

Ans. (b) The detection of protein-protein interactions by assembling a functional transcription factor from two fusion proteins

75. Shotgun approach is used for the construction of

a. cDNA
b. Genomic library
c. Both
d. None

Ans. (b) Genomic library

76. Which one of the following statements about genomic libraries are false?

a. Genomic libraries are made from cDNA
b. Genomic libraries must be representative if they are to contain all the genes in an organism
c. Genomic libraries must contain a minimum number of recombinants if they are to contain all the genes in an organism
d. The DNA must be fragmented to an appropriate size for the vector that is used

Ans. (a) Genomic libraries are made from cDNA

77. The term cDNA library means

a. Collection of cDNA clones by an individual researcher
b. Compilation of cDNA sequences in the database
c. Pool of cDNA generated from a specific tissue inserted into an appropriate vector that can be used as a source of the cDNA of interest
d. It is manual for cDNA research

Ans. (c) Pool of cDNA generated from a specific tissue inserted into an appropriate vector that can be used as a source of the cDNA of interest

78. A gene cannot be isolated from a human genomic DNA library by functional complementation in *E.coli* because of

a. Non-functional promoter
b. The absence of splicing machinery
c. Coupled transcription and translation
d. Codon bias

Ans. (b) The absence of splicing machinery

79. What clones should a eukaryotic cDNA library contain?

a. Clones that represent every fragment of DNA in approximately equal frequencies
b. Clones that represent one copy of every coding region
c. Clone representing transcribed DNA in approximately equal frequencies
d. Clones representing transcribed DNA in frequencies that reflect their level of expression

Ans. (d) Clones representing transcribed DNA in frequencies that reflect their level of expression

80. Identify the incorrect statement for the model plant *Arabidopsis thaliana*

a. Its mutants can be easily produced and characterized
b. Its genome sequence is known
c. All genes encompassing its genome have already been identified
d. The molecular genetic of its flowering has been extensively studied

Ans. (c) All genes encompassing its genome have already been identified

81. *Agrobacterium tumefaciens* is often used as vehicle to introduce foreign DNA into plants. The agrobacterial T-DNA in plant cells can be found as

a. An autonomously replicating nuclear plasmid
b. A mitochondrial plasmid
c. A chloroplast plasmid
d. Integrated into the plant genome

Ans. (d) Integrated into the plant genome

82. The following are useful to introduce genes into crop plants *except*

a. Ti plasmid
b. Particle gun
c. Breeding
d. Auxin

Ans. (d) Auxin

83. Which one of these statements about the applications of gene cloning is false?

a. A large amounts of recombinant protein can be produced by gene cloning
b. DNA fingerprinting is used detect proteins to DNA
c. Cloned genes can be used to detect carriers of disease–causing genes
d. Gene therapy attempts to correct a disorder by delivering a good copy of a gene to a patient

Ans. (b) DNA fingerprinting is used detect proteins to DNA

84.

GROUP -1	GROUP-2
a. Biolistic	1. Gene pulser
b. Agrobacterium	2. PDS1000 He
c. Electroporation	3. Micromanipulator
d. Microinjection	4. Vir operons 6Crol C

Ans. a-2, b-4, c-1, d-3

85. The length of each boarder sequence in Ti–plasmid is about

a. 25 million base pairs
b. 200 kilo base pairs
c. 25 kilo base pairs
d. 25 base pairs

Ans. (d) 25 base pairs

86. The essential component of Ti plasmid required for integration into plant genome is

a. Origin of replication
b. Tumor inducing gene
c. Nopaline utilization gene
d. All of the above

Ans. (b) Tumor inducing gene

87. *Agrobacterium tumefaciens* is an effective vector for use with

a. Corn
b. Rice
c. Wheat
d. Soyabean

Ans. (d) Soyabean

88. What role do opines play in crown gall diseases?

a. Source of carbon nitrogen and energy for the *Agrobacterium*
b. Transfer of T-DNA to plant cells
c. Attachment of *Agrobacterium* to the plants
d. Induction of the expression of vir genes

Ans. (a) Source of carbon nitrogen and energy for the *Agrobacterium*

89. A plant genetic engineer wishes to transfer and express a gene from sunflower into beans. Which of the following would be the vector of choice?

a. Lambda phage
b. pBR plasmid
c. Ti plasmid
d. Maize streak virus

Ans. (c) Ti plasmid

90. Genetically engineered male sterile crop plants may be produced by inserting

a. BT toxin gene
b. Barnase gene
c. Lectin gene
d. Chitinase gene

Ans. (b) Barnase gene

91. The term *tumefaciens* refers to which of the following?

a. Synthesis of mRNA from a DNA template
b. Synthesis of protein based on an mRNA sequence
c. Introduction of foreign DNA into a cell
d. The process by which a normal cell becomes malignant

Ans. (c) Introduction of foreign DNA into a cell

92. This of the following methods for the production of transgenic mice involves the initial creation of a cell chimera (a mixture of cells from distinct sources)

a. Pronuclear microinjection
b. Retroviral transduction

c. Transfection of ES cells
d. All of the above

Ans. (c) Transfection of ES cells

93. Which of the following methods for studying loss of gene function does not involve any modification of the genome?

a. RNA interference by injection of double stranded RNA
b. Expression of an integrated antisense transgene
c. Gene knockout by homologous recombination
d. None of the above

Ans. (a) RNA interference by injection of double stranded RNA

94. The major difference between transgenic mice and knockout mice is that

a. Transgenic mice always employ the use of cloned genes derived from other species
b. Transgenic mice have foreign that integrate at targeted loci through homologous recombination
c. Transgenic mice have a functional foreign gene added to their genome
d. Knockout mice always have a unique phenotype

Ans. (c) Transgenic mice have a functional foreign gene added to their genome

95. Match the gene of interest for various aspects of crop improvement Gene insert Aspects of crop improvement

a. Bar	1. Tolerance to heavy metals
b. vip 3A	2. Nutritional improvement with increased vitamin A
c. β-lac	3. Insect resistance
d. gsh-II	4. Herbicide resistance

Ans. (a-4, b-3, c-2, d-1)

96. Dideoxy DNA sequence exclusively depends on one of the followings

a. Termination
b. ATP
c. Plasmid vector
d. Vector primer

Ans. (a) Termination

97. The genome sequencing of rice is important because

a. The rice genome is very unique and contains genes not found in other plants
b. The rice genome is very large compared to the DNA of other grains and so more genes will be identified
c. It can identify genes associated with disease resistance, growth capacity, etc
d. It has a rapid life cycle and has many identifiable mutations

Ans. (c) It can identify genes associated with disease resistance, growth capacity, etc

98. An analysis of chromosomal DNA, using the southern blot technique, involves the following five major steps

a. Autoradiography
b. Blotting
c. Cleavage
d. Electrophoresis
e. Hybridization

Which of the following sequence of steps best illustrates this technique?

Ans. c, d, b,e, a

99. Which is not a step in the blotting procedure?

a. Ligation of the DNA into a vector
b. Separation of the DNA fragments on a gel
c. Transfer of the DNA fragments to a nitrocellulose membrane
d. Hybridization of the membrane with a labelled probe

Ans. (a) Ligation of the DNA into a vector

100. Which of the following types of information cannot determined from the traditional northern blotting technique?

a. The size of an mRNA species
b. The half-life of an mRNA species
c. The strand of DNA that is transcribed into mRNA
d. The amino acid sequence of the protein coded by an mRNA species

Ans. (d) The amino acid sequence of the protein coded by an mRNA species

101. Which of the following would not be possible to address using a Northern Blot?

a. Location of restriction sites in a particular gene
b. Spatial expression of a particular gene
c. Temporal expression of a particular gene
d. mRNA size

Ans. (a) Location of restriction sites in a particular gene

102. Choose the mismatch

a. Reporter molecule	1. Acts as shuttle vector
b. Maxam-gilbert method	2. Chemical modification of bases
c. Dideoxy terminators	3. Sanger method
d. Biotin	4. non-radioactive label

Ans. (a) Reporter molecule 1. Acts as shuttle vector

103. There are two different ways to determining the nucleotide sequence of a nucleic acid: the chemical sequencing (Maxam-Gilbert) method and the enzymatic sequencing (Sanger) method. The basic principle/advantage of the Sanger method is

a. The differential interaction of the bases with particular dyes
b. Extension of a synthetic primer and reliable termination of DNA repair synthesis
c. The correlation of restriction sites with the end-label of the DNA
d. The ability to 'sequence' both strands of the DNA duplex simultaneously

Ans. (d) The ability to 'sequence' both strands of the DNA duplex simultaneously

104. In agarose gel electrophoresis

a. DNA migrates toward the negative electrode
b. Supercoiled plasmids migrate slower than their nicked counterparts
c. Larger molecules migrate faster than smaller molecules
d. Ethidium bromide can be used to visualize the DNA

Ans. (d) Ethidium bromide can be used to visualize the DNA

105. Which of the following are not valid methods of labeling duplex DNA?

a. 5′-end labeling with polynucleotide kinase
b. 3′-end labeling with polynucleotide kinase
c. 3′-end labeling with terminal transferase
d. Nick translation

Ans. (b) 3′-end labeling with polynucleotide kinase

106. Which of the following methods would give you the most precise and accurate information about where and when a given gene is expressed?

a. *In situ* hybridization
b. DNA microarray
c. Protein microarray
d. Reporter gene fusion including introns

Ans. (d) Reporter gene fusion including introns

107. Which of the following methods can not be used to introduce a specific mutation at a predetermined site in a DNA sequence?

a. Primer extension on a single stranded template using a primer that incorporates a base mismatch
b. Primer extension on a single stranded template using an error-prone DNA polymerase
c. PCR amplification using a double template with one primer incorporating a base mismatch
d. None of the above

Ans. (b) Primer extension on a single stranded template using an error-prone DNA polymerase

108. Which of the following is/are useful marker(s) for genetic or physical mapping of human chromosomes?

a. Restriction fragment length polymorphisms
b. Expressed sequence tags
c. Short tandem repeat polymorphisms
d. Sequence tagged sites

Ans. a, b, c, d

109. Which of the following type(s) of polymorphism are commonly detected by using the polymerase chain reaction (PCR) and specific oligonucleotide primers?

a. Restriction fragment length polymorphism
b. Expressed sequence tags
c. Short tandem repeat polymorphisms
d. Sequence tagged sites

Ans. b, c, d

110. A certain purified DNA sample was cut with two restriction endonucleases E1 and E2. The following result were obtained from agarose gel electrophoresis Sample cut with E1 alone: two bands of size 35 kb and 15kb Sample cut with E2 alone: two bands of size 40 kb and 10kb Sample cut simultaneously with E1 and E2: three bands of size 35 kb, 10 kb, and 5 kb

a. Two sites for E1 and one site for E2
b. One sites for E1 and two sites for E2
c. One site each for E1 and E2
d. Three sites for E1 and one site for E2
The different in the restriction maps between two individuals of one species

Ans. (c) One site each for E1 and E2

111. In order to identify the person who committed a crime. Forensic experts will need to extract DNA from the tissue sample collected at the crime scene, and conduct one of the following in procedures for DNA finger-printing analysis

a. Cut the DNA and hybridize with specific micro-satellite probes
b. Cut the DNA and subclone the fragments
c. Determine the sequence of the subclones
d. b followed by c

Ans. (a) Cut the DNA and hybridize with specific micro-satellite probes

112. The DNA fingerprinting process involves

a. Chain terminators
b. Degenerate oligonucleotides
c. VNTR loci
d. RFLPs

Ans. (c) VNTR loci

113. Restriction fragment length polymorphism (RFLP) is

a. The technique used to fingerprint patterns of inheritance
b. The different in the restriction maps between the two alleles in a diploid cell
c. The different in the restriction maps between two individuals of one species
d. The different in the restriction maps between four individuals of one species

Ans. (c) The different in the restriction maps between two individuals of one species

114. Which of the following could not possibly give rise to restriction fragment length polymorphism (RFLP)?

a. A missense mutation within the protein coding region of a gene
b. A silent mutation within the protein coding region of a gene
c. A single base change within the intron sequence of a gene
d. An error in RNA splicing that mistakenly removes an exon during RNA processing

Ans. (d) An error in RNA splicing that mistakenly removes an exon during RNA processing

115. RFLP analysis can be used to distinguish between alleles based on differences in

a. Restriction enzyme recognition sites between the alleles
b. The amount of DNA amplified from the alleles during PC R
c. The ability of the alleles to be replicated in bacterial cells
d. The proteins expressed from the alleles

Ans. (a) Restriction enzyme recognition sites between the alleles

116. Positional cloning refers to

a. Using a selection procedure to clone a cDNA
b. Isolating a gene by PCR using primers from another species
c. Isolating a gene from a specific tissue in which it is being expressed
d. Mapping a gene to a chromosomal region and then identifying and cloning a genomic copy of the gene from the region

Ans. (d) Mapping a gene to a chromosomal region and then identifying and cloning a genomic copy of the gene from the region

117. Which of the following gene is defective in patients suffering from severe combined immunodeficiency syndrome (SCID)?

a. CFTR
b. Adenosine deaminase
c. Ribonucleotide reductase
d. α2-microoglobin

Ans. (b) Adenosine deaminase

118. A mouse in which one particular gene has been replaced by its inactivated form generated *in vitro* is called

a. Transgenic mouse
b. Knockout mouse
c. Nude mouse
d. Mutant mouse

Ans. (b) Knockout mouse

119. The principle of the yeast two-hybrid system is

a. The detection of protein-protein interactions by assembling a functional factor from two detection proteins
b. The detection of protein-protein interactions in a pair of hybrid yeast strains
c. The detection of protein-protein interactions by studying the hybridization of two cDNA sequence
d. The detection of protein-protein interactions between phage coat protein and target proteins

Ans. (a) The detection of protein-protein interactions by assembling a functional factor from two detection proteins

120. Which of the following is not one of the objectives of the Human Genome project?

a. Create a detailed genetic map of every human chromosome, with an average of 2–5% recombination frequency between markers
b. Obtain a detailed physical map of every human chromosome, based on overlapping recombinant DNA molecules cloned as yeast artificial chromosomes

c. Determine the sequence of all expressed human genes by cDNA cloning and sequencing
d. Determine the complete DNA sequence of each human chromosome
e. All

Ans. (e) All

121. Which of the following is not tool of genetic engineering?

a. Vectors
b. Enzymes
c. Foreign DNA
d. GMO

Ans. (d) GMO

122. In recombinant DNA technology a plasmid vector is cleaved by

a. Modified DNA ligase
b. A heated alkaline solution
c. The same enzyme that cleave the donor DNA
d. The different enzyme other than that cleave the donor DNA

Ans. (c) The same enzyme that cleave the donor DNA

123. The most common plasmid vector used in genetic engineering is

a. PBR 328
b. PBR 322
c. PBR 325
d. PBR 330

Ans. (b) PBR 322

124. Eco RI is an

a. Ligase
b. Polymerase
c. Restriction enzyme
d. Gyrase

Ans. (c) Restriction enzyme

125. The transgenic plant flavr savr tomato carries an artificial gene for

a. Delay ripening process
b. Longer shell life
c. Added flavours
d. All of these

Ans. (d) All of these

126. Hirudin is obtained from the transgenic plant

a. *Brassica napus*
b. *Hibiscus rosasinesis*
c. *Raphanus sativus*
d. *Vinca rosea*

Ans. (a) *Brassica napus*

127. Bt Cotton is

a. Cloned plant
b. Transgenic plant
c. Hybrid plant
d. Mutated plant

Ans. (b) Transgenic plant

128. Dolly sheep was genetically similar to

a. The mother from which nucleated fertilized egg was taken
b. The mother from which nuclear DNA of udder cell was taken
c. The surrogate mother
d. Both surrogate mother and nuclear donor mother

Ans. (b) The mother from which nuclear DNA of udder cell was taken

129. Genome is

a. Genes on nuclear DNA
b. Nuclear DNA + mitochondrial DNA
c. Nuclear DNA + chloroplast DNA
d. Nuclear DNA + Mitochondrial DNA + Chloroplast DNA

Ans. (d) Nuclear DNA + Mitochondrial DNA + Chloroplast DNA

130. A technique of using very small metal particles coated with desired gene in the gene transfer is called

a. Electroporation
b. Microinjection
c. Liposome
d. Biolistics

Ans. (d) Biolistics

131. The complete set of chromosomal and extra-chromosomal genes of an organisms is called

a. Genome
b. Gene pool
c. Gene bank
d. Gene library

Ans. (a) Genome

132. The study of all the proteins coded by the genome is called

a. Proteome
b. Proteomics
c. Genome
d. Protein formation

Ans. (b) Proteomics

133. Sequencing of genomic DNA comes under

a. Structural genomics
b. Functional genomics
c. Proteomics
d. Transgenesis

Ans. (a) Structural genomics

134. Gene expression, regulation and phenotype production are studied in second phase of genome analysis called

a. Structural genomics
b. Functional genomics
c. Proteomics
d. Transmeiosis

Ans. (b) Functional genomics

135. In forensic science which of the following is used?

a. Bacterial cloning
b. DNA foot printing
c. DNA fingerprinting
d. DNA cloning

Ans. (c) DNA fingerprinting

136. DNA fingerprinting is based on

a. Occurance of VNTR's
b. Knowledge of human karyotype
c. Cloned DNA
d. Recombinant DNA

Ans. (a) Occurance of VNTR's

137. VNTRs represents

a. New terminal regions in DNA
b. Functional genes in the DNA
c Split genes in the sample DNA
d. Specific non-coding sequences with unique tandem repeats

Ans. (d) Specific non-coding sequences with unique tandem repeats

138. Which ones produce androgenic haploids in anther cultures?

a. Anther wall
b. Tapetal layer of anther wall
c. Connective tissue
d. Young pollengrains

Ans. (d) Young pollengrains

139. Variations observed during tissue culture of some plants are known as

a. Clonal variations
b. Somatic variations
c. Somaclonal variations
d. Tissue culture variations

Ans. (c) Somaclonal variations

140. Virus free plants can be obtained through

a. Anitibiotic treatment
b. Bordeaux micture
c. Root tip culture
d. Shoot tip culture

Ans. (d) Shoot tip culture

141. Raising of plants from a small tissue in culture is known as

a. Macroproduction
b. Micropropagation
c. Tissue culture
c. Mass production

Ans. (b) Micropropagation

142. Callus is

a. Tissue that forms embryo
b. An insoluble carbohydrate
c. Unorganised actively dividing mass of cells maintained in culture
d. Tissue that growth to form embryoid

Ans. (c) Unorganised actively dividing mass of cells maintained in culture

143. Biopatents are

a. Right to use invention
b. Right to use biological entities
c. Right to use products
d. Right to use process

Ans. (b) Right to use biological entities

144. African plant Pentadiplandra is used as

a. Low calories sweetner
b. 2000 times sweeter agent
c. Sweetner for diabetic patients
d. All of these

Ans. (d) All of these

145. Name the organism from which bioweapon was derived from

a. Clostridium
b. *Yersinia pestis*
c. Fusarium species
d. Green algae

Ans. (c) Fusarium species

146. What is the term used to describe a set of standards which community regulates activity in relation to biological world is

a. Biopotency
b. Biopiracy
c. Biowar
d. Bioethics

Ans. (d) Bioethics

147. Biopiracy means

a. Use of biopatents
b. Thefts of plants and animals
c. Stealing of bioresources
d. Exploitation of bioresources without authentic permission

Ans. (d) Exploitation of bioresources without authentic permission

148. Bioethics is related to

a. Preventing biopiracy
b. Regulation of unethical activities like gene cloning in animals
c. Preventing theft of living materials
d. Moral guidance to the problems in biology

Ans. (b) Regulation of unethical activities like gene cloning in animals

149. Which of these restriction enzymes produce blunt ends?

a. SaII
b. EcoRV
c. XhoI
d. HindIII

Ans. (b) EcoRV

150. The RP13 gene of chromosome 17 codes for a protein

a. Involved in glucose transport
b. That is a component of hair and nails
c. Involved in eye development
d. Involved in the determination of personality

Ans. (c) Involved in eye development

151. Introduction of foreign genes for improving genotype is

a. Tissue culture
b. Immunisation
c. Biotechnology
d. Genetic engineering

Ans. (d) Genetic engineering

152. Genetic engineering means

a. Meiotic division of cells
b. Nucleotide transfer
c. Deletion and repair mechanism
d. None of these

Ans. (c) Deletion and repair mechanism

153. Isoschizomers recognize

a. Same recognition sequence but different recognition site
b. Same recognition site and recognition sequence
c. Same recognition site and different recognition sequence
d. Different recognition site and different recognition sequence

Ans. (b) Same recognition site and recognition sequence

154. A set of techniques that enables DNA from different sources to be identified, isolated and recombined so that new characteristics can be introduced into an organism is called

a. RDT
b. Genetic engineering
c. Molecular biology technique
d. All of these

Ans. (d) All of these

155. Restriction enzymes are named from

a. The person who discovered
b. The bacterium they are derived from
c. The viral DNA that they attack
d. Bone of the above

Ans. (b) The bacterium they are derived from

156. The recombinant DNA technique was engineered by

a. Stanley norman cohen
b. Herbert boyer
c. Both of these
d. None of these

Ans. (c) Both of these

157. Which of the following genes codes for a protein that plays an important role in white blood cell function?

a. DCP1 b. MPO
c. GLUT4 d. RP13

Ans. (b) MPO

158. Phosphodiester bond of DNA and RNA involves

a. 2°C and 1°C b. 5°C and 3°C
c. 5°C and 2°C d. 3°C and 1°C

Ans. (b) 5°C and 3°C

159. When populations are small, gene frequencies can change from generation to generation and some alleles may become fixed in a population. This is called

a. Assortative mating
b. Inbreeding
c. Heterosis
d. Genetic drift

Ans. (d) Genetic drift

160. Production of RDT and its transfer into a suitable host for multiplication/expression of the RDT. The recombinant DNA may or may not become integrated into the most genome is called

a. Genetic engineering
b. Genetic transformation
c. Genetic material
d. Genetic resource

Ans. (a) Genetic engineering

161. Genetic engineering was born on

a. 1971 b. 1973
c. 1984 d. 1985

Ans. (b) 1973

162. Sum total of all the genes and their alleles present in a species and its wild relatives is called

a. Genetic engineering
b. Genetic metabolism
c. Genetic material
d. Genetic resource

Ans. (d) Genetic resource

163. Which of the following is correct in terms of determination of location of genetic traits?

a. Known protein coding sequences are too far apart to allow linkage determination for most new genes
b. Restriction sites allow DNAs to be digested
c. Protein-coding genes are always associated with a restriction pattern
d. None of the above

Ans. (a) Known protein coding sequences are too far apart to allow linkage determination for most new genes

164. Insertion of Recombinant DNA into a suitable cell/organism is called

a. Genetic engineering
b. Genetic metabolism
c. Genetic material
d. Transformation

Ans. (d) Transformation

165. In gel electrophoresis, DNA molecules migrate from _____ to _____ ends of the gel.

a. Negative ... positive
b. Basic ... acidic
c. Long ... short
d. Positive to negative

Ans. (a) Negative ... positive

166. Restriction enzymes

a. Protect bacteria from viral infection
b. Cut DNA in a staggered fashion
c. Cut DNAs producing a blunt end
d. All of the above

Ans. (d) All of the above

167. A DNA molecule created in the laboratory by ligation of two or more different pieces of DNA is called

a. Recombinant DNA
b. Recombinant clone
c. Genetic counselling
d. Genetic diversity

Ans. (a) Recombinant DNA

168. A bacterial clone containing a recombinant DNA molecules is called

a. Recombinant DNA
b. Recombinant clone
c. Genetic counselling
d. Genetic diversity

Ans. (b) Recombinant clone

169. First discovered, Type II restriction endonuclease was _____ .

a. Hinf I
b. Eco K
c. Hind II
d. EcoRI

Ans. (c) Hind II

170. Which of the following techniques can be used to determine the defective gene responsible for developing cancer?

a. Western blot
b. Southern blot
c. Northern blot
d. Eastern blot

Ans. (b) Southern blot

171. Educating perspective parents, either suffering from or suspected to be heterozygous for some genetic disease, on the risk of their children genetic disease, on the risk of their children suffering from the same diseases is called

a. Recombinant DNA
b. Recombinant clone
c. Genetic counselling
d. Genetic diversity

Ans. (c) Genetic counselling

172. The variability present within a species, between individual of a population or different population groups of the same species for one or a group of traits is called

a. Recombinant DNA
b. Recombinant clone
c. Genetic counselling
d. Genetic diversity

Ans. (d) Genetic diversity

173. The transfer of antibiotic-resistant genes from genetically engineered bacteria to disease-causing bacteria

a. Would be of no concern if it occurred.
b. Has occurred
c. Can never occur
d. Seems unlikely

Ans. (d) Seems unlikely

174. Some genetic diseases cannot be diagnosed by changes in restriction sites. Some of these can be detected by allele-specific oligonucleotide probes. These are

a. Copies of the gene with an altered sequence so that a restriction site is inserted
b. Mutagenized copies of a gene
c. Short sequences that will hybridize only to a specific base sequence
d. PCR-amplified variable numbers of tandem repeats (VNTRs)

Ans. (c) Short sequences that will hybridize only to a specific base sequence

175. Origin of genetic variation in a relatively high frequency, usually, much higher than that ascribable to spontaneous mutation is called

a. Genetic instability
b. Recombinant clone
c. Genetic counselling
d. Genetic diversity

Ans. (a) Genetic instability

176. In order to insert a foreign gene into a plasmid, both must

a. Have identical DNA sequences
b. Originate from the same type of cell
c. Be cut by the same restriction enzyme
d. Be of the same length

Ans. (c) Be cut by the same restriction enzyme

177. The DNA segment to be cloned is called

a. DNA ligase
b. DNA insert
c. DNA array
d. DNA methylation

Ans. (b) DNA insert

178. A gene construct in which the gene is located in antisense co-orientation so that the natural sense strand of the gene is now transcribed to produce antisense RNA; used is antisense RNA technology is called

a. Antisense gene construct
b. Antisense RNA technology
c. Both a and b
d. None of these

Ans. (a) Antisense gene construct

179. Which of the following genetic diseases would be amenable to genetic engineering?

a. Down's syndrome
b. Muscular dystrophy
c. Cystic fibrosis
d. Cri du Chat

Ans. (c) Cystic fibrosis

180. The process of an antisense construct of the target gene is integrated into the genome to suppress the concerned endogenous genes is called

a. Antisense gene construct
b. Antisense RNA technology
c. Both a and b
d. None of these

Ans. (b) Antisense RNA technology

181. X-rays cause

a. The formation of thymine dimmers
b. Ionization of water in the cell
c. Heat
d. None of the above

Ans. (b) Ionization of water in the cell

182. The antigenic peptides bind within the cleft of MHC I or MHC II molecules and are displayed on the surface of antigen processing cells is called

a. Antigen presentation
b. Antisense orientation
c. Antisense strand
d. None of these

Ans. (a) Antigen presentation

183. Reverse orientation of a gene in relation to its promoter; the promoter is now located at the 5′ end of the antisense strand so that the natural sense is now transcribed is called

a. Antigen presentation
b. Antisense orientation
c. Antisense strand
d. None of these

Ans. (b) Antisense orientation

184. The order for the construction of a cDNA fragment from mRNA is

a. Bind oligo-dT, treat with reverse transcriptase, digest with RNase, add G residues to the 3′ end, bind oligo-dC, treat with DNA polymerase
b. Treat with reverse transcriptase, digest with RNase, add G residues to the 3′ end, bind oligo-dC, treat with DNA polymerase and bind oligo-dT
c. Digest with RNase, add G residues to the 3′ end, treat with reverse transcriptase, add G residues to the 3′ end and treat with DNA polymerase
d. Bind oligo-dC, treat with reverse transcriptase, digest with RNase, add G residues to the 3′ end, bind oligo-dT and treat with DNA polymerase

Ans. (a) Bind oligo-dT, treat with reverse transcriptase, digest with RNase, add G residues to the 3' end, bind oligo-dC, treat with DNA polymerase

185. The strand of a native gene, which is used by RNA polymerase as template to genetrate its complementary copy of RNA; this RNA ultimately function as messenger RNA; the promoter sequence is, as a rule, located at the 3′ end of the antisense strand is called

a. Antigen presentation
b. Antisense orientation
c. Antisense strand
d. None of these

Ans. (c) Antisense strand

186. The TP53 gene of chromosome 17 codes for a protein

a. That plays a role in the digestive process
b. Involved in glucose transport
c. Involved in the regulation of the cell cycle
d. That is like a white blood cell protein

Ans. (c) Involved in the regulation of the cell cycle

187. Colonies from a master plates are either lifted or replica plates onto a nitrocellulose filter, cells are lysed, DNA is denatured and hybridised with radioactive probe to detect the colonies having DNA/RNA sequence complementary to the probe is called

a. Colony hybridization
b. Northern hybridization
c. Southern hybridization
d. None of these

Ans. (a) Colony hybridization

188. Why is golden rice pale yellow in color?

a. It is rich in chlorophyll *a*
b. It is rich in beta-carotene
c. It is rich in chlorophyll *b*
d. It is rich in phycobilins

Ans. (b) It is rich in beta-carotene

189. An enzyme that seals nicks in DNA strand catalysing the formation of phosphodiester bond between the contiguous nucleotides is called

a. DNA ligase
b. DNA insert
c. DNA array
d. DNA methylation

Ans. (a) DNA ligase

190. Which type of restriction enzymes do not usually require ATP?

a. Type I
b. Type II
c. Type III
d. Type IV

Ans. (b) Type II

191. RNA sample is subjected to gel electrophoresis, RNA transferred from the gel onto a nylon membrane, immobilized and hybridized with a single stranded radioactive probe; autoradiography reverse the RNA and hybridized to the probe, used for detection of transcription of transgenes is called

a. Colony hybridization
b. Northern hybridization
c. Southern hybridixation
d. Somatic hybridization

Ans. (b) Northern hybridization

192. Production of hybrid plants *via* protoplast fusion; feasible in sexuality incompatible combinations, is sterile/non flowering species, etc. by

a. Southern blotting
b. Northern blotting
c. Both a and b
d. None of these

Ans. (d) None of these

193. An example of a restriction fragment length polymorphism is

a. An Eco RI cuts DNA at a different sequence than Hind III
b. Different length fragments of DNA resulting from loss or gain of a restriction site
c. Cystic fibrosis results from a three base deletion in most cases but in other cases, other mutations are involved
d. All of the above

Ans. (b) Different length fragments of DNA resulting from loss or gain of a restriction site

194. The characteristics two dimensional pattern formed by the separation of a mixture of peptides resulting from partial hydrolysis of a protein is known as

a. Genetic map
b. Peptide mapping
c. Peptide map
d. None of these

Ans. (b) Peptide mapping

195. A series of DNA sequence fixed as distinct spots on a suitable solid support, like glass chip; basically two types, spotted DNA array and printed oligonucleotide chips is called

a. DNA ligase
b. DNA insert
c. DNA array
d. DNA methylation

Ans. (b) DNA insert

196. Addition of methyl residues, chiefly to C residues, usually, located in CG or CNG sequence, after they are incorporated in DNA is called

a. DNA ligase
b. DNA insert
c. DNA array
d. DNA methylation

Ans. (d) DNA methylation

197. Knockout mice are created by

a. Mutagenizing a mouse and selecting for mutant offspring
b. Creating a chimera by fusing cells from two different cell lines
c. Infecting the mouse with a retrovirus
d. Transfecting embryonic stem cells with an altered gene sequence

Ans. (d) Transfecting embryonic stem cells with an altered gene sequence

198. The biotin labelled mRNA from non stressed cell is called

a. Driver mRNA
b. cDNA
c. Both a and b
d. None of these

Ans. (a) Driver mRNA

199. A plasmid

a. Is a circular DNA molecule
b. Always contains an origin of replication
c. Usually contains one or more restriction sites
d. All of the above

Ans. (d) All of the above

200. The copy of DNA or complementary DNA produced using RNA as tempelate; produced by rerverse transcriptase enzyme is called

a. Driver mRNA
b. cDNA
c. BOTH a and b
d. None of these

Ans. (b) cDNA

201. RNA produced by transcription of the antisense stand of a gene; in case of structure genes encoding protein, it usually means mRNA is

a. Driver mRNA
b. cDNA
c. BOTH a and b
d. None of these

Ans. (c) BOTH a and b

202. A diagram showing the relative sequence and position of specific genes along a chromosome is called

a. Genetic map
b. Genetic information
c. Genetic code
d. Gene expression

Ans. (a) Genetic map

203. A molecular technique in which DNA sequences between two oligonucleotide primers can be amplified is known as

a. Southern blotting
b. Northern blotting
c. Polymerase chain reaction
d. DNA replication

Ans. (c) Polymerase chain reaction

204. The Southern blotting technique depends on

a. Similarities between the sequences of probe DNA and experimental DNA
b. Similarities between the sequences of probe RNA and experimental RNA
c. Similarities between the sequences of probe protein and experimental protein
d. The molecular mass of proteins

Ans. (a) Similarities between the sequences of probe DNA and experimental DNA

205. The hereditary information contained in a sequence of nucleotide bases in chromosomal DNA or RNA is known as

a. Genetic map
b. Genetic information
c. Genetic code
d. Gene expression

Ans. (b) Genetic information

206. In genetic engineering, a chimera is

a. An enzyme that links DNA molecules
b. A plasmid that contains foreign DNA
c. A virus that infects bacteria
d. A fungi

Ans. (a) An enzyme that links DNA molecules

207. The set of triplet code words in DNA coding for the amino acid of proteins is known as

a. Genetic map
b. Genetic information
c. Genetic code
d. Gene expression

Ans. (c) Genetic code

208. The deliberate modifications of an organism's genetic information by directly changing its nucleic acid content is a subject matter of

a. Genetic engineering
b. Population genetics
c. Microbiology
d. Protein engineering

Ans. (a) Genetic engineering

209. Transcription in the case of proteins, translation to yield the product of a gene, a gene is expressed when its biological product is present and active is known as

a. Genetic map
b. Genetic information
c. Genetic code
d. Gene expression

Ans. (d) Gene expression

210. Electroporation is

a. The process of separating charged molecules through a gel maintained in an electric field
b. The process of combining foreign DNA to an electrically charged vector molecule
c. The application of high voltage pulses
d. The process of multiplication of the cells

Ans. (c) The application of high voltage pulses

211. What is the normal role of restriction endonucleases in bacterial cells?

a. To degrade the bacterial chromosome into small pieces during replication
b. To degrade invading phage DNA
c. To produce RNA primers for replication
d. All of the above

Ans. (b) To degrade invading phage DNA

212. Recombination between two DNA molecules of similar sequence, occurring in all cells; occurs during meiosis and mitosis in eukaryotes is called

a. Homologous Genetic Recombinatioin
b. Recombinant DNA
c. Recombinational DNA repair
d. Recombination

Ans. (a) Homologous Genetic Recombinatioin

213. Peptide mapping is also known as

a. Peptide fingerprinting
b. DNA fingerprinting
c. DNA footprinting
d. None of the above

Ans. (a) Peptide fingerprinting

214. A short molecule containing 2–20 nucleotide is

a. Oligonucleotide
b. Plasmid
c. Vector
d. Mononucleotide

Ans. (a) Oligonucleotide

215. Charged molecules are separated based on varying rates of migration through a solid matrix when subjected to an electric field. This technique is known as

a. Photoreactivation
b. Gel electrophoresis
c. Autoradiography
d. Blotting

Ans. (b) Gel electrophoresis

216. The transfer of genetic information from one cell to another by means of a viral vector is called

a. Transmination
b. Transcription
c. Transduction
d. Transformation

Ans. (c) Transduction

217. Introduction of an exogenous DNA into a cell, causing the cell to require a new phenotype is called

a. Transmination
b. Transcription
c. Transduction
d. Transformation

Ans. (d) Transformation

218. For gene probes to be useful they must

a. Be large enough to contain gene-specific sequences
b. Be labeled in some manner to allow detection
c. Both a and b
d. None of these

Ans. (c) Both a and b

219. A genomic library is

a. A database where the sequence of an organism's genome is stored
b. A collection of many clones possessing different DNA fragments from the same organisms bound to vectors
c. A book that describes how to isolate DNA from a particular organism
d. A place where the information of the genetic organization of organisms are kept.

Ans. (b) A collection of many clones possessing different DNA fragments from the same organisms bound to vectors

220. The process in which the genetic information present in an mRNA molecule specifies the sequence of amino acids during protein synthesis is called

a. Translation
b. Transcription
c. Transduction
d. Transformation

Ans. (d) Translocation

221. The movement of gene or set of genes from one site in the genome to another is called

a. Transmination
b. Transcription
c. Transduction
d. Translocation

Ans. (d) Translocation

222. A DNA sequence at which RNA polymerase may bind, leading to initiation of transcription is called

a. Transamination
b. Transcription
c. Promoter
d. Transformation

Ans. (c) Promoter

223. DNA formed by the joining of genes in two new combination is called

a. Recombinant DNA
b. Recombination
c. Recombinational DNA repair
d. None of these

Ans. (a) Recombinant DNA

224. Which of the variation of PCR aims to enhance specificity?

a. Anchored PCR
b. Hot start PCR
c. Touchdown PCR
d. Both a and b

Ans. (b) Hot start PCR

225. Which *E. coli* vectors yields single stranded copies of cloned DNA?

a. p-UC18/19
b. λ-Phage vectors
c. Phage M13 vector
d. Cosmid ectros

Ans. (c) Phage M13 vector

226. Which bacteria has at least two circular chromosomes in its genome?

a. Bacillus
b. Pseudomonas
c. Vibrio cholerae
d. Mycoplasma genitalium

Ans. (c) Vibrio cholerae

227. Which is not correct about DNA?

a. Double helix model of DNA was produced by Watson and Crick
b. DNA molecule ordinarily consist of two polynucleotide chains
c. DNA double helix is stabilized by hydrogen bonds
d. Two strands of a DNA molecule are oriented antiparallel to each other

Ans. (c) DNA double helix is stabilized by hydrogen bonds

228. Which is not correct?

a. If the base sequence of one DNA strand is known, the base sequence of its other strand can be easily deduced
b. The formation of hydrogen bonds between adenine and thymine, and between guanine and cytosine is known as complementary base pairing
c. Usually, B-DNA molecule has right handed coiling
d. Hydrophobic interaction are important in transcription

Ans. (d) Hydrophobic interaction are important in transcription

229. Multiple copies of a gene can be obtained by

a. Gene cloning
b. Polymerase chain reaction
c. Combination of PCR with chemical synthesis
d. All of the above

Ans. (d) All of the above

230. DNA polymerase III serves which type of function?

a. DNA repair
b. DNA replication
c. Initiation of DNA replication
d. All of the above

Ans. (b) DNA replication

231. Which is not correct about DNA replication?

a. The presence of replication fork in *E.coli* chromosome was first demonstrated by chain in 1953
b. DNA replication always proceed in the 5′–3′ direction
c. Both strands of DNA replicate continuously
d. DNA replication of DNA replication synthesis of a small RNA primer

Ans. (c) Both strands of DNA replicate continuously

232. Which enzyme is called molecular scissor?

a. DNA ligase
b. DNA gyrase
c. Restriction endonuclease
d. Topoisomerase

Ans. (c) Restriction endonuclease

233. A class of enzymes which cleaves DNA only within or near those sites that have specific base sequence is called

a. Type I endonuclease
b. Type II endonuclease
c. Type III endonuclease
d. Exonuclease

Ans. (c) Type III endonuclease

234. Which scientist was awarded Nobel Prize in 1978 for the discovery of endonucleases?

a. Smith
b. Nathans
c. Arber
d. All of these

Ans. (d) All of these

235. Near isogenic lines can be developed by

a. Single seed descont
b. Mutagenesis
c. Backcross method
d. Continued inbreeding

Ans. (c) Backcross method

236. Which is an example of type I restriction endonuclease?

a. Eco K
b. Hind III
c. Hind II
d. Bgl II

Ans. (a) Eco K

237. IRGSP stand for

a. International Rice Genome Sequencing Project
b. International Rice and Groundnut Sequencing Project
c. International Research on Groundnut, sorghum and Pigeonpea
d. Indian Rice genetic resources programme

Ans. (a) International Rice Genome Sequencing Project

238. Most of the type II restriction endonucleases have recognition site of how much length?

a. 4 bp
b. 5 bp
c. 6 bp
d. 4–6 bp

Ans. (d) 4–6 bp

239. Which restriction enzymes produces blunt ends?

a. Bam H1
b. Alu I
c. Pst I
d. Hind III

Ans. (b) Alu I

240. Which one has the largest number of genes?

a. Arabidopsis
b. Yeast
c. Caenorhabditis
d. Drosophila

Ans. (a) Arabidopsis

241. Identification of protein using antibodies may be done by

a. Enzyme linked immunosorbant assay
b. Western blotting
c. Precipitation and electrophoresis
d. All of the above

Ans. (d) All of the above

242. Which scientist isolated ribosomal RNA gene in 1965?

a. Maxam and Gilbert
b. Wallace and Birnstiel
c. Sanger and Southern
d. Brown and Gilbert

Ans. (b) Wallace and Birnstiel

243. Which has the smallest genome size

a. *Mycoplasma genitalium*
b. *Saccharomyces cerevisiae*
c. *E. coli*
d. *Caenorhabditis elegans*

Ans. (a) *Mycoplasma genitalium*

244. The l genome contains

a. Origin of replication
b. Genes for head and tail protein
c. Proteins involved in lysogeny
d. All of these

Ans. (d) All of these

245. Which population are used for linkage mapping?

a. F_2 population
b. Backcross population
c. Recombinant inbred lines
d. All of these

Ans. (d) All of these

246. Restrictive polyacrylamide gels are used for

a. Viroid test
b. Analysis of point mutations
c. DNA sequencing
d. All of these

Ans. (d) All of these

247. During DNA isolation, if bacterial cell extract has a heavy load of proteins, it is treated with?

a. Proteinase K
b. Trypsin
c. Pronase
d. Both a and c

Ans. (d) Both a and c

248. Which is the least likely to accumulate property folded proteins encoded by an eukaryotic transgene?

a. Animal cell
b. Saccharomyces
c. *E. coli*
d. Pichia

Ans. (c) *E. coli*

249. Which one has the largest genome size?

a. Arabidopsis
b. Yeast
c. Caenorhabditis
d. Drosophila

Ans. (d) Drosophila

250. In general, which is used for initial cloning?

a. B. Subtilis
b. Agrobacterium
c. *E. coli*
d. B. thuringiensis

Ans. (c) *E. coli*

251. Use of an antibiotic resistance and the lac Za in a vector, eliminates the need for

a. Plating on the antibiotic containing medium
b. Replica plating
c. Plating on a second selection medium
d. Both b and c

Ans. (d) Both b and c

252. AFLP may arise due to

a. A difference in restriction site
b. Deletions and insertion within the amplified restriction fragments
c. Mutation beyond the restriction sites that affect complementarity with the selection
d. All of these

Ans. (d) All of these

253. In case of linkage maps, the distance, between the markers are measured in terms of

a. Recombination frequency
b. Mutation frequency
c. Angstroms
d. Nucleotide numer

Ans. (a) Recombination frequency

254. Which of the following cleaves both the DNA strands at random sites?

a. DNase I
b. SI nuclease
c. Eco R I
d. Hind III

Ans. (a) DNase I

255. Which one has smallest genome size?

a. Arabidopsis
b. Yeast
c. Caenorhabditis
d. Drosophila

Ans. (b) Yeast

256. Which of the following enzymes is used for converting protruding ends into blunt ends?

a. Polynucleotide kinase
b. S1 nuclease
c. Klenow fragment of *E. coli* DNA polynuclease I
d. Both b and c

Ans. (d) Both b and c

257. Which is the preferred strategy for converting potruding ends in to blunt end ?

a. Polynucleotide kinase
b. S1 nuclease
c. Klenow fragment of *E. coli* DNA polynuclease I
d. Both b and c

Ans. (c) Klenow fragment of *E. coli* DNA polynuclease I

258. DNA fingerprinting is used for

a. Identification of varieties
b. Resolving disputed parentages
c. Identification of criminals
d. All of these

Ans. (d) All of these

259. ARMS PCR achieves differential amplification of allele due to

a. Primer sequence
b. Annealing temperature
c. Ion concentration
d. Specific PCR protocol

Ans. (a) Primer sequence

260. In most PCR product, a single nucleotide overhang is of

a. A at the 3′-end
b. A at the 5′-end
c. C at the 3′- end
d. T at the 5′- end

Ans. (a) A at the 3′-end

261. The genome of eukaryotes was first to be sequenced

a. Arabidopsis
b. Yeast
c. Caenorhabditis
d. Drosophila

Ans. (b) Yeast

262. Which of the following enzyme is used to covalently bond foreign DNA to a vector plasmid?

a. DNA polymerase
b. Restriction endonuclease
c. DNA ligase
d. DNA helicase

Ans. (c) DNA ligase

263. Bacterial cells protect their own DNA from degradation by restriction endonucleases by

a. Methylating the DNA at the sites that the enzyme recognizes
b. Deleting all recognition sites from the genome
c. Not producing any restriction endonucleases
d. Having anti restriction endonucleases

Ans. (a) Methylating the DNA at the sites that the enzyme recognizes

264. The piece of equipment, that introduces DNA into cells via DNA-coated microprojectiles is known as

a. Inoculating needle
b. Gene gun
c. DNA probe
d. Laser

Ans. (b) Gene gun

265. Which is not an example of insertion vector?

a. λgt 10
b. λgt 11
c. λgt 12
d. zap 11

Ans. (b) λgt 11

266. Identification of protein using antibodies may be done by

a. Enzyme linked immunosorbant assay
b. Precipitation and electrophoresis
c. Western blotting
d. All of these

Ans. (d) All of these

267. Replacement vector, λ ENBLA can be used to c lone DNA of upto which size?

a. 10 kb
b. 20 kb
c. 10 kb
d. 45 kb

Ans. (b) 20 kb

268. Bacterial cell usually multiply in

a. Jensen medium
b. Luria betani medium
c. YE medium
d. Ganberg medium

Ans. (a) Jensen medium

269. Pulsed field gel electrophoresis is able to separate chromosome of

a. Yeast
b. Bacteria
c. Protoson
d. All of these

Ans. (d) All of these

270. Who developed pBR 322?

a. Boliver Rodrigues
b. Berg Rosenberg
c. Benfy Ris
d. Bonner Riggs

Ans. (a) Boliver Rodrigues

271. Which vector has been constructed for use in two different hosts?

a. Shuttle vectors
b. Cosmids
c. Phasmids
d. Phagemids

Ans. (a) Shuttle vectors

272. DNA marker can be used for

a. Preparation of linkage map
b. Map based cloning of genes
c. Mapping of quantitative traits loci
d. All of these

Ans. (d) All of these

273. Which is not correct about RNA?

a. RNA molecules ordinarily consist of a single polyribonucleotide strand
b. RNA molecules contain uracil in the place of cytosine
c. Phosphodiseter bonds are formed between ribonuceotides in the same manner as in the case of deoxyribonucleotides
d. RNA was, most likely, the first genetic material, it was much later replaced by DNA

Ans. (b) RNA molecules contain uracil in the place of cytosine

274. Isozyme markers behave like

a. Recessive
b. dominant
c. Co dominant
d. Over dominant

Ans. (c) Co dominant

275. An animal, that has gained new genetic information from the acquisition of foreign DNA, is considered as

a. A chimera
b. A transgenic animal
c. A vector
d. An enzyme that links DNA molecules

Ans. (b) A transgenic animal

276. The advantage of using DNA polymerases from thermophilic organisms in PCR is that

a. The DNA polymerases of these bacteria are much faster than those from other organisms
b. The DNA polymerases of these bacteria can withstand the high temperatures needed to denature the DNA strands
c. The DNA polymerases of these bacteria never make mistakes while replicating DNA
d. All of the above

Ans. (d) All of the above

277. Difference between λ gt 10 and λ gt 11 vectors is that

a. λ gt 11 is an expression vector
b. λ gt 10 is an expression vector
c. λ gt 10 is a replacement vector
d. λ gt 11 is a repl cement vector

Ans. (a) λ gt 11 is an expression vector

278. λ ZAP vector is an example of

a. Phage
b. Cosmid
c. Plasmid
d. Phagemid

Ans. (d) Phagemid

279. λ gt 10 and λ gt 11 vectors can propagate cloned fragments up to

a. 6–7 kb
b. 16–17 kb
c. 26–27 kb
d. 30–40 kb

Ans. (a) 6–7 kb

280. DNA from a bacterial strain having genetic composition a + b + c + d + e + was used to transform bacteria with genetic composition a–b–c– d–e– . The transformed cells were checked for the co-transformed genes and the sequence of co-transformation was

1. a, d
2. c, e
3. b, c
4. d, b

So the order of genes is:

a. a–c–e–d–b
b. a–b–d–c–e
c. c–e–a–d–b
d. a–d–b–c–e

Ans. (d) a–d–b–c–e

281. Gene A of 500 bp is cloned in a vector 'V' of 2.8 kb at sites Eco RI and Hind III. Eco RI and Hind III are present in the MCS region of 'V' at 1900 and 1910 sites ..... of vector respectively. To find out the orientation of gene and the vector both are cut at pst I sites. Pst I cuts the vector at 1700 and 100 bp. The right orientation of the gene in the vector would give fragment of

a. 2.8 kb and 500 bp
b. 2.8 kb and 100 bp
c. 3.1 kb and 200 bp
d. 3 kb and 300 bp

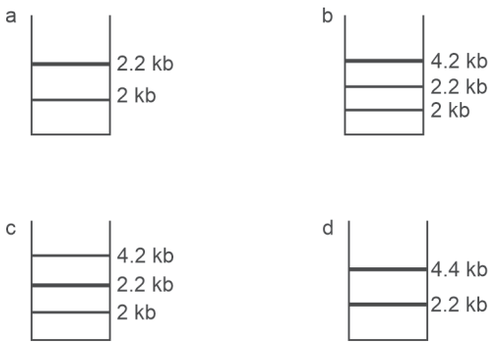
Ans. (d) 3 kb and 300 bp

282. The distance between gene A and B is 11 kb and that of gene C and A is 4 kb. One more gene D is placed at 5 kb from B and 12 kb from C so, what is the genetic makeup?

a. A–C–B–D
b. C–A–D–B
c. C–A–B–D
d. C–B–D–A

Ans. (a) A–C–B–D

283. A 4.2 kb plasmid DNA has two restriction sites, Hind III and Eco RI. Complete double digestion of the plasmid yields two bands of size 2 and 2.2 kb. A G:T mismatch was introduced in one strand of Hind III. The damaged plasmid was incubated in a reaction having all the components required for repair. If the efficiency of repair was 50% which one of the band pattern would appear on agarose gel. After treating the repaired plasmid with both Hind III and Eco RI



Ans. (b)

284. The appearance of gene in a conjugation experiment was, p = 10 min, q = 12 min, r = 3 min, s = 7 min what is the order of the genes?

a. p, q, r, s
b. r, p, s, q
c. r, s, p, q
d. p, q, s, r

Ans. (c) r, s, p, q

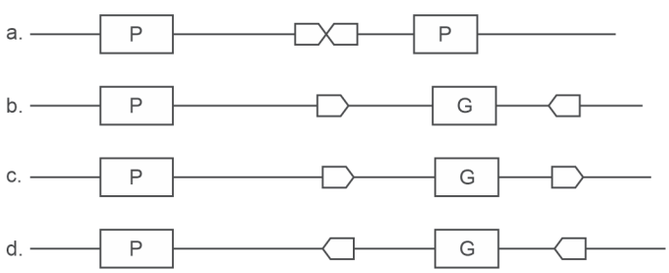
285. In a transgenic mice, Lox P sites are introduced in the target gene A in the following manner

This mice was mated with another mice expressing Cre Recombinase only in 'x' cells. What will be expression profile of A in the Cre/Lox recombinant mice:

a. Gene A will be expressed in x cell as Cre with delete Lox p sites.
b. Gene A will not expressed in x cells as Exon-2 will be inverted.
c. Gene A will not be expreesed as Exon-1 will deleted.
d. Gene A will not be expressed in x cells as Exon-2 will be deleted.

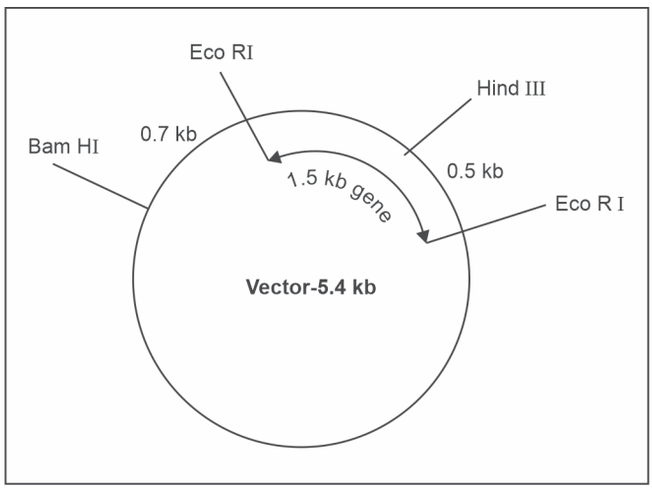
Ans. (d) Gene A will not be expressed in x cells as Exon-2 will be deleted.

286. In a mice gene 'G' has lox-P sites arranged on its sites so that when Cre recombinant acts on them the gene get inverted, What is the correct orientation of Lox-P sites?



Ans. (b)

287. In the below diagram the gene is inserted its right orientation for the gene to be in its wrong orientation which one of the statements would be incorrect?



a. Digestion with Hind III would linearize the plasmid
b. Digestion with EcoRI would give a fragments of 5.4 kb and one of 1.5 kb
c. Double digestion with Bam H I and Hind III would give fragments of size 0.7 kb, 1 kb, 0.5 kb and 3.2 kb
d. Double digestion with Bam H I and Hind III would give bands of 1.2 kb and 5.7 kb

Ans. (c) Double digestion with Bam H I and Hind III would give fragments of size 0.7 kb, 1 kb, 0.5 kb and 3.2 kb

288. A recognition sequence ' GAATTC' would appear in a genome at a distance of how many base pairs

a. 4096 bp
b. 1296 bp
c. 24 bp
d. 256 bp

Ans. (c) 24 bp

289. A gene encodes protein of sequence V-R-Y-W-L-H, a point mutation in the gene converts the sequence to V-P-P-P-H, a second point mutation in the same gene restores the sequence which statements regarding the mutation are correct

A. The first mutation was a substitution mutation and the second was deletion
B. The first mutation was an insertion in the second codon
C. The second mutation was an insertion in the second codon
D. The first mutation was deletion in the second codon

a. A
b. D
c. C and D
d. B and C

Ans. (c) C and D

290. A reporter gene luciferase (lux) in the vicinity of Lac Z promoter sequence what would be the expression profile of Lux, If the promoter gets mutated?

a. Increase in Lux activity in the presence of lactose
b. Increase in Lux activity in the absence of lactose
c. No effects on Lux activity in the presence of lactose
d. Decrease in Lux activity in presence of lactose

Ans. (c) No effects on Lux activity in the presence of lactose

291. Match the following

Enzyme	*Organism*	*Recognition sequence*	*Pattern of cut*
a. Bam H I	e. *E. coli*	k. GGATTCC	p. Blunt
b. Hind III	f. Bacillus amylo-	l. AAGCTT	q. Sticky
c. Eco R I	liqifaciens	m. GAATTC	r. Sticky
d. Pvu I	g. Bacillus	n. CGATCG	s. Sticky
	globigi	o. AGCT	t. Sticky
	h. Haemophilus influenza RD		
	i. Haemophilus influenza RF		
	j. Proteus vulgaris		

a. A-F-K-Q, B-H-L-R, C-E-M-S, D-J-N-T
b. A-F-K-P, B-H-L-R, C-E-M-S, D-J-N-T
c. A-H-K-P, B-F-L-R, C-E-M-S, D-J-N-T
d. A-E-M-S, B-F-K-Q, C-I-O-P

Ans. (a) A-F-K-Q, B-H-L-R, C-E-M-S, D-J-N-T

292. Match the following with correct size vector

Vector	*Insert size*
a. M13	g. 200–200 kb (f)
b. Plasmid	h. < 300 kb (e)
c. Lambda phage	i. 1–4 kb (a)
d. Cosmids	j. 1–5 kb (b)
e. BAC	k. 5–25 kb (c)
f. YAC	l. 35–45 kb (d)
	m. 70–1000 kb
	n. 100–300 kb
	o. 10 Mb

a. A-I, B-J, C-K, D-L, E-N, F-O
b. A-I, B-J, C-K, D-L, E-N, F-O

c. A-I, B-J, C-K, D-L, E-H, F-G
d. A-O, B-N, C-M, D-H, E-I, F-O

Ans. (c) A-I, B-J, C-K, D-L, E-H, F-G

293. A transgenic lettuce plant was generated by overexpressing IPT gene under the control of the promoter of sequence activator gene (SAG12). Following are the some statements regarding these transgenic plants

A. Exhibit delays senescence
B. Exhibit fast senescence
C. Having higher amount of cytokinin during senescence
D. Have higher amount of gibberellins during senescence

Which one of the following combination of above statements are correct?

a. A and B
b. A and C
c. B and D
d. C and D

Ans. (b) A and C

294. An interrupted mating experiment was performed between *HFr* strain a+ b+ c+ and F- strain a- b- c- strain the genotype of majority of streptomycin resistant exoconjugant after 10, 20 and 30 min of interrupted mating is given below

10 min	a+b-c-
20 min	a+b-c+
30 min	a+b+c+

The most probable gene order would be

a. abc
b. cab
c. bac
d. acb

Ans. (d) acb

295. While designing an experiment for *Agrobacterium* mediated plant transformation, a student noted down following points

A. Ti and Ri plasmid induce crown gall and hairy root disease respectively.
B. Enzyme Octopine synthase and Nopaline synthase involved in the synthesis of octopine and nopaline respectively are encoded by T-DNA.
C. All the six vir genes A, B, C, D, E, G are absolutely required for virulence.
D. Almost 25 bp direct repeat sequence flanking all Ti and Ri plasmids in the T-DNA regions is essential for T-DNA transfer.

Which one of the following combination of above statements is correct

a. A B C
b. B C D
c. A C D
d. A B D

Ans. (d) A B D

296. What is the correct order of infection of plant cell by *agrobacterium*.

a. Acetosyringone ..... vir A ..... vir G ..... vir B
b. Acetosyringone ..... vir A ..... vir B ..... vir G
c. vir-B ..... Acetosyringone ..... vir G ..... vir ..... A
d. vir B ..... vir A ..... vir G ..... Acetosyringone

Ans. (a) Acetosyringone ..... vir A ..... vir G ..... vir B

297. Among existing technologies, which of the following vector system would you prefer to use for generating a library for 140 kb, eukaryotic genomic DNA fragments, while give the consideration to size as well as stability of insert?

a. Phage
b. Cosmid
c. BAC
d. YAC

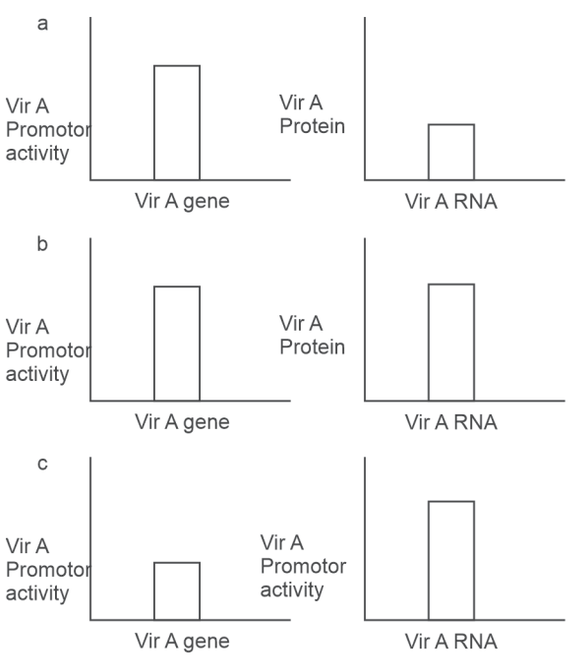
Ans. (c) BAC

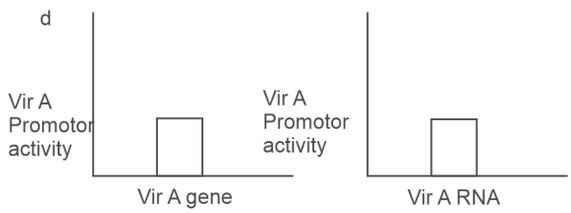
298. The following are useful to introduce gene into crop plant except

a. Ti plasmid
b. Particle gun
c. Breeding
d. Auxin

Ans. (d) Auxin

299. *Agrobacterium tumefaciens* senses the phenolic compound to infect the plants and then some gene are constitutively express to facilitate the infection regarding this which graph is correct for infection in plant?





Ans. (b)

300. Molecular beacons technique is Baredon?

A. Complementarity with target strand as well as separation of fluorophore and quencher
B. Complementarity is required but fluorescence is not necessary
C. Complementarity and fluorescence is basic requirement of this technique
D. Quencher control the fluorophore but due to complementarity fluorophore not able to flourish and its important for molecular beacon technique

a. A, C
b. B, D
c. B, C, D
d. Question is wrong

Ans. (a) A, C

301. An M.Sc. student would like to observe changes the level of serum protein for which an antibody is available. Which one of the following method would be best?

a. Inverted microscopy
b. Immunofluorescence *in situ* hybridisation
c. ELISA
d. Fluorescence activated cell sorting

Ans. (c) ELISA

302. What phenotype would you predict for A mutant mouse lacking one of the genes require for site specific recombination in lymphocytes?

a. Decrease in cell counts
b. Immunodeficient
c. Increase in cell counts
d. Increase in B cell counts

Ans. (b) Immunodeficient

303. In a confirmatory test for HIV, one or more viral antigens are detected in blood of patients, following are the steps to be performed for the experiment

A. Transfer of viral antigens to nitrocellulose paper
B. Incubation with the buffer containing antibodies specific for viral antigens
C. Separation of viral antigens by SDS-PAGE
D. Detection of bands by enzyme linked secondary antibodies

Identify the correct steps to performed for the experiments

a. A-B-C-D
b. B-C-D-A
c. C-A-B-D
d. C-B-A-D

Ans. (a) A-B-C-D

304. Match the following

a. RT-PCR	1. Lac-z gene (b)
b. Puc-19	2. Homologous DNA in chromosome (c)
c. *In-situ* hybridisation	3. Identification of complementary DNA (d)
d. Nucleic acid hybridisation	4. RNA interference
e. RFLP	5. Bam HI
f. AFLP	6. Dominant inheritance (f)
	7. Codominant inheritance (e)
	8. SYBE green (a)

a. a-8, b-1, c-2, d-3, e-7, f-6
b. a-8, b-1, c-2, d-3, e-6, f-7
c. a-8, b-1, c-6, d-3, e-4, f-5
d. The given option is not suitable.

Ans. (a) a-8, b-1, c-2, d-3, e-7, f-6

305. Which of these restriction enzyme produce blunt end?

a. Sau
b. Eco RV
c. X hol
d. Hind II

Ans. (b) Eco RV

CHECK YOUR GRASP

1. Blue–white selection is used

a. To test for the presence of a plasmid in bacteria
b. To reveal the identity of a cloned DNA fragment
c. To express the product of a cloned gene
d. To test for the presence of a cloned insert in a plasmid

2. pBR322 which is frequently used as a vector for cloning gene in *E. coli* is

a. An original bacterial plasmid
b. A modified bacterial plasmid
c. A viral genome
d. A transposon

3. Choose the correct statement (s) about thermostable DNA polymerase used in PCR

a. Taq Pol has no proof reading ability
b. Taq Pol has 5′ → 3′ exonuclease activity
c. p*fu* pol has 3′ → 5′ exonuclease activity
d. T*li* Pol has no 3′ → 5′ exonuclease activity
e. a, b, c, all

4. If a transcript of a given gene is degraded when mixed with DNA encoding the same gene, one could conclude that the RNA solution is contaminated with

a. RNAse A
b. RNAse T
c. RNAse H
d. DNAse III

5. The length of each border sequence in Ti–plasmid is about

a. 25 million base pairs
b. 200 kilo base pairs
c. 25 kilo base pairs
d. 25 base pairs

6. For cloning a DNA fragment larger than 100 Kb, which of the following vector system would be suitable

a. Plasmid
b. Cosmid
c. Yeast artificial chromosome
d. Lambda bacteriophage

7. Which of the following sequences is most likely to be a restriction enzyme recognition site?

a. CGGCTT
b. CGCCGC
c. GTAATG
d. GTCGAC

8. Which of the following is not component of yeast artificial chromosome?

a. Centromere
b. Telomere
c. Origin of replication
d. Cos site

9. BAC, which can be used to clone large DNA fragments, is derived from

a. CoIE plasmid
b. F plasmid
c. 2µ plasmid
d. Mu phage

10. Which of the following could not possibly give rise to restriction fragment length polymorphism (RFLP)?

a. A missense mutation within the protein coding region of a gene
b. A silent mutation within the protein coding region of a gene
c. A single base change within the intron sequence of a gene
d. An error in RNA splicing that mistakenly removes an exon during RNA processing

11. The recombinant DNA technique was engineered by

a. Stanley norman cohen
b. Herbert bayer
c. Both of these
d. None of these

12. The process in which the genetic information present in an mRNA molecule specifies the sequence of amino acids during protein synthesis is called

a. Translation
b. Transcription
c. Transduction
d. Transformation

13. Which one has smallest genome size?

a. Arabidopsis
b. Yeast
c. Caenorhabditis
d. Drosophila

In case of less than 80% score, go through brief review and glance once again from chapter

Key: 1-d 2-b 3-e 4-c 5-d 6-c 7-d 8-d 9-b 10-d 11-c 12-a 13-b

4

Plant Tissue Culture and Genetic Transformation

1. The scientist, who has first tested the *in vitro* selection for diseases resistance of wild fire disease of tobacco is

a. Watson b. Carlson
c. Waldeyer d. Fleming

Ans. (b) Carlson

2. High ratio of cytokinin to Auxin in growth medium favours

a. Shoot formation b. Leaf formation
c. Root formation d. Callus formation

Ans. (a) Shoot formation

3. The deletion of genes governing Auxin and cytokinin production from T-DNA of a Ti plasmid is known as

a. Addition b. Deletion
c. Disarming d. Cohesion

Ans. (c) Disarming

4. Most commonly used medium for tissue culture is

a. BS medium b. MS medium
c. LS medium d. B6 medium

Ans. (b) MS medium

5. The culture of whole plants and organ is termed as

a. Protoplast culture
b. Callus culture
c. Non organised culture
d. Organised culture

Ans. (d) Organised culture

6. The presence of the following phytohormones in the medium is generally essential for embryo initiation

a. Cytokinin b. Auxin
c. Kinetin d. All of the above

Ans. (b) Auxin

7. Factors contributing to produce somaclones are

a. Explants source
b. Genotype
c. Duration of cell culture
d. All of the above

Ans. (d) All of the above

8. Scarlet is a disease resistance variety of the crop called

a. Radish b. Tomato
c. Sweet potato d. Turnip

Ans. (c) Sweet potato

9. The molecules, which can stimulate the production of secondary metabolites in plant cell is called

a. Repressor b. Elicitors
c. Promoter d. Adapter

Ans. (b) Elicitors

10. A bead of gel containing a somatic embryo needed for the development of a complete plantlet from the enclosed somatic embryo or shoot bud is called

a. Calcitrant seed b. Bio seed
c. Artificial seed d. Natural seed

Ans. (c) Artificial seed

11. A natural genetic engineer is

a. Trigoderma
b. Ppseudomonas
c. Agrobacterium
d. Fusarium

Ans. (c) Agrobacterium

12. A chemical that is added to rooting media to prevent/eradicate the root inhibiting agent is

a. Gibberellins
b. Ethylene
c. Activated charcoal
d. None of these

Ans. (c) Activated charcoal

13. Introduction of a viral genome in to plant cells by placing it within the T-DNA of a Ti plasmid is called

a. Lipoinfection
b. Agroinfection
c. Reconinfection
d. Vector infection

Ans. (b) Agroinfection

14. The process in which the young embryos are removed from developing seeds and are placed on suitable nutrient medium to obtained seedling is called as

a. Callus culture
b. Embryo culture
c. Meristem culture
d. Stem culture

Ans. (b) Embryo culture

15. The process of a prolonged exposure to low temperature followed by shoot tip culture to eliminate the virus is called as

a. Heliothrapy
b. Cryotherapy
c. Thermotherapy
d. None of these

Ans. (b) Cryotherapy

16. Preservation of cell, tissues and organs in liquid nitrogen at –196°C is called as

a. Thermopreservation
b. Cryopreservation
c. Hydropreservation
d. Helopreservation

Ans. (b) Cryopreservation

17. Introduction of a tobacco mosaic virus transgene into plants in 1986 was used to demonstrate a process called as

a. Cross protection
b. Co-transfection
c. Co-transformation
d. Co-suspension

Ans. (a) Cross protection

18. The technique of grafting of shoot tips onto young rootstock seedling grown *in vitro* allowing the recovery of complete shoots from them is called

a. Micropropagation
b. Microprotoplast
c. Mobilization
d. Micrografting

Ans. (d) Micrografting

19. The mass production of clonal progeny through tissue culture is called

a. Micropropagation
b. Micrografting
c. Microprotoplast
d. None of these

Ans. (a) Micropropagation

20. The cell to cell transfer of a non con-jugative plasmid in the presence of a conjugative plasmid inside the same cell as the former is called as

a. Mobilization
b. Micropropagation
c. Microprotoplast
d. Micrografting

Ans. (a) Mobilization

21. Use of diploids in breeding of crops like potato offers which of the following advantage?

a. A lesser efficiency of selection
b. Much easier hybridization with diploid wild species Which offers many genes of great value
c. Both a and b
d. None of these

Ans. (b) Much easier hybridization with diploid wild species. Which offers many genes of great value

22. Gametoclonal variation may occur due to which of the following?

a. Gene amplification
b. Gene mutation
c. Residual heterozygosity
d. All of the above

Ans (d) All of the above

23. The phenomenon of a natural cell reverting to meristematic state and forming a dedifferentiated callus tissue is called as

a. Organogenesis
b. Rhizogenesis
c. Caulogenesis
d. Dedifferentiation

Ans. (d) Dedifferentiation

24. Which of the following is correct about anther culture?

a. Anther are generally cultured in the light at 25–30°C, but regenerated plantlets are transferred to dark
b. Low concentration 1–2% of sucrose is essential for androgenesis.
c. In *barssica compestres*, pretreatment of anthers at 30–45°C gives better induction.
d. All of the above

Ans. (c) In *barssica compestres*, pretreatment of anthers at 30–45°C gives better induction.

25. A type of organogenesis by which only adventitious shoot bud initiation takes place in callus tissue is called as

a. Organogenesis
b. Caulogenesis
c. Rhizoenesis
d. Dedifferentiation

Ans. (b) Caulogenesis

26. Match the column A and B and select the correct option from those listed below them.

A. Transgene	**I. PEG**
B. Probe	**II. Gene isolation**
C. Meristem	**III. Transgenic**
D. Fusogen	**IV. Micropropagation**

a. A-III, B-II, C-IV, D-I
b. A-II, B-III, C-IV, D-I
c. A-III, B-I, C-IV, D-III
d. A-I, B-II, C-IV, D-III

Ans. (a) A-III, B-II, C-IV, D-I

27. The process by which cell and tissues are forced to undergo change which lead to the production of a unipolar structure namely shoot/root primordium is called as

a. Rhizogenesis
b. Organogenesis
c. Caulogenesis
d. None of these

Ans. (b) Organogenesis

28. The type of organogenesis by which only adventitious initiation takes place in callus tissue is called

a. Rhizogenesis
b. Organogenesis
c. Dedifferentiation
d. Caulogenesis

Ans. (a) Rhizogenesis

29. In 1922, Blakeslee and co-workers, for the first time, reported occurrence of haploids in Datura due to which of the following process?

a. Mutagenesis
b. Parthenogenesis
c. Androgenesis
d. Gynogenesis

Ans. (d) Gynogenesis

30. Which of the following is correct about haploid production?

a. Androgenic induction is only possible with immature anthers, containing immature pollen.
b. The early or mid uninucleate stage of microspore development is the most responsive stage in most of the species.
c. In 1964, Guha and Maheshwari reported *in vitro* production of haploids through anther culture.
d. All of the above

Ans. (b) The early or mid uninucleate stage of microspore development is the most responsive stage in most of the species.

31. An amorphous mass of parenchyma cells arising from the proliferation of the parent tissue is called as

a. Explants
b. Medium
c. Callus
d. Stock plant

Ans. (c) Callus

32. A piece of plant tissue placed in an environment free from microorganisms supplemented with balanced diet of chemical is called as

a. Medium
b. Callus
c. Explants
d. Stock plant

Ans. (c) Explants

33. During distant hybridization, problem of endosperm abortion can be overcome by which of the following?

a. Callus culture
b. Anther culture
c. Embryo culture
d. All of the above

Ans. (c) Embryo culture

34. Which of the following are the characteristic of cytokinin?

a. Induce flowering in long day plant
b. Promote *in vitro* shoot regeneration
c. Initiate callus division
d. All of the above

Ans. (b) Promote *in vitro* shoot regeneration

35. The plant from which the explant is removed is called as

a. Explant
b. Stock plant
c. Medium
d. Callus

Ans. (b) Stock plant

36. Mixture of certain chemicals to from a nutrient rich gel/liquid for growing cultures is referred to as

a. Medium
b. Callus
c. Explants
d. All of the above

Ans. (a) Medium

37. In plant tissue culture ABA may effect which of the following?

a. Enhance root differentiation
b. Promote somatic embryo maturation
c. Induce somatic embryo conversion
d. All of the above

Ans. (b) Promote somatic embryo maturation

38. Plants with gametic chromosome number are termed as which of the following?

a. Dihaploid
b. Monoploid
c. Haploid
d. None of these

Ans. (c) Haploid

39. Micropropagation can be achieved through which of the following?

a. Production of adventitious shoot buds
b. Enhanced axillary branching
c. Somatic embryogenesis
d. All of the above

And. (d) All of the above

40. The substance/hormone that induces cell division and formation of adventitious roots is

a. Cytokinin
b. Agar
c. Auxin
d. Diphenyl urea

Ans. (c) Auxin

41. A seaweed derivative which act as the most popular solidifying agent is called as

a. Cytokinin
b. Agar
c. Auxin
d. Diphenyl urea

Ans. (b) Agar

42. The important growth regulator for induction of embryogenesis is called as

a. Abscissic acid
b. IAA
c. Gibberellic acid
d. IBA

Ans. (a) Abscissic acid

43. How many types of synthetic seed have been proposed?

a. Encapsulated, hydrated somatic embryos
b. Dehydrated somatic shoot bud with a gel
c. Both a & b
d. None of these

Ans. (a) Encapsulated, hydrated somatic embryos

44. Which of the following are characteristics of an Auxin?

a. Prevents apical bud dominance
b. Involved in differentiation of phloem
c. Basipetal translocation
d. All of the above

Ans. (c) Basipetal translocation

45. Higher the agar concentration in the medium, the binding of water will be

a. Stronger
b. Lower
c. Weaker
d. Higher

Ans. (b) Lower

46. Tissues injured during explants excision from the stock plant causes release of compounds like

a. Sulphur exudates
b. Polyphenol oxidase
c. Oxalate
d. Hydrocynates.

Ans. (b) Polyphenol oxidase

47. Culture of isolated plant organs is called as

a. Cell culture
b. Callus culture
c. Organ culture
d. All of the above

Ans. (c) Organ culture

48. Progress in haploid and dihaploid production is still slow due to which of the following bottlenecks?

a. Genetic instability
b. Low level of albinism
c. High frequency of plantlet regeneration.
d. All of the above

Ans. (a) Genetic instability

49. Which of the following hydrogels have been used for encapsulation of hydrated somatic embryos?

a. Carageenan and gel-rite
b. Sodium pectate and agar
c. Sodium and potassium alginate
d. All of the above

Ans. (d) All of the above

50. Which of the following are characteristic of gibbrellic acid?

a. Induces bud dormancy
b. Enhance genetic and physiological dwarfism
c. In tissue culture, elongation of shoot
d. All of the above

Ans. (c) In tissue culture, elongation of shoot

51. Culture of a diferential tissue from explants which is allowed to dedifferentiate *in vitro* is called as

a. Cell culture
b. Callus culture
c. Organ culture
d. None of these

Ans. (b) Callus culture

52. Somaclonal variation occurs due to which of the following ?

a. Activation of silent genes in multigene families
b. Methylation and demethylation in the promoter region of gene
c. Non-reciprocal mitotic recombination and activation of transposable elements.
d. All of the above

Ans. (d) All of the above

53. Among the given hydrogels, which one is the most perfect

a. Agarose
b. Potassium alginate
c. Sodium alginate
d. Agar

Ans. (c) Sodium aliginate

54. Which of the following is correct about bulbosum technique of haploid production?

a. It is based on chromosome elimination during early embryo development.
b. Embryo culture is essential for obtaining haploid plants form the crosses between *Triticum aestivum* and *H.bulbosum.*
c. This method was reported by kasha and kao in 1970
d. All of the above

Ans. (d) All of the above

55. Survival of encapsulated somatic embryo has often been reported to be lower than that of the non-capsulated one probably due to which of the following?

a. Poor photosynthesis
b. Poor storage of food material
c. Poor respiration under the almost anaerobic condition within the capsule.
d. All of the above

Ans. (c) Poor respiration under the almost anaerobic condition within the capsule.

56. The process of formation of a bipolar structure containing the shoot and root meristem from the explants or from cell callus culture is called as

a. Somatic embryogenesis
b. Androgenetic analysis
c. Parthogenetic embryo
d. All of the above

Ans. (a) Somatic embryogenesis

57. Anther culture is used for the production of

a. Diploid plants
b. Haploid plants
c. Polyploid plant
d. All of the above

Ans. (d) All of the above

58. The scientist, who was able to obtain callus from isolated pollen culture of gymnosperms is

a. O.Hertwig
b. Sunderland
c. Tulecke
d. Haberlandt

Ans. (d) Haberlandt

59. Ethylene promotes which of the following?

a. Ageing of stem
b. Activity of chlorophyllase
c. Activity of cell wall promoting enzyme
d. All of the above

Ans. (b) Activity of chlorophyllase

60. Guha and Maheshwari produced haploids from anther culture of which of the following?

a. *Solanum esculentum*
b. Nicotana
c. Datura
d. Ginkgo

Ans. (c) Datura

61. Somaclonal variation generally serves the same purpose as which of the following?

a. Test cross breeding
b. Hybrid sorting
c. Mutation breeding
d. None of the above

Ans. (c) Mutation breeding

62. A Ti-plasmid having a functional *vir* region but lacking the T-DNA region, including the border sequence is known as

a. Binary vector
b. Helper plasmid
c. Helper T-cell
d. All of the above

Ans. (b) Helper plasmid

63. Virus free plant can be obtained by

a. Pollen culture
b. Ovary culture
c. Meristem culture
d. Shoot tip culture

Ans. (c) Meristem culture

64. Which of the following is correct about ethylene?

a. It is a natural product of ripening fruit.
b. It is phytogerontological hormone
c. Ethylene treatment increases the number of female flowers in cucumber
d. All of the above

Ans. (d) All of the above

65. Culturing of unfertilized ovaries to obtained haploid plant from egg cell or other haploid cells of the embryo sac is called

a. Meristem culture
b. Anther culture
c. Ovary culture
d. Stem culture

Ans. (c) Ovary culture

66. Synthetic seeds are

a. Somatic embryo b. Somaclone
c. Cybrids d. Protoplast

Ans. (a) Somatic embryo

67. Which of the following is not correct about Abscissic acid?

a. Precursor of ABA is malic acid
b. It is a naturally occurring growth inhibitor
c. It destroyed the effect of GA and promotes dormancy in buds and seeds.
d. It is synthesis in leaves

Ans. (a) Precursor of ABA is malic acid

68. Which phytohormones is used for development of synthetic seeds?

a. GA b. ABA
c. Auxin d. Ethylene

Ans. (b) ABA

69. The approach of isolating pollen grains and culturing *in vitro*, giving rise to haploid embryos is called as

a. Ovary culture b. Meristem culture
c. Pollen culture d. Stem culture

Ans. (c) Pollen culture

70. Which of the following scientists first reported interspecific hybridization through protopast fusion in two species of *Nicotiana*?

a. Power and co-worker
b. Miller and co-worker
c. Carson and co-worker
d. None of these

Ans. (c) Carson and co-worker

71. Use of which of the following minimizes the risk of variation during *in vitro* conservation of germplasm?

a. Somatic embryo b. Root apices
c. Zygotic embryo d. All of the above

Ans. (c) Zygotic embryo

72. Which of the following factors is responsible for the loss of plant genetic resources?

a. Urbanization and industrialization
b. Modern farming practices
c. Extension for farming into wild habitates
d. All of the above

Ans. (d) All of the above

73. Success in germplasm storage is determined by which of the following factor

a. Storage method and condition used
b. Initial quality of material stored
c. Both a and b
d. None of these

Ans. (c) Both a and b

74. Pusa jai kisan (bio-902) is a somaclonal variety of which of the following crops

a. Indian pumpkin
b. Indian mustard
c. Indian rice
d. Indian groundnut

Ans. (b) Indian mustard

75. Which of the following material is conserved as germplasm?

a. Parents of hybrids, mutants and cytogenetic stocks
b. Normal variety and wild cultivars
c. Wild texa related to animal species
d. All of the above

Ans. (a) Parents of hybrids, mutants and cytogenetic stocks

76. Which of the following variety was developed from somaclona variation?

a. Delgold b. A.C. Chang
c. Sigma d. All of the above

Ans. (c) Sigma

77. Which of the following requirement must be fulfilled by any tissue culture technique that is used for conservation of germplasm?

a. Plant virus elimination from the stored tissues/ organ
b. Genetic variability of the material to be preserved should be guaranteed.
c. Well defined protocol which guarantees a high percentage of plant recovery from stored tissue
d. All of the above

Ans. (c) Well defined protocol which guarantees a high percentage of plant recovery from stored tissue

78. Which of the following steps are involved in conservation of plant genetic resources?

a. Data storage and retrieval
b. Conservation and evaluation of germplasm
c. Utilization, training and global coordination
d. All of the above

Ans. (d) All of the above

79. The national research center on plant biotechnology is located at which of the following place?

a. Mumbai
b. Dehradun
c. New Delhi
d. Bangalore

Ans. (c) New Delhi

80. Which of the following is thermolabile?

a. IBA
b. ABA
c. GA
d. IAA

Ans. (b) ABA

81. Most commonly used method for transformation of plants is

a. Protoplast method
b. Agrobacterium mediated transformation
c. Microinjection
d. Protoplast method

Ans. (b) Agrobacterium mediated transformation

82. In tissue culture, regeneration of shoot and root occurs by manipulating the balance of

a. Auxin and cytokinin
b. Cytokinin and ABA
c. ABA and ethylene
d. Auxin and ABA

Ans. (a) Auxin and cytokinin

83. In 1998, the concept of traitor gene was given by a company called

a. Pioneer seeds
b. Indo American hybrids
c. Vaibhav seeds
d. Monsanto campany USA

Ans. (b) Indo American hybrids

84. Cryopreservation is based on which of the following?

a. Liquid ammonia
b. Liquid nitrogen
c. Liquid carbon di oxide
d. None of these

Ans. (b) Liquid nitrogen

85. Which of the following scientist is regarded as father of plant tissue culture?

a. Aristotal
b. Gottlieb Harberlandt
c. Jean P. Nitsch
d. Fleming

Ans. (b) Gottlieb Harberlandt

86. Which of the following is thermolable?

a. Cytokinin
b. Pectinnase
c. Lectinase
d. Protease

Ans. (b) Pectinnase

87. The technique of embryo culture can be used to obtain which of the following?

a. Propagation of orchid
b. Interspecific hybrids
c. Overcoming dormancy and to shorten breeding cycle
d. All of these

Ans. (d) All of these

88. For long term storage of germplasm, which of the following is used?

a. Liquid nitrogen
b. Carbon dioxide
c. Liquid ammonia
d. Mineral oil

Ans. (a) Liquid nitrogen

89. Which of the following is correct about alloplasmic lines?

a. Used for production of allopolyploidy
b. Produced by hybridization
c. Production of cybridization/repeated backcrossing
d. None of these

Ans. (c) Production of cybridization/repeated backcrossing

90. Which of the following enzyme is used for obtaining protoplasts?

a. Catalase
b. Protease
c. Pectinase
d. None of these

Ans. (c) Pectinase

91. Somatic embryo maturation is not promoted by which of the following?

a. Auxin
b. Cytokinin
c. GA
d. Abscissic acid

Ans. (b) Cytokinin

92. In general, callus culture are subcultured after which of the following periods?

a. 5–10 weeks
b. 6–12 weeks
c. 4–6 weeks
d. 10–12 days

Ans. (c) 4–6 weeks

93. In general, suspension culture are subcultured after which of the following periods?

a. 4–6 weeks
b. 3–10 days
c. 10–20 days
d. None of these

Ans. (b) 3–10 days

94. The technique of cryopreservation involves which of the following?

a. Freezing and reculture
b. Freezing and subculture

c. Thawing and reculture
d. All of these

Ans. (c) Thawing and reculture

95. Among the given Auxins, which one is the most frequently used in plant tissue culture?

a. ABA
b. IBA
c. NAA
d. 2,4-D

Ans. (d) 2,4-D

96. The term somaclonal variation was coined by which of the following scientists?

a. Skirvin and karp
b. Larkin and Scowcroft
c. Fleming and Watson
d. None of the above

Ans (b) Larkin and Scowcroft

97. Protoplast fusion is induced by which of the following treatments?

a. PEG
b. High voltage electric pulse
c. High pH and high calcium concentration
d. All of the above

Ans. (d) All of the above

98. Pusa jai kisan (Bio-902) somaclonal of Indian mustard was isolated from which of the following varieties?

a. Pusa 288
b. Kranti
c. Karuna
d. Varuna

Ans. (d) Varuna

99. Meristem culture can be used for which of the following purposes?

a. Cybrid formation
b. Germplasm collection
c. Germplasm exchange and conservation
d. All of the above

Ans. (c) Germplasm exchange and conservation

100. Delgold and A.C.Change, developed through somatic hybridization are cultivars of which of the following?

a. *Brassica compristis*
b. *Phenoxy dectyliferus*
c. *Nicotiana rustica*
d. *Nicotiana tabacum*

Ans. (d) *Nicotiana tabacum*

101. Among the given varieties of tobacco, which one was developed through haploid phase?

a. F 330
b. F211
c. GSM331
d. None of these

Ans. (b) F211

102. Among the given compound which one is the most commonly used as cryoproectant?

a. Glycerol
b. Methanol
c. DMSO
d. Toluene

Ans. (c) DMSO

103. Sugarcane somaclone Ono, isolated from the parental variety pindar, is resistance to a disease caused by which of the following?

a. Virus
b. Fungus
c. Bacteria
d. All of these

Ans. (a) Virus

104. In which of the following tree species, embryo culture is used to overcome dormancy?

a. *Iris*
b. *Prunus*
c. *Taxus*
d. All of the above

Ans. (d) All of the above

105. Scarlet is somaclone of which of the following?

a. Soybean
b. Wheat
c. Sweet potato
d. All of the above

Ans. (c) Sweet potato

106. The first plant from a mature plant cell was regenerated by which of the following?

a. Yellow
b. Braun
c. White
d. Haberlandt

Ans. (b) Braun

107. Among the given agents, which one is used as cryoprotectants?

a. DMSO, glycerol and formic acid
b. DMSO, proline and acotinic acid
c. DMSO, glycerol and proline
d. None of these

Ans. (c) DMSO, glycerol and proline

108. During gynogenesis, haploid plants cell was regenerated by which of the following?

a. Polar cell
b. Egg cell
c. Synergids cell
d. None of these

Ans. (b) Egg cell

109. Delgold is a variety of which of the following?

a. Chewing tobacco
b. Flue-cured tobacco
c. Both a and b
d. None of these

Ans. (b) Flue-cured tobacco

110. Somatic hybridization has been the most successful in which of the following?

a. Poaceae b. Malvaceae
c. Solanaceae d. Euphorbiaceae

Ans. (c) Solanaceae

111. In which of the following, somaclonal variation can occurs?

a. Direct adventitious shoot regeneration
b. Suspension culture
c. Direct somatic embryogenesis
d. All of the above

Ans. (d) All of the above

112. Evergreen is a somaclone of which of the following?

a. Tomato b. Blackberry
c. Potato d. Radish

Ans. (b) Blackberry

113. Among the given supplements/additives, which is an example of complex organic supplement/additive?

a. Coconut milk and tomato juice
b. Corn milk and malt extract
c. Yeast extract and casein hydrolysate
d. All of the above

Ans. (d) All of the above

114. Tobacco culture A.C. Change is resistant to which of the following?

a. White rust b. Black rot
c. YMV d. TMV

Ans. (b) Black rot

115. Among the given surface sterilizing agents, which one gives the best result?

a. Silver iodide b. Sodium hypochlorite
c. Sodium chloride d. Bromine water

Ans. (b) Sodium hypochlorite

116. Somaclone scarlet has improvement in which of the following traits?

a. Disease resistance b. Skin colour
c. Herbicide resistance d. None of these

Ans. (b) Skin colour

117. Slow growth shoot culture protocols have been developed for which of the following?

a. Coconut and citrus b. Ginger and banana
c. Sweet potato and garlic d. Both b & c

Ans. (d) Both b & c

118. The cultivar A.C. Chang and delgold were released for commercial cultivation in which of the following countries?

a. New delhi b. Canada
c. Japan d. China

Ans. (b) Canada

119. Hyperhydricity of culture may not be reduced by which of the following?

a. Gibberellic acid b. Growth retardants
c. Agar hydrolyate d. All of the above

Ans. (a) Gibberellic acid

120. For long term *in vitro* storage of plant germplasm, which of the following is in practical use?

a. Lyophilizaton b. Cryoperservation
c. Mobilization d. None of these

Ans. (b) Cryoperservation

121. Among the given variety of rice, which was developed through haploid phase?

a. ICPH-8 b. IR-8
c. IR-20 d. Shin shu

Ans. (d) Shin shu

122. In protoplast isolation and culture , ionic osmoticum is not preferred because of which of the following?

a. It reduces protoplast fusion
b. It reduces protoplast yield
c. It reduces protoplast survival
d. It inhibits cell wall regeneration

Ans. (d) It inhibits cell wall regeneration

123. Andro is a somaclone of which of the following?

a. Potato b. Tomato
c. Apple d. Flax

Ans. (d) Flax

124. Bio-13 is a somaclone of which of the following?

a. *Glycin max* b. *Zea maize*
c. *Citronella java* d. None of the above

Ans. (c) *Citronella java*

125. PEG induced protoplast fusion is enhanced by which of the following?

a. Low pH PEG treatment medium
b. High Ca^{+2} culture medium
c. High pH PEG treatment medium
d. All of the above

Ans. (c) High pH PEG treatment medium

126. Which of the following steps are not involved in cryopreservation?

a. Thawing
b. Encapsulation
c. Preculture
d. Freezing

Ans. (b) Encapsulation

127. Among the given varieties of wheat, which one is of the following traits?

a. PBW 373
b. HUW 206
c. Jinghua I
d. Halna

Ans. (c) Jinghua I

128. Intergeneric hybrids from which of the following Crosses have been recovered through embryo culture?

a. *Hordeum VulgareX Triticum Aestivum*
b. *Triticum Aestivum X Secale Cereal*
c. *Brasica Compristis X Brasica Nigra*
d. All of the above

Ans. (b) *Triticum Aestivum X Secale Cereal*

129. Somaclone andro has improvement in which of the following?

a. Wilt resistance
b. Disease resistance
c. Rust immunity
d. All of the above

Ans. (c) Rust immunity

130. Anther culture ordinary yields which of the following?

a. Diploid plant
b. Haploid plant
c. Polyploidy plant
d. None of these

Ans. (b) Haploid plant

131. Sugarcane variation arises due to which of the following?

a. Cos 771
b. Co 1188
c. Pindar
d. Co 1148

Ans. (c) Pindar

132. Somaclonal variation arises due to which of the following?

a. Change in chromosome number
b. Gene mutation
c. Gene amplification
d. All of the above

Ans. (d) All of the above

133. Stirred tank reactor can also be used as which of the following?

a. Air bubble reactor
b. Feed batch reactor
c. Batch reactor
d. Immobilized reactor

Ans. (c) Batch reactor

134. Which of the following is not an example of alkaloid?

a. Codeine
b. Morphine
c. Camphor
d. Berberine

Ans. (c) Camphor

135. New alleles of known gene and even new mutation of genes not known so far have been recovered through which of the following?

a. Hybridization
b. Somaclonal variation
c. Cybrdization
d. Embryo rescue

Ans. (b) Somaclonal variation

136. Somatic hybridization produces which of the following?

a. Symmetric hybrid
b. Asymmetric hybrid
c. Both a and b
d. None of the above

Ans. (c) Both a and b

137. Which of the following is not correct about taxol?

a. It is obtained from trichosanthes species
b. It acts on spindle like colchicines
c. It is used for treatment of breast cancer
d. It is used for the treatment of ovarian cancer

Ans. (a) It is obtained from trichosanthes species

138. Somatic hybrids are also called which of the following?

a. Somatic hybrid
b. Cytoplasmic hybrid
c. Vybrids
d. Both b and c

Ans. (b) Cytoplasmic hybrid

139. Which of the following is not correct about micropropagation?

a. Suitable techniques of micropropagation are available for all valuable sp.
b. Somaclonal variation may arise during *in vitro* culture
c. Vitrificaton may be a problem in some micro-propagation
d. All of the above

Ans. (a) Suitable techniques of micropropagation are available for all valuable sp.

140. Conventional *in vitro* environment used for micropropagation has which of the following feature?

a. High sugar concentration and growth
b. Low photosynthesis photon flux density
c. Constant temp. and high relative humidity
d. All of the above

Ans. (d) All of the above

141. Secondary metabolite include which of the following compound?

a. Alkaloid
b. Phenylpropanoids
c. Terpinoids
d. All of the above

Ans. (d) All of the above

142. Which of the following is not correct about biotransformation?

a. Arbutin is produced commercially by biotransformation
b. Products generated by biotransformation are more useful or valuable than the precursors used
c. Biotransformation reactions are catalyzed by enzymes present in cells
d. Low rate of biotransformation prevents commerce exploitation of the very large number of bioconversions known for the plant cell

Ans. (a) Arbutin is produced commercially by biotransformation

143. Which of the following is correct about taxol?

a. It is obtained from trichosanthes sp.
b. It promote dissolution of microtubules into tubulin molecules
c. It is used for the treatment of breast cancer
d. Both b & c

Ans. (d) Both b & c

144. Which of the followings not correct about asymmetric hybrids?

a. Asymmetric hybrids can be produced by fusion of cytoplasts of a species with irradiated protoplast of another species
b. Several asymmetric hybrids have been produced in *Nicotiana*, *Brassica*, etc.
c. Asymmetric hybrids can be produced by fusion of cytoplasts of a species with irradicated protoplasts of another species
d. All of the above

Ans. (a) Asymmetric hybrids can be produced by fusion of cytoplasts of a species with irradiated protoplast of another species

145. Which of the following is not a feature of somaclonal variation?

a. Somaclonal variation occurs in very low frequency
b. A very effective selection can be practised at the cell level for several traits
c. Use of somaclonal variation may reduce the time required for the release of new variety as compared to mutation breeding
d. Their chromosome number may be doubled to obtained homozygous lines is at least 6–8 times as efficient as that among segregating population

Ans. (a) Somaclonal variation occurs in very low frequency

146. Which of the following plant species, biotransforms hydroquinone into arbutin?

a. *Datura innoxia*
b. *Rauwofia serpentine*
c. *Catharanthus roseus*
d. All of the above

Ans. (d) All of the above

147. A spin filter bioreactor is a good example of which of the following?

a. Air lift bioreactor
b. Continues flow reactor
c. Fed batch reactor
d. Fluidized bed reactor

Ans. (b) Continues flow reactor

148. Micropropagation of woody trees presents which of the following problems?

a. Difficulties in rooting
b. Poor growth *in vitro*
c. Browning of medium
d. All of the above

Ans. (d) All of the above

149. Which of the following advantage is correct about micropropation?

a. Extremely low multiplication rates
b. Limited to a particular season.
c. Plant of desired sex can be selectively multiplied
d. Plant can not be maintained *in vitro* in a pathogen free state

Ans. (c) Plant of desired sex can be selectively multiplied

150. Symmetric hybrid produced through protoplast fusion provides which of the following opportunities in crop improvement programmes?

a. Widening of genetic base of an allopolyploid
b. Generation of noval material for scientific studies
c. Creation of superior hybrid
d. All of the above

Ans. (d) All of the above

151. Protoplasts can be used for genetic transformation by which of the following technique?

a. Liposome mediated delivery
b. PEG mediated DNA uptake
c. Electorporation
d. All of the above

Ans. (d) All of the above

152. Which of the following limitation are associated with haploid production?

a. In many crops, large number of haploid can be easily obtained
b. A sophisticated tissue culture laboratory and a dependable greenhouse are essential for success
c. Low frequency of albinos are produced in anther cultures of monocots especially cereals
d. Occurrence of sporophitic variation may limit the usefulness of pollen embryo for genetic transformation.

Ans. (b) A sophisticated tissue culture laboratory and a dependable greenhouse are essential for success

153. It is desirable to preserve which of the following tissue to minimise the risk of genetic instability

a. Root tip
b. Shoot tip
c. Zygotic embryo
d. Both b & c

Ans. (b) Shoot tip

154. Which of the following are the characteristic feature of batch bioreactors?

a. Continuous in growth rate
b. Constant level of cellular waste
c. Continuous change in the composition of cells
d. None of the above

Ans. (c) Continuous change in the composition of cells

155. For rapid development of homozygous lines, haploids can be produced by which of the following approaches?

a. Anther culture
b. Interspecific hybridization
c. Ovary culture
d. All of the above

Ans. (d) All of the above

156. Which of the following element is essential for plant cell and tissue culture?

a. Co
b. Cl
c. Ni
d. P

Ans. (d) P

157. Which of the following problems are correct about large scale culture of plant cells?

a. The longer fermentation time decrease the risk of contamination
b. Characterstics of a cell population may change during culure, and prolonged continuous culture may be desirable
c. In case of biochemical production growth may enhance biochemical formation and vice-versa
d. Small reactor and short formation time required

Ans. (b) Characterstics of a cell population may change during culure, and prolonged continuous culture may be desirable

158. Which of the following is used as growth retardant?

a. TIBA and paclobutrazole
b. Daminozide
c. ABA and chlormequat
d. All of the above

Ans. (d) All of the above

159. Which of the following chemicals interferes with virus multiplication?

a. Chloroamphinicol
b. Raffinose
c. Actinomycin D
d. None of these

Ans. (c) Actinomycin D

160. In case of slow growth culture, high osmotic concentration are created by which of the following?

a. Fructos
b. Mannose
c. Sorbitol
d. Galactose

Ans. (c) Sorbitol

161. Cryoprotactant reduce cryoinjury by which of the following?

a. Enhance the cellular dehydration
b. Reduced ice crystal formation
c. Enhance the dislocation of structural water.
d. All of these

Ans. (b) Reduced ice crystal formation

162. Which of the following cryoprotactant acts through withdrawal of cellular water?

a. Glycerol
b. Tyrosine
c. Proline
d. DMSO

Ans. (a) Glycerol

163. Cryoinjury results from which of the following?

a. Dislocation of structural water
b. Toxic solution effect
c. Ice crystal formation
d. All of the above

Ans. (d) All of the above

164. Which of the following are the features of a spin-filter bioreactor?

a. The culture s aerated by a sparger
b. A stirrer plate magnetically coupled to the central shaft provides continuous stirring
c. The central shaft of bioreactor houses a spinning filter
d. All of the above

Ans. (d) All of the above

165. Cryoprotection is done at which of the following temperature?

a. 5°C
b. 0°C
c. 15°C
d. 25°C

Ans. (b) 0°C

166. Partial desiccation step can be combined with cryopreservation of which of the following?

a. Cryoprotection
b. LN refrigerator
c. Controlled freezing
d. All of the above

Ans. (c) Controlled freezing

167. Which of the following is not correct?

a. Dividing cells are more likely to survive cryopreservation than nondividing cells.
b. Partial desiccation of tissues reduces cryoinjury
c. Cryoprotectants minimise loss of structural water
d. Meristematic cells suffer from less cryoinjury than differentiated cells

Ans. (a) Dividing cells are more likely to survive cryopreservation than nondividing cells.

168. Partial desiccation step can be combined with cryopreservation of which of the following?

a. Zygotic embryo
b. Encapsulated somatic embryos
c. Vitrified somatic embryo
d. None of the above

Ans. (b) Encapsulated somatic embryos

169. Which of the following is correct about cryo-protectant?

a. Fructose in non permeable
b. Glycerol is highly permeable
c. Sucrose is highly permeable
d. PEG is highly permeable

Ans. (b) Glycerol is highly permeable

170. Which of the following techniques used for cell cloning are used for protoplast culture as well?

a. Somaclone method
b. Microdrop method
c. Filter paper raft tissue
d. Microchamber technique

Ans. (b) Microdrop method

171. Which of the following vitamins is essential for plant tissue culture?

a. Pyridoxine
b. Formic acid
c. Thiamine
d. Inositol

Ans. (c) Thiamine

172. In case of shoot regeneration, GRs are required during which of the following?

a. Developmental determination phase
b. Morphogenic competence acquisition phase
c. Both a and b
d. None of these

Ans. (c) Both a and b

173. Which of the following was the first to be achieved?

a. Pollen culture
b. Embryo culture
c. Embryogenesis
d. Somatic hybridization

Ans. (b) Embryo culture

174. A batch culture has which of the following feature?

a. Progressive nutrient depletion
b. Typical Sigmoidal growth curve
c. Limitation culture duration
d. All of the above

Ans. (d) All of the above

175. Which of the following chemicals has been used to eliminate viruses from plant?

a. Penicillin
b. Riboflavin
c. Actinomycin D
d. None of the above

Ans. (c) Actinomycin D

176. A high Auxin concentration is required during which of the following?

a. SE transformation
b. SE induction
c. SE maturation
d. SE conversion

Ans. (b) SE induction

177. Which of the following is the limitation of artificial seed?

a. Difficult large scale production
b. Low production cost
c. Difficulties in storage
d. All of the above

Ans. (c) Difficulties in storage

178. GRs are not used during which of the following stages of Micropropagation?

a. Shooting
b. Rooting
c. Culture establishment
d. Multiplication

Ans. (c) Culture establishment

179. In Micropropagation, *in vitro* hardening is achieved by which of the following?

a. Use of *pseudomonas* culture
b. Cooling of culture vessels at bottom
c. PEG in medium
d. All of the above

Ans. (d) All of the above

180. Virus free plants produced by various *in vitro* techniques can be used for which of the following?

a. Commercial cultivation
b. Breeding programmes
c. For germplasm exchange
d. Both b & c

Ans. (d) Both b & c

181. Certain biochemicals are produced by specialized cells present in organized structures. Which of the following culture systems will be useful for production of such compounds?

a. Embryo culture
b. Callus culture
c. Organ culture
d. Suspension culture

Ans. (c) Organ culture

182. Genetic erosion is the consequence of which of the following?

a. Enhanced the genetic variability among cultivated variety
b. Extinction of wild relatives of crop species
c. Enhanced the genetic variability within the species
d. None of these

Ans. (b) Extinction of wild relatives of crop species

183. Which of the following is a sweetening agent?

a. Shikonin
b. Digitoxin
c. Pyrethrini
d. Thaumatin

Ans. (d) Thaumatin

184. Which of the following can serve as elicitors?

a. Some glycosidic protein
b. Cell wall pectins
c. Chitosan
d. None of these

Ans. (c) Chitosan

185. Shikonin production by cultured cells of *Lithospermum erythrorhizon* is suppressed by which of the following?

a. NAA
b. 2, 4-D
c. Kinetin
d. IBA

Ans. (c) Kinetin

186. Which of the chemical promotes shikonin production by cultured cells of *L. Erythrorhizon*?

a. NH_4^+
b. Cu^{+2}
c. 2,4-D
d. Thiamine

Ans. (b) Cu^{+2}

187. Which of the following is a steroid?

a. Shikonin
b. Dioxgenin
c. Pyrethrin
d. Thaumatin

Ans. (b) Dioxgenin

188. Which of the following has insecticidal activity?

a. Shikonin
b. Digitoxin
c. Pyrethrin
d. Thaumatin

Ans. (c) Pyrethrin

189. Biochemical accumulation by cultured plant cells is affected by which of the following?

a. Inoculum size
b. Light quality
c. Chemical composition of medium
d. All of the above

Ans. (d) All of the above

190. Which of the following breeding procedure applicable to only autopolyploid crop species?

a. Somaclonal breeding
b. Analytical breeding
c. Hybrid sorting
d. Both b and c

Ans. (d) Both b and c

191. In most species, cells become committed to gametophytic development after which of the following stages?

a. Binucleate pollen
b. Somatic mother cell
c. Trinucleat pollen
d. Uninucleat pollen

Ans. (a) Binucleate pollen

192. Which of the following involves in haploid production?

a. Somaclonal breeding
b. Analytical breeding
c. Hybrid sorting
d. Both b and c

Ans. (d) Both b and c

193. In which of the following, dihaploids are used for breeding, while tetraploids are used as commercial varieties?

a. Tobacco
b. Tomato
c. Potato
d. Soybean

Ans. (c) Potato

194. In which of the following plant species, YY males are used to produce all male population?

a. *Asparagus*
b. *Coccinia*
c. *Trichosanthes*
d. None of these

Ans. (a) *Asparagus*

195. Which of the following stresses are known to promote androgenesis?

a. Drought treatment
b. IBA
c. Heat treatment
d. NAA

Ans. (c) Heat treatment

196. Which of the following have been shown to prevent precocious germination of cultured embryos?

a. Lactine hydroysate
b. ABA
c. NAA
d. Low score levels

Ans. (b) ABA

197. Which of the following have been used as selection agents for cells selections to develop disease resistance Somaclonal variant?

a. Pathogen
b. Toxins
c. Culture filterate
d. All of the above

Ans. (d) All of the above

198. Somatic hybridization can be resorted to only when which of the following criteria are satisfied?

a. Totipotancy of the isolated protoplasts
b. Availability of the effective strategy for selection of hybrid cells
c. Isolation protoplast in large quantities
d. Both b and c

Ans. (d) Both b and c

199. Match the columns A and column B

A. Absisic acd	I. IAA
B. Synthetic seed	II. Dormin
C. Ethylene	III. IBA
D. Natural Auxin	IV. Ethrel

a. A-II, B-III, C-IV, D-I
b. A-II, B-I, C-IV, D-III
c. A-III, B-II, C-IV, D-I
d. A-II, B-III, C-I, D-IV

Ans. (a) A-II, B-III, C-IV,D-I

200. The instrument that is used to measure the growth of plants is called as

a. Gulconometer
b. Auxanometer
c. Algometer
d. Anemometer

Ans. (b) Auxanometer

201. The smallest viable unit which can grow, multiply and from a plant in tissue culture

a. Chromosome
b. Cell
c. Tissue
d. Nucleus

Ans. (b) Cell

202. Micropropagation is

a. Raising of plants from a small tissue in culture
b. Multiplication of small plant
c. Propagation of small parts of organisms
d. Indefinite maintenance of an organ or tissue

Ans. (a) Raising of plants from a small tissue in culture

203. Tissue culture is

a. Growth and multiplication of cell on artificial medium
b. Growth of specific plant structure on artificial medium
c. Maintenance, growth and differentiation of cell, tissue and organs on artificial medium
d. None of the above

Ans. (c) Maintenance, growth and differentiation of cell, tissue and organs on artificial medium

204. Part of plant used for culturing is called

a. Stock
b. Explants
c. Scion
d. Callus

Ans. (b) Explants

205. Tissue culture technique was first attempted by

a. Nobecourt
b. Hanning
c. Haberlandt
d. Gautheret

Ans. (c) Haberlandt

206. Tissue culture technique was first performed successfully by

a. White
b. Harberlandt
c. Nobecourt
d. Gautheret

Ans. (a) White

207. The structure employed by white for first successful tissue culture was

a. Root of carrot
b. Root of tomato
c. Leaf cells
d. Apical meristem

Ans. (b) Root of tomato

208. Callus is

a. Tissue that forms embryo
b. Tissue that grows to form embryoid
c. Unorganised actively dividing mass of cells maintained in culture
d. None of the above

Ans. (c) Unorganised actively dividing mass of cells maintained in culture

209. Callus formation is promoted by

a. Proper light and subculturing
b. Excess of NAA
c. Absence of cell
d. Darkness and subculturing

Ans. (d) Darkness and subculturing

210. Differentiation of callus into plant part is

a. Embryogenesis
b. Morphogenesis
c. Totipotency
d. Embryoid formation

Ans. (b) Morphogenesis

211. Who discovered that morphogenesis in culture medium is controlled by hormones

a. Skoog and Miller
b. Muir *et al*
c. Vasil and hilderbrandt
d. Helperin and wetherell

Ans. (a) Skoog and Miller

212. Embryo culture technique was discovered by

a. Skoog and miller
b. Muir *et al*
c. Vasil and hilderbrandt
d. Steward

Ans. (d) Steward

213. Embryoid is

a. A miniature embryo
b. Non-zygotic embryo formed *in vitro* culture
c. Embryo raised in culture medium
d. Cellular aggregate similar to embryo in appearance

Ans. (b) Non-zygotic embryo formed *in vitro* culture

214. The concept of cellular totipotency was given by

a. Skoog and Miller
b. Steward
c. Gottliet Haberlandt
d. Helperin and wetherell

Ans. (c) Gottliet Haberlandt

215. Ramet is

a. Clone
b. Cell aggregate
c. Callus
d. Individual of clone

Ans. (d) Individual of clone

216. Guha and Maheshwari are famous for

a. Protoplast culture
b. Pollen culture
c. Shoot tip culture
d. None of the above

Ans. (b) Pollen culture

217. The technique of protoplast fusion was developed by

a. Skoog and miller
b. Muir *et al*
c. Vasil and hilderbrandt
d. Carlson *et al*

Ans. (d) Carlson *et al*

218. Explants is required to be disinfectant before placing in culture. This done by

a. Autoclaving
b. Ultraviolet rays
c. Clorax or hypochlorite
d. X-rays

Ans. (c) Clorax or hypochlorite

219. Aseptic culture means

a. Presence of bacteria
b. Absence of other organism like microbes
c. Parthenogenetic development
d. None of the above

Ans. (b) Absence of other organism like microbes

220. Abnormal growth of a plant organ is

a. Teratoma
b. Tumour
c. Witches broom
d. Callus

Ans. (b) Tumour

221. Crown gall is caused by

a. Aspergillus
b. *Agrobacterium tumefaciens*
c. *Bacillus stolonifer*
d. *Rhizopus stolonifer*

Ans. (b) *Agrobacterium tumefaciens*

222. TIP is

a. Tuber inducing protein
b. Tuber inducing principle
c. Tumour inducing protein
d. Tumour inducing principle

Ans. (d) Tumour inducing principle

223. Root knots are generally caused due to infestation

a. Symbiotic bacteria
b. Symbiotic cyanobacteria
c. Nematodes
d. Insect larvae

Ans. (c) Nematodes

224. Teratoma is

a. Abnormal swelling
b. Formation of a number of shoots from a tumour
c. Development of a number of close branches
d. Secretion of tumour inducing principle

Ans. (b) Formation of a number of shoots from a tumour

225. Witches broom is characterised by

a. Hypertrophy
b. Typotrophy
c. Teratoma
d. A number of close branches

Ans. (d) A number of close branches

226. Variation appearing suddenly in culture

a. Somatic variation
b. Somaclonal variation
c. Mutation
d. Aberration

Ans. (b) Somaclonal variation

227. Abnormal growth can be due to

a. Infection
b. Injury
c. Hybridization
d. All of the above

Ans. (d) All of the above

228. Virus free plants can be obtained through

a. Shoot tip culture
b. Root tip culture
c. Haploid culture
d. Embryo culture

Ans. (a) Shoot tip culture

229. What additional treatment is required by protoplast fusion in plant

a. PEG and sodium nitrate
b. Coconut milk and glycine
c. Cellulose and pectinase
d. All of the above

Ans. (c) Cellulase and pectinase

230. Protoplast fusion result in

a. Genetic hybridization
b. Male sterility
c. Abundant seeds of rare plants
d. Parasexual/somatic hybridization

Ans. (d) Parasexual/somatic hybridization

231. Pollen culture produces

a. Haploid plant where every gene can exprass its effect
b. Homozygous diploid plant
c. Abundant seed of rare plant
d. Abundant pollen in male sterile plant

Ans. (a) Haploid plant where every gene can exprass its effect

232. An androgenic plant can be converted into homozygous diploid plant through the application of

a. Nitrogen mustard
b. Nitrous acid
c. Colchicines
d. Acridine orange

Ans. (c) Colchicines

233. The enzyme required to obtained wall free/naked protoplast are

a. Cellulase and proteinase
b. Cellulase and pectinase
c. Cellulase and amylase
d. Amylase and pectinase

Ans. (b) Cellulase and pectinase

234. Which technique can be helpful in overcoming hybridisation barrier

a. Shoot tip culture
b. Embryo rescue
c. Protoplast fusion
d. Both b and c

Ans. (d) Both b and c

235. Two protoplast can be made to fuse through the application of

a. Electrofusion
b. PEG
c. Sodium nitrate
d. All of the above

Ans. (d) All of the above

236. Who developed the technique of nurse tissue to show cellular totipotency

a. Hilderbrandt
b. Steward
c. Muir
d. Konar

Ans. (c) Muir

237. Pollen embryoids were discovered by

a. Konar and Nataraja
b. Guha and Maheshwari
c. Skoog and Miller
d. Heparin and Wetherell

Ans. (b) Guha and Maheshwari

238. Which of the following can yield a completely haploid plant

a. Root tip
b. Anther
c. Carpel
d. Stem apical meristem

Ans. (b) Anther

239. Cellular totipotency was demonstrated by

a. Theodore Schwann
b. A.V. Leeuwenhoek
c. F.C. Steward
d. Robert Hooke

Ans. (c) F.C. Steward

240. A totipotent cell means

a. An undifferentiated cell capable of developing in to a system or entire plant
b. An undifferentiated cell capable of developing into an organ
c. An undifferentiated cell capable of developing in to complete embryo
d. Cell which lacks the capability to differentiate in to an organ or system

Ans. (a) An undifferentiated cell capable of developing into a system or entire plant

241. Micropropagation refer to

a. Mature stage of endosperm
b. The phenomenon of manufacture of hormones
c. Germination of seed where cotyledons come above the soil
d. A technique to obtain new plants by culturing cell or tissue in culture medium

Ans. (d) A technique to obtain new plants by culturing cell or tissue in culture medium

242. A major use of embryo culture is in

a. Induction of Somaclonal variation
b. Overcoming hybridisation barriers
c. Production of alkaloids
d. Clonal propagation

Ans. (b) Overcoming hybridisation barriers

243. On culturing the young anther of a plant a botanist got a few diploid plant along with haploid plants. Which of the following might have given the diploid plant?

a. Exine of pollen grain
b. Vegetative cell of pollen
c. Cells of anther wall
d. Generative cell of pollen

Ans. (c) Cells of anther wall

244. Which one produce androgenic haploids in anther cultures

a. Anther cell
b. Tapetal layer of anther wall
c. Connective tissue
d. Young pollen grain

Ans. (d) Young pollen grain

245. In tobacco callus, which one shall induce shoot differentiation in combination of Auxin and cytokinin

a. Higher concentration cytokinin and lower concentration of Auxin
b. Lower concentration cytokinin and higher concentration of Auxin
c. Only cytokinin and no Auxin
d. Only Auxin and no cytokinin

Ans. (a) Higher concentration cytokinin and lower concentration of Auxin

246. In callus culture, roots can be induced by the supply of

a. Auxin and no cytokinin
b. Higher concentration cytokinin and lower concentration of Auxin
c. Lower concentration cytokinin and higher concentration of Auxin
d. None of the above

Ans. (c) Lower concentration cytokinin and higher concentration of Auxin

247. After demonstration of cellular totipotency, a botanist wishes to raise identical plants. The tissue or part likely to yield haploid embryo are

a. Stem apices
b. Root tips
c. Young anther
d. Young leaves

Ans. (c) Young anther

248. Who could grow tomato roots successfully and developed the technique of tissue culture for the first time

a. Hilderbrandt
b. P.R. White
c. W.H. Muir
d. F.C. Steward

Ans. (b) P.R. white

249. Plant tumour/crown gall abnormal growth is caused by

a. Agrobacterium
b. Azotobactor
c. Nostoc
d. *E.coli*

Ans. (a) Agrobacterium

250. Which of the following plant cells will show totipotency

a. Sieve tubes
b. Xylem vessels
c. Meristem
d. Cork cell

Ans. (c) Meristem

251. Variations observing during tissue culture of some plant are known as

a. Clonal variation
b. Somaclonal variation
c. Somatic variation
d. Tissue culture variation

Ans. (b) Somaclonal variation

252. Virus free plants can be obtained by

a. Antibiotic treatment
b. Bordeaux mixture
c. Root tip culture
d. Shoot tip culture

Ans. (d) Shoot tip culture

253. Tissue culture technique can be used to produce in definite number of new plants from a small parental tissue. The economic importance of the technique is in raising

a. Variants through picking up Somaclonal variation
b. Genetically uniform population of an elites species
c. Homozygous diploid plants
d. Development of new species

Ans. (b) Genetically uniform population of an elites species

254. Haploid plant culture are obtained from

a. Leaves
b. Root tip
c. Pollen grain
d. Buds

Ans. (c) Pollen grain

255. Somaclonal variation are the ones

a. Caused by mutagens
b. Produced during tissue culture
c. Induced during sexual embryogeny
d. Caused by gamma rays

Ans. (b) Produced during tissue culture

256. Parasexual hybridisation means fusion of

a. Male gamete with female gametes
b. Male gamete with synergid
c. Somatic protoplasts
d. Male gamete with somatic cell

Ans. (c) Somatic protoplasts

257. Application of embryo culture is in

a. Clonal propagation
b. Overcoming hybridization barrier
c. Production of alkaloids
d. Formation of Somaclonal variation

Ans. (b) Overcoming hybridization barrier

258. Plants developed *in vitro* culture from pollen grains are

a. Androgenic haploid
b. Pollen plant
c. Male plant
d. Sterile plant

Ans. (a) Androgenic haploid

259. In tissue/bacterial culture glassware and nutrients are sterilised through

a. Water bath at 200°C
b. Dry air oven at 200°C
c. Dehumidifier
d. Autoclave

Ans. (d) Autoclave

260. Development of shoot and root in tissue culture is determined by

a. Cytokinin and Auxin ratio
b. Enzymes
c. Temperature
d. Plant nutrient

Ans. (a) Cytokinin and Auxin ratio

261. Plant raised from single germinating pollen grain under culture condition would be

a. Diploid
b. Haploid
c. Triploid
d. Tetraploid

Ans. (b) Haploid

262. Plant medium used widely in preparation of culture medium is obtained from

a. *Cycas revolute*
b. *Cocus nucifera*
c. *Pinus roxburghii*
d. *Borassus flabellifera*

Ans. (b) *Cocus nucifera*

263. Clonal cell lines are obtained from

a. Tissue culture
b. Tissue fractionation
c. Tissue homogenisation
d. Tissue system

Ans. (a) Tissue culture

264. Auxenic culture is

a. Culture of tissue
b. Culture of genes
c. Pure culture without contamination
d. Pure culture of microbes without any external nutrient

Ans. (c) Pure culture without contamination

265. A cell from leaf is made to grow into complete plant under culture conditions. It shows cellular

a. Cloning
b. Totipotency
c. Hybridization
d. All of the above

Ans. (b) Totipotency

266. Use of Agrobacterium T-DNA, transposons etc., for identification and/or isolation of a gene by first integrating it into the concerned gene and isolating mutants so produced is known as

a. Gene tagging
b. Gene silencing
c. Gene expression
d. Gene modification

Ans. (a) Gene tagging

267. Multiplication of plants via asexual reproduction, e.g. via micropropagation, vegetative propagation, etc. is called

a. Clonal deletion
b. Clonal propagation
c. Clonal selection
d. None of these

Ans. (b) Clonal propagation

268. Growth in such culture shows a typical sigmoid curve, and they require subculture/termination after a specific period of time in

a. Assay culture
b. Batch culture
c. Cell culture
d. Root culture

Ans. (b) Batch culture

269. *In vitro* culture of single or relatively small groups of cells, e.g. suspension culture, this term is often used for callus culture as well as

a. Assay culture
b. Cell culture
c. Root culture
d. None of these

Ans. (b) Cell culture

270. Successful somaclone of Blackberry is derived from

a. Cucumber
b. Carrot
c. Potato
d. Blackberry

Ans. (d) Evergreen

271. Among the given surface which is best sterilizing agents is

a. Silver nitrate
b. Carbemide
c. Calcium or sodium hypochlorite
d. Bromine water

Ans. (c) Calcium or sodium hypochlorite

272. Somaclone scarlet has improvement in

a. Skin colour
b. Insect resistance
c. Yield
d. Disease resistance

Ans. (a) Skin colour

273. Which variety of rice was not developed through haploid phase?

a. Pusa basmati
b. Shin shu
c. IR8
d. Pragati

Ans. (c) IR8

274. Somaclone Andro is a variety of

a. Mango
b. Turnip
c. Flax
d. Corn

Ans. (c) Flax

275. Anther culture ordinarily yields

a. Haploid plants
b. Disomic plants
c. Polyploidy plants
d. Double haploid plants

Ans. (a) Haploid plants

276. Somaclonal variation arises due to

a. Change in chromosome number
b. Deletion/duplication
c. Gene mutation/gene amplification
d. All of these

Ans. (d) All of these

277. Sugarcane somaclone one was isolated from

a. CO1148 b. Pindar
c. BO 54 d. COS 176

Ans. (a) CO1148

278. Somatic hybrid are also called

a. Parasexual hybrids b. Cytoplasmic hybrids
c. Vybrids d. Both a and b

Ans. (a) Parasexual hybrids

279. Which element is not essential for plant cells and tissue culture?

a. Ni b. Mg
c. K d. Ca

Ans. (a) Ni

280. An Air lift bioreactor is a good example of

a. Spin filter bioreactor
b. Batch reactor
c. Continuous flow bioreactor
d. None of these

Ans. (a) Spin filter bioreactor

281. Micropropagation of woody trees presents whic problems

a. Browning in medium
b. Difficulties in rooting
c. Poor growth *in vitro*
d. All of these

Ans. (d) All of these

282. Protoplasts can be used for genetic transformation by

a. PEF mediated DNA uptake
b. Liposome mediated delivery
c. Electroporation
d. All of these

Ans. (d) All of these

283. In case of slow growth culture, high osmotic concentrations as created by

a. Mannitol b. Sorbitol
c. Sucrose d. All of these

Ans. (d) All of these

284. Cryoprotectants reduce cryoinjury by

a. Reduction in cellular dehydration
b. Reduced ice crystal formation
c. Reduced dislocation of structural water
d. All of these

Ans. (d) All of these

285. Vitrification/encapsulation eliminated the need during cryopreservation

a. Controlled freezing b. Cryoproetctant
c. LN refrigerator d. Both a and b

Ans. (a) Controlled freezing

286. The formation of embryoids from the pollen grains in the tissue culture medium is duet to

a. Organogenesis b. Test tube culture
c. Double fectilization d. Cellular totipotency

Ans. (d) Cellular totipotency

287. Which was the first to be achieved?

a. Embryo culture b. Anther culture
c. Somatic hybridization d. Embryogenesis

Ans. (c) Somatic hybridization

288. Common technique used for cell cloning as well protoplast culture is

a. Microchamber technique
b. Filter paper raft nurse tissue
c. Microdrop method
d. Bergman's planting technique

Ans. (c) Microdrop method

289. During SE induction, which plant hormone is needed to be higher

a. Auxin b. Cytokinin
c. Gibberellins d. Ethylene

Ans. (a) Auxin

290. GA_3 has a beneficial effect during

a. SE induction b. SE development
c. SE maturation d. SE conversion

Ans. (a) SE induction

291. ABA is generally promotive during

a. SE induction
b. SE development
c. SE maturation
d. SE conversion

Ans. (c) SE maturation

292. Biochemical accumulation by cultured plant cells is affected by

a. Chemical composition of medium
b. Light quality
c. Inoculums size
d. All of these

Ans. (c) Inoculums size

293. Which have been shown to prevent precocious germination of cultured embryos?

a. High sucrose levels
b. ABA
c. Casein hydrolysate
d. All of these

Ans. (d) All of these

294. Which of the following is a evergreen temperate plant?

a. Apricot
b. Chilgoza
c. Plum
d. Almond

Ans. (a) Apricot

295. Which of the following is a very dwarf root stock for propagation of apple?

a. M-27
b. M-12
c. M-13
d. None of these

Ans. (a) M-27

296. Which of the following chemical is used to enhance rootings in cuttings?

a. IAA
b. IBA
c. NAA
d. All of these

Ans. (d) All of these

297. Which of the following hormone is used for fast rootings in cutting?

a. Seredix-A
b. Vitamin A
c. Vitamin E
d. None of these

Ans. (a) Seredix-A

298. The rooting of cuttings can be induced by cutting before planting in

a. IAA
b. GA
c. ABA
d. Zn solution

Ans. (a) IAA

299. Exchange of germplasm is carried mostly through shoot tips because it is

a. Cheap
b. Small and handy
c. Virus free
d. Genetically stable

Ans. (c) Virus free

300. The gynophores of groundnut is commonly referred to as the

a. Perinth
b. Peg
c. Ovate
d. Monadelph

Ans. (b) Peg

301. The rice variety containing "Dee gee woo gen" gene is

a. Indrasan
b. Basmati
c. Tilak
d. IR 8

Ans. (d) IR 8

302. Which variety was developed through somatic hybridization followed by back crossing?

a. Delgold
b. Sigma
c. A.C. Change
d. Both a and c

Ans. (b) Sigma

303. The technique of embryo culture can be used to obtain

a. Interspecific hybrids
b. Propagation of orchids
c. Dormancy and to shorten breeding cycle
d. All of these

Ans. (d) All of these

304. In general, callus cultures are subcultured after

a. 4–6 days
b. 4–6 weeks
c. 8–10 days
d. 8–10 weeks

Ans. (b) 4–6 weeks

305. Somatic embryo maturation is not promoted by

a. Cytokinin
b. High sucrose
c. Partial desiccation
d. Abscissic acid

Ans. (a) Cytokinin

306. Genetic or Chimeral Variation was first described by

a. Freezing and storage
b. Larkin and Scowcroft
c. Skirvin and Karp
d. Evans and sharp

Ans. (b) Larkin and Scowcroft

307. The first plant from a mature plant cell was regenerated by

a. Braun
b.Haberlandt
c. Cocking
d. White

Ans. (a) Braun

308. During gynogenesis, haploid plants generally originated from

a. Synergids
b. Antipodal cells
c. Egg cell
d. Polar nuclei

Ans. (c) Egg cell

309. Somatic hybridization has been the most successful in

a. Malvaceae
b. Leguminosae

c. Graminae
d. Solanaceae and Cruciferae

Ans. (d) Solanaceae and Cruciferae

310. The green revolution was a product of

a. Hybrids
b. Conventional plant breeding
c. Selection breeding
d. None of these

Ans. (b) Conventional plant breeding

311. Protoplasts can be produced from suspension cultures, callus tissues or intact tissues by enzymatic treatment with

a. Cellulotyic enzymes
b. Pectolytic enzymes
c. Both cellulotytic and pectolytic enzymes
d. Proteolytic enzymes

Ans. (c) Both cellulotytic and pectolytic enzymes

312. Which of the following is considered as the disadvantage of conventional plant tissue culture for clonal propagation?

a. Multiplication of sexually derived sterile hybrids
b. Less multiplication of disease free plants
c. Storage and transportation of propagates
d. Both b and c

Ans. (c) Storage and transportation of propagates

313. What is meant by 'Organ culture'?

a. Maintenance alive of a whole organ, after removal from the organism by partial immersion in a nutrient fluid
b. Introduction of a new organ in an animal body with a view to create genetic mutation in the progenies of that animal
c. Cultivation of organs in a laboratory through the synthesis of tissues
d. The aspects of culture in community which are mainly dedicated by the need of a specified organ of the human body

Ans. (a) Maintenance alive of a whole organ, after removal from the organism by partial immersion in a nutrient fluid

314. Which method of plant propagation involves the use of girdling?

a. Grafting
b. Cutting
c. Layering
d. Micropropagation

Ans. (c) Layering

315. Which of the following is used in the culture of regenerating protoplasts, single cells or very dilute cell suspensions?

a. Nurse medium
b. Nurse or feeder culture
c. Both (a) and (b)
d. None of the above

Ans. (c) Both (a) and (b)

316. In a callus culture

a. Iincreasing level of cytokinin to a callus induces shoot formation and increasing level of auxin promote root formation
b. Increasing level of auxin to a callus induces shoot formation and increasing level of cytokinin promote root formation
c. Auxins and cytokinins are not required
d. Only auxin is required for root and shoot formation

Ans. (a) Iincreasing level of cytokinin to a callus induces shoot formation and increasing level of auxin promote root formation

317. Which breeding method uses a chemical to strip the cell wall of plant cells of two sexually incompatible species?

a. Mass selection
b. Protoplast fusion
c. Transformation
d. Transcription

Ans. (b) Protoplast fusion

318. The phenomenon of the reversion of mature cells to the meristematic state leading to the formation of callus is known as

a. Redifferentiation
b. Dedifferentiation
c. Both a and b
d. None of the above

Ans. (b) Dedifferentiation

319. Cell fusion method includes the preparation of large number of

a. Plant cells stripped of their cell wall
b. Cells from different species
c. Single plant cell stripped of their cell wall
d. Plant cells with cell wall

Ans. (c) Single plant cell stripped of their cell wall

320. Subculturing is similar to propagation by cuttings because

a. It separates multiple microshoots and places them in a medium
b. It uses scions to produce new microshoots
c. They both use *in vitro* growing conditions
d. All of the above

Ans. (a) It separates multiple microshoots and places them in a medium

321. When plated only in nutrient medium, how much time is required for the protoplast to synthesize new cell wall?

a. 2–5 days
b. 3–5 days
c. 5–10 days
d. 10–15 days

Ans. (c) 5–10 days

322. Agrobacterium based gene transfer is efficient in

a. Only with dicots
b. Only with monocots
c. With both monocots and dicots
d. With majority monocots and few dicots

Ans. (a) Only with dicots

323. Which of the following is an ethylene biosynthesis inhibitor?

a. Citric acid
b. Succinic acid
c. Activated charcoal
d. Silver thiosulphate

Ans. (d) Citric acid

324. Nitrogen in the plant cell culture media is provided by either ammonia or nitrate salt in the media

a. Utilization of ammonium cause culture pH to drop while utilization of nitrate cause culture pH to rise
b. Utilization of nitrate cause culture pH to drop while utilization of ammonium cause culture pH to rise
c. Utilization of both ammonium and nitrate result in rise in pH
d. Utilization of both ammonium and nitrate result in drop in pH

Ans. (a) Utilization of ammonium cause culture pH to drop while utilization of nitrate cause culture pH to rise

325. Which of the following growth regulator is added for shoot initiation during plant regeneration from callus?

a. Auxins
b. Cytokinins
c. Gibberellins
d. Brassinosteroids

Ans. (b) Cytokinins

326. Which of the following growth regulator is used to stimulate embryo or shoot development?

a. Auxins
b. Cytokinins
c. Gibberellins
d. Brassinosteroids

Ans. (c) Gibberellins

327. Which of the following growth regulator cause plant cells to grow?

a. Auxins
b. Cytokinins
c. Gibberellins
d. Brassinosteroids

Ans. (a) Auxins

328. Silver thiosulphate is added to culture medium as it helps to

a. Maintain the pH
b. Remove toxic phenolics from plant cells
c. Prevent the gaseous plant hormone, ethylene dioxide from accumulating to detrimental condition
d. All of the above

Ans. (c) Prevent the gaseous plant hormone, ethylene dioxide from accumulating to detrimental condition

329. In plant cell culture media, auxins and cytokinins are used in the range of

a. l–50 µM
b. l5–50 µM
c. 20–50 µM
d. 40–50 µM

Ans. (a) l–50 µM

330. Concentration of sucrose generally used in plant cell culture media is

a. 10–15 g/l
b. 20–30 g/l
c. 25–45 g/l
d. 10–65 g/l

Ans. (b) 20–30 g/l

331. Which is/are the naturally occurring plant auxins?

a. IBA
b. NAA
c. IAA
d. None of the above

Ans. (b) NAA

332. Which is/are the disadvantage/(s) of using IAA in plant cell culture media?

a. It is unstable in solution
b. Gets easily oxidized
c. Conjugated to inactive form by plant cells
d. All of the above

Ans. (d) All of the above

333. To maintain the pH of the culture

a. Organic acid such as citric, fumaric, malic and succinic acid is used
b. Synthetic buffers such as Tris, MES or HEPS are used
c. Both (a) and (b)
d. Ammonium salts are used

Ans. (c) Both (a) and (b)

334. Which of the following is not a cytokinin?

a. 2,4-dichlorophenoxyacetic acid
b. 6 benzylaminopurine
c. Zeatin
d. Kinetin

Ans. (a) 2,4-dichlorophenoxyacetic acid

335. Which of the following is not true about nurse or conditioned medium?

a. It is liquid removed from the suspension of fast growing cells
b. It contains uncharacterized growth factor released by growing cells
c. It is used in the culture of regenerating protoplast
d. It is removed aseptically from the culture and is autoclaved before use

Ans. (d) It is removed aseptically from the culture and is autoclaved before use

336. What is 'nurse' or conditioned medium?

a. It is the media full of growth factors used for the growth of cells
b. It is the medium added to nurse the callus culture
c. Both (a) and (b)
d. None of these

Ans. (c) Both (a) and (b)

337. Neutralized activated charcoal is occasionally added to young regenerating cultures to

a. Remove toxic phenolics produced by the stressed plant cell
b. Help to remove plants growth regulators introduced at an earlier stage
c. Both (a) and (b)
d. Maintain the pH of the medium

Ans. (c) Both (a) and (b)

338. Virulence trait of *Agrobacterium tumefaciens* is borne on

a. Chromosomal DNA
b. Tumour inducing plasmid DNA
c. Both chromosomal and plasmid DNA
d. Cryptic plasmid DNA

Ans. (b)

339. The size of the virulent plasmid of *Agrobacterium tumefaciens* is

a. 40–80 kb
b. 140–235 kb
c. 100–135 kb
d. 200–235 kb

Ans. (b) 140–235 kb

340. Which of the following is not true about the helper plasmids?

a. These can replicate in *Agrobacterium*
b. These help in the mediating conjugation of intermediate vectors
c. These can't replicate in *Agrobacterium*
d. All of the above

Ans. (a) These can replicate in *Agrobacterium*

341. Which technique is used to introduce genes into dicots?

a. Electroporation
b. Particle acceleration
c. Microinjection
d. Ti-plasmid infection

Ans. (d) Ti-plasmid infection

342. In a plant tumour cell

a. Complete Ti-plasmid is incorporated in plant nuclear DNA
b. Different parts of the Ti-plasmid are incorporated
c. Only a small specific segment of callus T-DNA is incorporated
d. May vary from plant to plant

Ans. (c) Only a small specific segment of callus T-DNA is incorporated

343. Co-integrating transformation vectors must include a region of homology in

a. The vector plasmid
b. The Ti-plasmid
c. Between vector plasmid and Ti-plasmid
d. None of these

Ans. (c) Between vector plasmid and Ti-plasmid

344. Integrated nopaline T-DNA occurs as

a. Single segment
b. Two segments
c. Three segments
d. None of these

Ans. (a) Single segment

345. Opines are

a. Amino acid derivatives found in tumor tissues
b. Amino acid derivatives found in normal tissues
c. Amino acid derivatives found in both normal as well as tumor tissues
d. None of the above

Ans. (a) Amino acid derivatives found in tumor tissues

346. Which of the following is true about *Agrobacterium tumefaciens*?

a. It causes crown gall disease of plants
b. It infects gymnosperms
c. It infects dicotyledonous angiosperms
d. All of the above

Ans. (d) All of the above

347. Advantage of microprojectile method over microinjection method for gene transfer in plants include

a. Intact cells are used
b. Method is universal in its application irrespective of all shape, size, type and presence or absence of cell wall
c. Gene can be transferred to many cells simultaneously
d. All of the above

Ans. (d) All of the above

348. On Ti-plasmid T-region or T-DNA is flanked by a direct repeat of

a. 12 bp b. 32 bp
c. 25 bp d. 45 bp

Ans. (c) 25 bp

349. *Agrobacterium tumefaciens* is a

a. Gram (+) bacteria b. Gram (–) bacteria
c. Both a and b d. None of these

Ans. (b) Gram (–) bacteria

350. Which of the following genes are constitutively expressed and control the plant induced activation of other *vir* genes?

a. *vir* A and *vir* G b. *vir* T and *vir* G
c. *vir* D and *vir* A d. *vir* A and *vir* C

Ans. (a) *vir* A and *vir* G

351. Integrated octopine T DNA occurs as

a. Single segment b. Two segment
c. Third segment d. Five segment

Ans. (b) Two segment

352. Which of the following plant signal molecules regulate the expression of *vir* B, C, D and E in case of tobacco?

a. Acetosyringone
b. α-hydroxy syringone
c. Both a and b
d. None of these

Ans. (c) Both a and b

353. Intermediate vectors containing T-DNA are conjugation deficient. Thus conjugation is mediated in presence of which of the following plasmid?

a. pRK 2013
b. pRN 3
c. Either (a) or (b)
d. None of these

Ans. (c) Either (a) or (b)

354. Which of the following is true about T DNA?

a. Integration of T-DNA can occur at many different, apparently random sites in the plant nuclear DNA
b. Integration of T-DNA occurs only at one specific sites in the plant nuclear DNA
c. Integration of T-DNA occurs at two specific sites in the plant nuclear DNA
d. Integration of T-DNA occurs at one site that may be random in the plant nuclear DNA

Ans. (a) Integration of T-DNA can occur at many different, apparently random sites in the plant nuclear DNA

355. Which of the following is not true about the direct repeats flanking T-DNA?

a. They are conserved between nopaline and octopine Ti-plasmids
b. These repeats are transferred intact to the plant genome
c. These are important in integration mechanism
d. All of these

Ans. (b) These repeats are transferred intact to the plant genome

356. The left segment of octopine T-DNA (TL) is necessary for

a. Enzymes for agropine biosynthesis
b. Tumour formation
c. Conjugative transfer
d. None of these

Ans. (b) Tumour formation

357. Which of the following is not true for microinjection technique that involves transfer of DNA into protoplast?

a. It is carried out with the help of micromanipulator
b. The recipient cells are immobilized on artificial support or artificially bound to substarate
c. It employs needle with diameter greater than cell diameter
d. All of these

Ans. (c) It employs needle with diameter greater than cell diameter

358. Virulent strains of Agrobacterium contain large Ti-plasmids, which are responsible for the DNA transfer and subsequent disease symptoms. It has been shown that Ti-plasmids contain

a. One set of sequence necessary for gene transfer
b. Two sets of sequence necessary for gene transfer
c. Three sets of sequence necessary for gene transfer
d. Four sets of sequence necessary for gene transfer

Ans. (b) Two sets of sequence necessary for gene transfer

359. The direct repeats flanking the T-DNA of *Agrobacterium tume-faciens* are known as

a. Cos site
b. Flanking sequences
c. Border sequences
d. Transfer sequences

Ans. (c) Border sequences

360. T-DNA transfer and processing into plant genome requires products of which of the following genes?

a. *vir* A,B
b. *vir* G,C
c. *vir* D,E
d. All of these

Ans. (d) *vir* G,C

361. Because of large size of Ti-plasmid, intermediate vectors (IV) are developed in which T DNA has been subcloned into

a. pBR 322 based plasmid vector
b. pRK 2013
c. pRN 3
d. All of these

Ans. (a) pBR 322 based plasmid vector

362. Which of the following are used as selection marker for the cells transformed with *Agrobacterium*?

a. Neomycin phosphotransferase
b. Streptomycin phosphotransferase
c. Hygromycin phosphotransferase
d. Any of the above

Ans. (d) Any of the above

363. *Vir* genes required for the T-DNA transfer and processing are located

a. On the T-DNA
b. Outside the T-DNA region
c. On the plant genome
d. All of the above

Ans. (b) Outside the T-DNA region

364. Plant transformation vectors based on *Agrobacterium* can generally be divided into

a. Two vectors
b. Three vectors
c. Four vectors
d. Five vectors

Ans. (a) Two vectors

365. The production of secondary metabolites requires the use of

a. Meristem
b. Protoplast
c. Auxiliary buds
d. Cell suspension

Ans. (d) Cell suspension

366. Synthetic seeds are

a. Artificially synthesized seeds
b. Somatic embryos encapsulated in suitable matrix
c. Seeds of plants modified genetically
d. None of these

Ans. (b) Somatic embryos encapsulated in suitable matrix

367. Somatic embryoids are

a. Identical with zygotic embryos and without seed coats
b. Identical with zygotic embryos and with seed coats
c. Non-identical with zygotic embryos and without seed coats
d. Non-identical with zygotic embryos and with seed coats

Ans. (a) Identical with zygotic embryos and without seed coats

368. The production of high quality and uniform embryos has been limited to only

a. Carrot
b. Alfalfa
c. Both (a) and (b)
d. None of these

Ans. (c) Both (a) and (b)

369. The preserved embryoids are termed as

a. Synthetic seeds
b. Semi-synthetic seeds
c. Natural seeds
d. Fermented seeds

Ans. (a) Synthetic seeds

370. Encapsulation is necessary to produce and protect synthetic seeds. The encapsulation is carried out by various types of hydrogels, which are

a. Soluble in water
b. Soluble in organic solvents
c. Insoluble in water
d. Insoluble in organic solvents

Ans. (a) Soluble in water

371. Recalcitrant seeds are

a. Resistant to drying and freezing temperature
b. Killed by drying and freezing temperature
c. Both (a) and (b)
d. None of above

Ans. (b) Killed by drying and freezing temperature

372. The encapsulation of somatic embryos can be carried out by

a. Automatic encapsulation process
b. Gel complexation
c. Both (a) and (b)
d. Coating proteins

Ans. (c) Both (a) and (b)

373. One of the defense mechanisms adopted by plants for detoxification of heavy metal is the synthesis of

a. Phytochelatin
b. Calmodulin
c. Tubulin
d. Systemin

Ans. (a) Phytochelatin

374. What is the major function of auxin?

a. Controls abscission of leaves
b. Promotes stem elongation
c. Absorbs light and affects seed germination
d. Promotes root elongation

Ans. (d) Promotes root elongation

375. Which one of the following phytohormones plays a role in seed germination?

a. Gibberellins
b. Cytokinin D
c. Auxins
d. Abscisic acid

Ans. (a) Gibberellins

376. Most abundant intracellular ion in plants is

a. Iron
b. Calcium
c. Potassium
d. Zinc

Ans. (c) Potassium

377. S-adenosyl methionine is a precursor of which plant hormone

a. Abscisic acid
b. Auxin
c. Ethylene
d. Cytokinin

Ans. (c) Ethylene

378. Which phytohormone induces seed dormancy?

a. Gibberellins
b. Abscisic acid
c. Auxin
d. Ethylene

Ans. (b) Abscisic acid

379. Which of the following helps in osmoprotection in plants?

a. Proline
b. Tryptophan
c. Glycine
d. Levulinic acid

Ans. (a) Proline

380. Which of the following does not occur during seed development?

a. Accumulation of storage protein
b. Synthesis of LEA protein
c. Desiccation
d. Synthesis of Gibberelic acid

Ans. (d) Synthesis of Gibberelic acid

381. In signal transduction pathway of which plant hormone genes *'rht'*, *'spy'*, *'gay'* are associated

a. Auxin
b. Gibberelic acid
c. Abscisic acid
d. Ethylene

Ans. (b) Gibberelic acid

382. Among the following which is not a function of hydrogen peroxide released during plant stress response

a. Cross linking glycans in cell wall
b. Lignin deposition
c. Production of ethylene and salicylic acid
d. Production of jasmonic acid

Ans. (c) Production of ethylene and salicylic acid

383. Phytochromes involved in red/far-red response are dimeric chromoproteins. The two subuints of phytochromes are linked with

a. PAS domain
b. PTB domain
c. Hinge region
d. Kinase domain

Ans. (c) Hinge region

384. Major transport of nitrogen in xylem sap is in form of

a. Glutamate
b. Allantoin
c. Glutamine
d. Ammonia

Ans. (b) Allantoin

385. *Agrobacterium tumefaciens* causes crown gall disease in dicots plants. Which phytohormone genes are present in T-DNA

a. Auxin and cytokinin
b. Auxin only
c. Cytokinin only
d. Cytokinin and brassinosteroids

Ans. (a) Auxin and cytokinin

386. Among the following which is a terpene

a. Chlorophyll
b. Lycopene
c. Xanthophylls
d. Carotene

Ans. (b) Lycopene

387. In tissue culture experiment to initiate shoot formation from undifferentiated mass of cells the medium must contain

a. Low auxin and high cytokinin
b. High auxin and high cytokinin
c. High auxin and low cytokinin
d. Low auxin and low cytokinin

Ans. (a) Low auxin and high cytokinin

388. During germination of seeds over other cells during gastrulation is termed

a. Mobilization of reserve food
b. Transcription of specific gene
c. Cell division
d. Embryo differentiation

Ans. (a) Mobilization of reserve food

389. In which part of the plant are auxins produced

a. Root meristem
b. Shoot meristem
c. Vascular bundels
d. Mesophyll cells

Ans. (b) Shoot meristem

390. Which hormone induces formation of late embryogenesis abundant (LEA) protein during seed maturation?

a. Gibberelic acid
b. Abscisic acid
c. Ethylene
d. Cytokinin

Ans. (b) Abscisic acid

391. Which of the following phytohormones can check drought stress?

a. Auxin
b. Gibberellins
c. ABA
d. Cytokinin

Ans. (c) ABA

392. DMSO is a frequently used cryoprotectant. It is obtained from

a. Marine fish
b. Marine algae
c. Chemosynthesis
d. Gymnosperms

Ans. (b) Marine algae

393. Which of the following is a proteinaceous phytohormone?

a. Auxin
b. Cytokinin
c. Systemin
d. Jasmonate

Ans. (c) Systemin

394. Which of the following phytohormone can be an alternative of cold treatment?

a. ABA
b. Gibberellins
c. Cytokinins
d. Ethylene

Ans. (b) Gibberellins

395. Which of the following phytohormone helped greatly in the spreading of green revolution?

a. Auxin
b. Cytokinin
c. Gibberellins
d. Ethylene

Ans. (c) Gibberellins

396. The methods of growing cells and tissues *in vitro* on a nutrient medium is called

a. Hybridization
b. Tissue culture
c. Gene cloning
d. Gene therapy

Ans. (b) Tissue culture

397. The protoplasts of two different plants fuse to form

a. Zygote
b. Embryo
c. Embryoid
d. Heterokaryon

Ans. (d) Heterokaryon

398. Which cell-based plant technology involves combining of two cells without cell walls from different species?

a. Clonal propagation
b. Hybridization
c. Protoplast fusion
d. Mutant selection

Ans. (c) Protoplast fusion

399. If the goal were to create a plant resistant to an insecticide, which cell-based plant technology would be most effective

a. Clonal propagation
b. Hybridization
c. Protoplast fusion
d. Mutant selection

Ans. (d) Mutant selection

400. The temperature adjusted for production of callus explants is

a. 25°C b. 20°C
c. 35°C d. 15°C

Ans. (a) 25°C

401. The idea of growing plant cell in artificial medium was proposed by

a. Robbius and kotte b. Haberlandt
c. White d. Miller

Ans. (b) Haberlandt

402. The first successful tissue culture was performed by

a. Miller b. Haberlandt
c. Robbius and kotte d. None

Ans. (c) Robbius and kotte

403. The first to show that the plant cells can grow on synthetic media

a. Shipra Guha b. Satish Maheswari
c. Haberlandt d. Darwin

Ans. (d) Darwin

404. Plant tissue culture is useful for

a. Synthesis of medicinal compounds
b. Carrying out biotransformation
c. Preservation of plant cells
d. All

Ans. (d) All

405. Callus is formed through the stages of

a. Induction b. Cell division
c. Cell differentiation d. All

Ans. (d) All

406. The total depletion of nutrient in medium of callus growth takes about

a. 14 days
b. 21 days
c. 28 days
d. 35 days

Ans. (c) 28 days

407. Explants is

a. Only external part of plant body for culturing
b. Any part of the plant for culturing
c. Both A and B
d. None

Ans. (b) Any part of the plant for culturing

408. Plant cell culture is

a. Callus culture b. Protoplast culture
c. Suspension culture d. All

Ans. (d) All

409. Protoplast is

a. Plant cell without cell wall
b. Animal cell without cell membrane
c. Plant cell with prominent cell wall
d. None

Ans. (a) Plant cell without cell wall

410. Protoplast is useful for

a. Gene manipulation in plant
b. Formation of somatic hybrids
c. Both A and B
d. None

Ans. (c) Both A and B

411. The solution used for surface sterilization of leaves is

a. 2% sodium hypochlorite
b. 5% sodium hypochlorite
c. 2% calcium hypochlorite
d. None

Ans. (a) 2% sodium hypochlorite

412. Plasmolysis of cells occurs in presence of

a. 13% mannitol b. 25% mannitol
c. 10% mannitol d. None

Ans. (a) 13% mannitol

413. The pure protoplast float on

a. Glucose-mannitol solution
b. Sucrose-sorbitol solution
c. Sucrose-mannitol solution
d. None

Ans. (b) Sucrose-sorbitol solution

414. Induced fusion of protoplast can be performed by treating with

a. Sodium nitrate b. Polyethylene glycol
c. Both A and B d. None

Ans. (d) None

415. If protoplasts are very less amount, protoplast fusion can be performed by

a. Fusogen method b. Drop method
c. Both A and B d. None

Ans. (b) Drop method

416. The factor that hinders the production of phytopharmaceutical using plant cell culture is

a. Less availability of raw material
b. Fluctuation in quality
c. Both A and B
d. None

Ans. (c) Both A and B

417. Organotypic culture is

a. Formation of a 3D structure containing indisguishable cells
b. Retention of structure and function of explant
c. Both A and B
d. None

Ans. (b) Retention of structure and function of explant

418. In tissue culture rooting can be induced from callus by supplementing the medium with

a. Auxin
b. Cytokinin
c. Gibberellin
d. Ethylene

Ans. (a) Auxin

419. Select the incorrectly matched pair

a. Explants-excised plant part used in tissue culture
b. Cytokinin-root initiation from callus
c. Somatic embryo—embryo produced from a vegetative cell
d. Anther culture—haploid plant

Ans. (b) Cytokinin-root initiation from callus

420. Caulogenesis is the formation of

a. Callus
b. Shoot
c. Roots
d. Embryoid

Ans. (b) Shoot

421. Plant tissue culture technique is a redefined method of

a. Hybridization
b. Vegetative propagation
c. Asexual reproduction
d. Selection

Ans. (b) Vegetative propagation

422. Polyethylene glycol is

a. Fusogenic chemical
b. Electrofusion stimulant
c. Callus stimulant
d. Differentiation stimulant

Ans. (a) Fusogenic chemical

423. Somatic hybridization is achieved through

a. Grafting
b. Protoplast fusion
c. Conjugation
d. Recombinant DNA technology

Ans. (b) Protoplast fusion

424. Meristem culture helps in developing

a. Hybrid plants
b. Virus free plants
c. Disease resistant plants
d. Tall plants

Ans. (b) Virus free plants

425. *In vitro* culture of plant parts need

a. Controlled environmental condition
b. Aseptic condition
c. Maintenance of pH
d. All of these

Ans. (d) All of these

426. Genetic variation observed in callus obtained from tissue culture is called

a. Morphogenesis
b. Rhizogenesis
c. Callogenesis
d. Somaclonal variation

Ans. (d) Somaclonal variation

427. All the cells in a callus are

a. Genetically homogeneous
b. Genetically heterogeneous
c. Similar in size
d. Inefficient to grow organs

Ans. (b) Genetically heterogeneous

428. Which one of the following statements about plant tissue culture is correct

a. Cells can be cultured only on solid medium
b. Cells can be cultured both on solid and liquid medium
c. Callus do not need hormones
d. The cells of the callus cannot be subcultured

Ans. (b) Cells can be cultured both on solid and liquid medium

429. The production of a large number of genetically similar plants through plant tissue culture is called

a. Hybridoma technology
b. Recombinant DNA technology
c. Gene therapy
d. Micropropagation

Ans. (d) Micropropagation

430. In tissue culture, relative amounts of xylem and phloem are altered by changing concentration of the following compound in the medium

a. Vitamins
b. Sugar
c. Amino acids
d. Agar

Ans. (b) Sugar

431. During tissue culture in cereals, root formation is promoted in medium lacking

a. IAA
b. GA
c. 2,4 D
d. Sucrose

Ans. (c) 2,4 D

432. The somatic embryogenesis in plants was demonstrated for the first time in

a. Datura
b. Carrot
c. Tobacco
d. Petunia

Ans. (b) Carrot

433. Pilot plants for production of biomass through tissue culture were established by DBT at three centres, which did not include the following

a. NCL, Pune
b. TERI, New Delhi
c. NFPTCR, New Delhi
d. CDFD, Hyderabad

Ans. (d) CDFD, Hyderabad

434. The best choice of a haploid cell in tissue culture

a. Stem
b. Bud
c. Root
d. Pollen grain

Ans. (b) Bud

435. Differentiation of callus tissue into different in tissue culture method is on account of the choice of

a. Cells from parent plant
b. Plant growth substances in the medium
c. Containers used for the purpose
d. Tissue selection from the parent plant

Ans. (b) Plant growth substances in the medium

436. The ability of a plant cell to give rise to a whole plant is called

a. Quantun energy
b. Energy currency
c. Totipotency
d. Explant

Ans. (c) Totipotency

437. Dormancy in plants can be overcome by

a. Protoplast culture
b. Meristem culture
c. Leaf culture
d. Embryo culture

Ans. (d) Embryo culture

438. In crop improvement programmes, virus free clones can be obtained through

a. Grafting
b. Spray of antibiotics
c. Hybridization
d. Shoot tip culture

Ans. (d) Shoot tip culture

439. Higher auxin to cytokinin ratio in plant tissue culture leads to

a. Rhizogenesis
b. Callogenesis
c. Morphogenesis
d. Shooting

Ans. (a) Rhizogenesis

440. Which is the correct sequence of events in *in vitro* plant propagation?

a. Inoculation-Callogenesis-Hardening-Organogenesis
b. Inoculation-Organogenesis-Hardening-Callogenesis
c. Organogenesis-Callogenesis-Inoculation-Hardening
d. Inoculation-Callogenesis-Organogenesis–Hardening

Ans. (d) Inoculation-Callogenesis-Organogenesis–Hardening

441. Which of the following is not a component of growth nutrient medium in plant tissue culture

a. Sucrose
b. Agarose
c. Inorganic salt
d. Amino acids

Ans. (b) Agarose

442. The plant hormone indole-3-acetic acid (IAA) is present in most plants. The structure of this hormone is related to which one of the following amino acids?

a. Glutamic acid
b. Aspartic acid
c. Lysine
d. Tryptophan

Ans. (d) Tryptophan

443. Somatic embryogenesis is an important exercise in micropropagation and genetic engineering of plants. The following steps are considered as critical for achieving somatic embryogenesis

A. Reducing the concentration of sucrose in the medium by half
B. Addition of the hormone, 2,4D, to induce somatic embryos

C. Reduce agar concentration to 0.6% (w/v)
D. Use maltose in place of sucrose as a carbon source

Which one of the following combinations is correct?

a. A and C
b. B and D
c. A and B
d. C and D

Ans. (b) B and D

444. Encasing of which of the following plant cells in a gelatinous matrix is referred as artificial seed?

a. Microcalli
b. Somatic embryos
c. Root tips
d. Shoot tips

Ans. (b) Somatic embryos

445. *Arabidopsis thaliana* seeds were planted on Murashige Skoog (MS) plates with or without a hormone added to the medium. Seeds were found to germinate late in the hormone containing MS plates as compared to MS plates without hormone. Identify the hormone.

a. Jasmonic acid
b. Cytokinin
c. Auxin
d. Abscisic acid

Ans. (d) Abscisic acid

446. A(*n*) ..... is an excised piece of leaf or stem tissue used in micropropagation.

a. Micro shoot
b. Medium
c. Explant
d. Scion

Ans. (c) Explant

447. Protoplasts can be produced from suspension cultures, callus tissues or intact tissues by enzymatic treatment with

a. Cellulotyic enzymes
b. Pectolytic enzymes
c. Both cellulolytic and pectolytic enzymes
d. Proteolytic enzymes

Ans. (c) Both cellulolytic and pectolytic enzymes

448. Which of the following is considered as the disadvantage of conventional plant tissue culture for clonal propagation?

a. Multiplication of sexually derived sterile hybrids
b. Less multiplication of disease free plants
c. Storage and transportation of propogates
d. Both (b) and (c)

Ans. (c) Storage and transportation of propogates

449. What is meant by 'Organ culture'

a. Maintenance alive of a whole organ, after removal from the organism by partial immersion in a nutrient fluid
b. Introduction of a new organ in an animal body with a view to create genetic mutation in the progenies of that animal
c. Cultivation of organs in a laboratory through the synthesis of tissues
d. The aspects of culture in community which are mainly dedicated by the need of a specified organ of the human body

Ans. (a) Maintenance alive of a whole organ, after removal from the organism by partial immersion in a nutrient fluid

450. Which method of plant propagation involves the use of girdling?

a. Grafting
b. Cuttings
c. Layering
d. Micropropagation

Ans. (c) Layering

451. Organogenesis is

a. Formation of callus tissue
b. Formation of root and shoots on callus tissue
c. Both (a) and (b)
d. Genesis of organs

Ans. (b) Formation of root and shoots on callus tissue

452. Which of the following is used in the culture of regenerating protoplasts, single cells or very dilute cell suspensions?

a. Nurse medium
b. Nurse or feeder culture
c. Both (a) and (b)
d. None of these

Ans. (c) Both (a) and (b)

453. In a callus culture

a. Increasing level of cytokinin to a callus induces shoot formation and increasing level of auxin promote root formation
b. Increasing level of auxin to a callus induces shoot formation and increasing level of cytokinin promote root formation
c. Auxins and cytokinins are not required
d. Only auxin is required for root and shoot formation

Ans. (a) Increasing level of cytokinin to a callus induces shoot formation and increasing level of auxin promote root formation

454. Protoplasts are the cells devoid of

a. Cell membrane
b. Cell wall
c. Both cell wall and cell membrane
d. None of these

Ans. (b) Cell wall

455. Which breeding method uses a chemical to strip the cell wall of plant cells of two sexually incompatible species?

a. Mass selection
b. Protoplast fusion
c. Transformation
d. Transpiration

Ans. (b) Protoplast fusion

456. The phenomenon of the reversion of mature cells to the meristematic state leading to the formation of callus is known as

a. Redifferentiation
b. Dedifferentiation
c. Either (a) or (b)
d. None of these

Ans. (b) Dedifferentiation

457. Cell fusion method includes the preparation of large number of

a. Plant cells stripped of their cell wall
b. Single plant cell stripped of their cell wall
c. Plant cells with cell wall
d. Cells from different species

Ans. (b) Single plant cell stripped of their cell wall

458. Subculturing is similar to propagation by cuttings because

a. It separates multiple microshoots and places them in a medium
b. It uses scions to produce new microshoots
c. They both use *in vitro* growing conditions
d. All of the above

Ans. (a) It separates multiple microshoots and places them in a medium

459. The ability of the component cells of callus to form a whole plant is known as

a. Redifferentiation
b. Dedifferentiation
c. Either (a) or (b)
d. None of these

Ans. (a) Redifferentiation

460. What is/are the benefit(s) of micropropagation or clonal propagation?

a. Rapid multiplication of superior clones
b. Multiplication of disease free plants
c. Multiplication of sexually derived sterile hybrids
d. All of the above

Ans. (d) All of the above

461. When plated only in nutrient medium, how much time is required for the protoplast to synthesize new cell wall?

a. 2–5 days
b. 5–10 days
c. 10–15 days
d. 15–17 days

Ans. (b) 5–10 days

462. Cellular totipotency is the property of

a. Plants
b. Animals
c. Bacteria
d. All of these

Ans. (a) Plants

463. Agrobacterium based gene transfer is efficient

a. Only with dicots
b. Only with monocots
c. With both monocots and dicots
d. With majority monocots and few dicots

Ans. (a) Only with dicots

464. The production of secondary metabolites require the use of

a. Protoplast
b. Cell suspension
c. Meristem
d. Auxillary bud

Ans. (b) Cell suspension

465. Synthetic seed is produced by encapsulating somatic embryo with

a. Sodium chloride
b. Sodium alginate
c. Sodium acetate
d. Sodium nitrate

Ans. (b) Sodium alginate

466. DMSO (Dimethyl sulfoxide) is used as a

a. Gelling agent
b. Alkylating agent
c. Chelating agent
d. Cryoprotectant

Ans. (d) Cryoprotectant

467. The most widely used chemical for protoplast fusion, as fusogens, is

a. Mannitol
b. Sorbitol
c. Mannol
d. Poly ethylene glycol (PEG)

Ans. (d) Poly ethylene glycol (PEG)

468. Cybrids are produced by

a. Fusion of two different nuclei from two different species
b. Fusion of two same nuclei from same species
c. Nucleus of one species but cytoplasm from both the parent species
d. None of the above

Ans. (c) Nucleus of one species but cytoplasm from both the parent species

469. Callus is

a. Tissue that forms embryo
b. An insoluble carbohydrate

c. Tissue that grows to form embryoid
d. Un-organized actively dividing mass of cells maintained in cultured

Ans. (d) Un-organized actively dividing mass of cells maintained in cultured

470. Growth hormone producing apical dominance is

a. Auxin b. Gibberellins
c. Ethylene d. Cytokinin

Ans. (a) Auxin

471. A medium which is composed of chemically defined compound is called

a. Natural media
b. Synthetic media
c. Artificial media
d. None of these

Ans. (b) Synthetic media

472. To obtain haploid plant, we culture

a. Entire anther b. Nucleus
c. Embryo d. Apical bud

Ans. (a) Entire anther

473. Genetic or Chimeral Variation are the one

a. Caused by mutagens
b. Produce during tissue culture
c. Caused by gamma rays
d. Induced during sexual embryogeny

Ans. (b) Produce during tissue culture

474. Which of the following plant cell will show totipotency

a. Xylem vessels b. Sieve tube
c. Meristem d. Cork cells

Ans. (c) Meristem

475. Which vector is most commonly used in crop improvement

a. Plasmid
b. Cosmid
c. Phasmid
d. Agrobacterium

Ans. (d) Agrobacterium

476. Genetic variation commonly appears in plants

a. Growing in polluted soil or water
b. Exposed to gamma rays
c. Raised in tissue culture
d. Transformed by recombinant DNA technology

Ans. (c) Raised in tissue culture

477. The final stage in the tissue culture programme before the new plants are taken out for cultivation in the fields is known as

a. Hardening b. Micropropagation
c. Caulogenesis d. Embryogenesis

Ans. (a) Hardening

478. The problem of necrosis and gradual senescence while performing tissue culture can be overcome by

a. Spraying auxins b. Spraying cytokinins
c. Suspension culture d. Subculture

Ans. (b) Spraying cytokinins

479. A major application of embryo culture is in

a. Clonal propagation
b. Production of embryoids
c. Overcoming hybridization barriers
d. Induction of somaclonal variations

Ans. (c) Overcoming hybridization barriers

480. In tissue culture of parenchyma, mitosis is accelerated in the presence of

a. Auxin only b. Cytokinin only
c. Auxin and cytokinin d. Auxin and gibberellins

Ans. (c) Auxin and cytokinin

481. In the plant tissue culture, the callus tissues can be regenerated into complete plantlets primarily by

a. Sugars b. Vitamins
c. Amino acids d. Hormones

Ans. (d) Hormones

482. In tissue culture medium, the embryoids formed from pollens grains is due to

a. Cellular totipotency b. Organogenesis
c. Double fertilization d. Test tube culture

Ans. (a) Cellular totipotency

483. Which plant organ shows maximum totipotency?

a. Meristem b. Sieve tube
c. Xylem vessel d. Collenchymas

Ans. (a) Meristem

484. To produce plants that are homozygous for all traits, the best choice is

a. Cell suspension cultures
b. Callus culture
c. Anther/pollen culture
d. Plant organ culture

Ans. (c) Anther/pollen culture

485. Cell suspension cultures require

a. Organogenesis
b. Electroporation
c. Differentiation
d. Disaggregation

Ans. (d) Disaggregation

486. Which of the following are mismatched?

a. Cell suspension culture-somatic cell embryogenesis
b. Homozygous plants-anther/pollen culture
c. Callus culture-differentiated tissues regenerate
d. All are correctly matched

Ans. (c) Callus culture-differentiated tissues regenerate

487. Most plant tissue cultures are initiated from

a. Calluses
b. Explants
c. Plantlets
d. Protoplasts

Ans. (b) Explants

488. If you want to use a plant tissue culture as a chemical factory for vitamins, choose

a. Suspension cultures
b. Callus cultures
c. Organ cultures
d. Anther/pollen culture

Ans. (a) Suspension cultures

489. The fastest way to ripe tomato using tissue culture is by

a. Cell suspension culture
b. Callus culture
c. Plant organ culture
d. Anther/pollen culture

Ans. (c) Plant organ culture

490. Pores in protoplasts may be opened to DNA by the application of

a. Magnetism
b. Light
c. Enzymes
d. Electricity

Ans. (d) Electricity

491. Unlike the somatic cells of animals, plant cells can be grown in tissue culture and regenerate new plants

a. Because each cell contains the entire genome
b. Because plant cells can differentiate and revert back to seeds
c. Because plant cells are able to express genes that were not previously expressed
d. Both a and b

Ans. (c) Because plant cells are able to express genes that were not previously expressed

492. Plant transformation is

a. When a plant grown in culture generates increased genetic variation
b. When plant cells in suspension cultures form individual embryos that can grow into plants
c. The incorporation of foreign DNA into the plant genome
d. When dedifferentiated callus cells develop into tissue that is different from the original source tissue

Ans. (c) The incorporation of foreign DNA into the plant genome

493. Tissue culture refers to

a. Anther culture
b. Ovule culture
c. Protoplast culture
d. All of these

Ans. (d) All of these

494. Naked cell is called

a. Plastid
b. Proplastid
c. Protoplast
d. Cytoplast

Ans. (c) Protoplast

495. The plant part which is used for regeneration is called

a. Clone
b. Callus
c. Explant
d. None of these

Ans. (c) Explant

496. A mass of unorganized regenerated cells in culture medium is called

a. Embryoid
b. Somatic bud
c. Callus
d. All of these

Ans. (c) Callus

497. The process of differentiation of root and shoot from somatic embryos in culture medium is called

a. Viability
b. Longevity
c. Totipotency
d. Prepotency

Ans. (c) Totipotency

498. The process of differentiation of root and shoot from somatic embryos in culture medium is called

a. Gametogenesis
b. Sporogenesis
c. Organogenesis
d. Embryogenesis

Ans. (c) Organogenesis

499. Organ culture refers to

a. Anther culture
b. Ovule culture
c. Embryo culture
d. All of these

Ans. (d) All of these

500. Callus refers to a mass of

a. Cells b. Unorganized cells
c. Organized cells d. All of these

Ans. (d) All of these

501. The first application Somaclonal variation done by

a. Baraski b. Bunn
c. Larkin and Scowcroft d. Davidson

Ans. (c) Larkin and Scowcroft

502. Larkin and Scowcroft first used the term somaclonal variation in

a. 1960 b. 1901
c. 1985 d. 1991

Ans. (b) 1901

503. The anther culture technique was first developed by

a. Bahaduri b. Maheshwari
c. Guha and maheshwari d. Barski

Ans. (c) Guha and maheshwari

504. Guha and Maheshwari first developed anther culture technique in the year

a. 1952 b. 1960
c. 1962 d. 1965

Ans. (c) 1962

505. Guha and Maheshwari first developed anther culture technique working with

a. Brassica b. Corn
c. Datura d. Oenothera

Ans. (c) Datura

506. The nutrient medium for tissue culture was first developed by

a. Gamberg, *et al* b. Murashige and Scoog
c. Maheshwari d. Bahaduri

Ans. (d) Bahaduri

507. Murashige and Scoog first developed nutrient medium for tissue culture in

a. 1952 b. 1960
c. 1962 d. 1965

Ans. (c) 1962

508. Micropropagation is widely used in

a. Horticulture b. Floriculture
c. Forestry d. All of these

Ans. (d) All of these

509. In vegetatively propagated species, somaclonal variation is

a. Low b. Moderate
c. High d. Very high

Ans. (c) High

510. Ovule culture is used for

a. Plant propagation b. Plant regeneration
c. Embryo rescue d. None of these

Ans. (c) Embryo rescue

511. The ability of a plant cell to develop into whole plant is called

a. Organogenesis b. Protoplast culture
c. Totipotency d. Protoplast culture

Ans. (c) Totipotency

512. Father of plant tissue culture is

a. G. Haberlandt b. P.R. White
c. E.C. Cocking d. R.J. Gautheret

Ans. (a) G. Haberlandt

513. Department of Biotechnology, Government of India was created in the year

a. 1985 b. 1986
c. 1987 d. 1988

Ans. (b) 1986

514. The first plant from a mature plant cell was regenerated by Braun in

a. 1969 b. 1956
c. 1948 d. 1959

Ans. (d) 1959

515. In general, callus cultures are subcultured after every

a. 2–3 weeks b. 4–6 weeks
c. 8–10 weeks d. 6–8 weeks

Ans. (b) 4–6 weeks

516. In general, suspension cultures are sub cultured after every

a. 1–2 days b. 3–10 days
c. 10–15 days d. 12–18 days

Ans. (b) 3–10 days

517. Indian mustard (Pusa Jai Kisan), is a somaclone of) isolated from the variety

a. Varuna b. Pusa Bold
c. Kranti d. Karuna

Ans. (a) Varuna

518. Pusa Jai Kisan somaclone was developed at

a. Indian Agriculture Research Institute
b. G. B. Pant University of Agriculture and Technology
c. Punjab Agriculture University
d. National Research Center on Mustard

Ans. (d) National Research Center on Mustard

519. Bio 13 is a somaclone of

a. *Bacopa monniera*
b. *Citronella java*
c. *Brassica juncea*
d. *Menthe arvensis*

Ans. (b) *Citronella java*

520. Sugarcane somaclone Ono was isolated from the parental variety

a. CoS 771 b. Co 1148
c. Pindar d. Bo 54

Ans. (c) Pindar

521. Sugarcane somaclone Ono is resistant to

a. Fiji disease b. Red rot
c. Smut d. Grassy shoot

Ans. (a) Fiji disease

522. Sigma is a somaclone of

a. Wheat b. Alfalfa
c. Tomato d. Sorghum

Ans. (b) Alfalfa

523. Evergreen is somaclone of

a. Potato b. Celery
c. Blackberry d. Flax

Ans. (c) Blackberry

524. Somaclone Scarlet has improvement in which trait?

a. Skin colour b. Cooking quality
c. Yield d. Insect resistance

Ans. (a) Skin colour

525. Andro is a somaclone of

a. Flax b. Asparagus
c. Maize d. Rice

Ans. (a) Flax

526. For long-term storage of germplasm, which of the following is used

a. Liquid oxygen b. Liquid nitrogen
c. Mineral oil d. Carbon dioxide

Ans. (b) Liquid nitrogen

527. The technique of cryopreservation involves

a. Freezing and storage
b. Thawing and reculture
c. Freezing and reculture
d. Both a and b

Ans. (d) Both a and b

528. Among the given enzyme, which one is the cell wall degrading enzyme

a. Cellulose b. Pectinase
c. Macerozyme d. All of the above

Ans. (d) All of the above

529. Tobacco cultivar Delfield and A.C. Chang were derived through

a. Somaclonal variation
b. Somatic hybridization
c. Genetic engineering
d. Anther culture

Ans. (b) Somatic hybridization

530. Resistance to black leg was transferred in *Brassica napus* through protoplast fusion from

a. *B. juncea* b. *B. campestris*
c. *B. nigra* d. *B. oleracea*

Ans. (a) *B. juncea*

531. λ vector can be used for cloning of DNA molecules of up to

a. 50 kbp b. 75 kbp
c. 25 kbp d. 100 kbp

Ans. (c) 25 kbp

532. Crystal proteins are proteolytically processed in the insect midgut to yield a toxic core fragment of

a. 70 kDa b. 60 kDa
c. 50 kDa d. 40 kDa

Ans. (b) 60 kDa

533. CryI proteins are insecticidal to

a. Lepidoptera b. Coleopteran
c. Dipteral d. Orthoptera

Ans. (a) Lepidoptera

534. The cry IIB proteins is specific to

a. Coleopteran
b. Orthopoda
c. Diptera
d. Lepidoptera

Ans. (c) Diptera

535. The first transgenic plant containing coat protein mediated virus resistance were produced in 1986 in which crop?

a. Tomato
b. Tobacco
c. Potato
d. Alfalfa

Ans. (b) Tobacco

536. The slow ripening transgenic tomato Flavr Savr was developed in USA by using

a. Antisense RNA technology
b. Ribozyme technology
c. Cosuppression approach
d. Transgene silencing approach

Ans. (a) Antisense RNA technology

537. Gene *barnase* is expressed in which tissue in order to produce male sterility?

a. Filament
b. Tapetum
c. Ovary wall
d. Pollen

Ans. (b) Tapetum

538. The bar gene conferring resistance to phosphinothricin was isolated from

a. *Bacillus subtilis*
b. *Agrobacterium* sp.
c. *Azotobactor vinelandii*
d. *Streptomyces* sp.

Ans. (d) *Streptomyces* sp.

539. The pTA29 sequence was isolated from

a. Tobacco
b. Tomato
c. Cauliflower mosaic virus
d. Cotton

Ans. (a) Tobacco

540. The first somatic hybrid was produced by

a. Carlson and coworkers
b. Cocking and coworkers
c. Skoog and coworkers
d. None of the above

Ans. (a) Carlson and coworkers

541. The first plant from a mature plant cells was regenerated in 1959 by

a. Liabach
b. Braun
c. White
d. Gautheret

Ans. (b) Braun

542. Among the given surface sterilizing agents, which one gives good results

a. Silver nitrate
b. Bromine water
c. Cetrimide
d. Calcium or sodium hypochlorite

Ans. (d) Calcium or sodium hypochlorite

543. Term protoclone was first used by

a. Larkin
b. Skoog
c. Miller
d. None of the above

Ans. (a) Larkin

544. Tissue culture medium (MS) is adjusted to a pH of ..... before autoclaving

a. 3.5–5.6
b. 5.6–6.0
c. 6.0–7.0
d. None of these

Ans. (b) 5.6–6.0

545. What is the medicinal value of *Panax ginseng*?

a. Antispasmolytic
b. Anticholinergic
c. Tonic
d. Antimalarial

Ans. (c) Tonic

546. What is the medicinal value of *Hyoscyamus niger*?

a. Antispasmolytic
b. Anticholinergic
c. Antilleukaemic
d. Antimalarial

Ans. (a) Antispasmolytic

547. What is the medicinal value of *Tarasacum officibale*?

a. Antispasmolytic
b. Anticholinergic
c. Antilleukaemic
d. Antimalarial

Ans. (a) Antispasmolytic

548. What is the medicinal value of *Delonix regia*?

a. Antispasmolytic
b. Anticholinergic
c. Agglutination
d. Antimalarial

Ans. (c) Agglutination

549. What is the medicinal value of *Moringa oleifera*?

a. Antiviral
b. Anticholinergic
c. Antilleukaemic
d. Antimalarial

Ans. (a) Antiviral

550. What is the medicinal value of *Datura innoxia*?

a. Agglutination
b. Anticholinergic
c. Antilleukaemic
d. Antimalarial

Ans. (b) Anticholinergic

551. What is the medicinal value of *Catharanthus roseus*?

a. Agglutination
b. Anticholinergic
c. Antilleukaemic
d. Antimalarial

Ans. (c) Antilleukaemic

552. What is the medicinal value of *Sanatalum album*?

a. Agglutination
b. Anticholinergic
c. Antilleukaemic
d. Essential oil

Ans. (d) Essential oil

553. What is the medicinal value of *Artimisia annua*?

a. Agglutination
b. Anticholinergic
c. Antilleukaemic
d. Antimalarial

Ans. (d) Antimalarial

554. Young plant explanta (i.e. soften) are more susceptible to vitrification. This statement is

a. False
b. True
c. Not known
d. None of these

Ans. (b) True

555. Cybrids can be obtained by using any one of the following methods

a. Selective elimination of chromosome of one parent at a later stage after fusion of the nuclei
b. Selective elimination of one of the nuclei from the heterokaryon
c. Fusion of normal protoplast from one parent and protoplast containing nonviable nuclei from the other parent
d. Fusion of normal protoplast from one parent with enucleated protoplast from the other parent

Ans. (d) Fusion of normal protoplast from one parent with enucleated protoplast from the other parent

556. When normal protoplasts of two species are fused, the resulting somatic hybrid plants have somatic chromosome complement of both the fusion parents. Such somatic hybrids are called

a. Asymmetric hybrids
b. Symmetric hybrids
c. Both A and B
d. None of these

Ans. (b) Symmetric hybrids

557. Through suspension culture, Ojima and Ohira selected two cell lines of ..... tolerant to Al and Mn by subculturing cells in excessive amount of $AlCl_3$ for several months

a. Cabbage
b. Carrot
c. Cauliflower
d. None of these

Ans. (b) Carrot

558. Which of the following institute is engaged in preservation of plant germplasm based on cryopreservation technology?

a. International Plant Germplasm Research Institute
b. National Bureau of Plant Genetic Resources, New Delhi
c. IRRI, Philippines
d. All of these

Ans. (d) All of these

559. ..... is done by removing the specimen from frozen state (liquid nitrogen stage) and transferring them in a water bath at 35–40°C or about 1–2 min. or until specimen is warmed up

a. Freezing
b. Thawing
c. Regeneration
d. None of these

Ans. (b) Thawing

560. Polyploid shows chromosomal abnormalities ..... than diploids

a. Less
b. Very less
c. More
d. None of these

Ans. (c) More

561. "Ruseet Burbank" cultivars of potato have originated from ..... protoplast

a. Root
b. Leaf
c. Shoot
d. None of these

Ans. (b) Leaf

562. Which of the following technology is used for Virus Indexing for biological material?

a. Sap of plants to test virus infection
b. TEM serology
c. ELISA
d. All of the above

Ans. (d) All of the above

563. When somatic embryos are transferred on induction medium they give rise to secondary somatic embryos. This method obtaining embryos recurrently is termed

a. Cyclic embryogenesis
b. Repetitive embryogenesis
c. Both A and B
d. None of these

Ans. (c) Both A and B

564. In case of indirect embryogenesis cells require redetermination through in a period in culture and this is termed

a. Induced embryogenic determined cells
b. Pre-embryogenic determined cells
c. Both A and B
d. None of these

Ans. (a) Induced embryogenic determined cells

565. In case of direct embryogenesis cells of explanted tissues are already determined for embryogenic development, and this is known as

a. Induced embryogenic determined cells
b. Pre-embryogenic determined cells
c. Both A and B
d. None of these

Ans. (b) Pre-embryogenic determined cells

566. When explants produce callus and the callus forms embryos then it is called

a. Indirect embryogenesis
b. Direct embryogenesis
c. Both A and B
d. None of these

Ans. (a) Indirect embryogenesis

567. When embryogenesis occurs directly on the explants without production of callus, it is known as

a. Indirect embryogenesis
b. Direct embryogenesis
c. Both A and B
d. None of these

Ans. (b) Direct embryogenesis

568. What is the intensity of fluorescent light, in general, in environmentally controlled culture room?

a. 3000 lux
b. 1000 lux
c. 2000 lux
d. None of these

Ans. (a) 3000 lux

569. What is the percentage of relative humidity that is maintained normally in environmentally controlled culture room?

a. 30–40 b. 20–30
c. 60–70 d. None of these

Ans. (c) 60–70

570. The ratio of light: dark period in environmentally controlled culture room normally is

a. 11:8 b. 14:6
c. 16:8 d. None of these

Ans. (c) 16:8

571. In which plant, virus, vein mottle virus, ring spot virus can be eliminated by meristem culture

a. *Dianthus barbatus*
b. *Ipomoea batata*
c. *Allium sativum*
d. *Chrysanthemum sp.*

Ans. (a) *Dianthus barbatus*

572. In which plant Turnip mosaic virus and CaMV were shown to be eliminated by meristem culture

a. *Brassica oleracea* b. *Ipomoea batata*
c. *Allium sativum* d. *Chrysanthemum sp.*

Ans. (a) *Brassica oleracea*

573. In which plant, virus B has been shown to be eliminated by meristem culture

a. *Brassica oleracea*
b. *Dianthus barbatus*
c. *Allium sativum*
d. *Chrysanthemum sp.*

Ans. (d) *Chrysanthemum sp.*

574. In which plant mosaic virus was demonstrated to be eliminated by meristem culture

a. *Brassica oleracea*
b. *Dianthus babatus*
c. *Allium sativum*
d. *Chrysanthemum sp.*

Ans. (c) *Allium sativum*

575. Sugars, sugars alcohols, polyvinyl pyrrolidone, polyethylene glycol (PEG), polyethylene oxide (PEO), hydroxystarch are the examples of ..... type of cryoprotectants

a. Non permeating b. Permeating
c. Both A and B d. None of these

Ans. (a) Non permeating

576. Glycerol, DMSO and methanol are ..... type of cryoprotectants

a. Non permeating
b. Permeating
c. Both A and B
d. None of these

Ans. (b) Permeating

577. All conventional methods of storage failed to prevent losses caused by

a. Economic and political issues
b. Natural disorders
c. Attack of pathogens and pests
d. All of the above

Ans. (d) All of the above

578. The concept of cryopreservation is based on arrest of ..... of biological material stored at the low temperature (–196°C)

a. Imbibition
b. Diffusion
c. Osmosis
d. None of these

Ans. (d) None of these

579. Hydroxyprolie resistant lines of potato showed increased tolerance to

a. Frost
b. Salinity
c. Both A and B
d. None of these

Ans. (c) Both A and B

580. The first report on mutant isolation through plant tissue cultures is on the selection of ..... suspension cells tolerant to high temperature

a. Cicer
b. Antirhinum
c. Linum
d. None of these

Ans. (b) Antirhinum

581. The possible mechanism of metal tolerance in plants is

a. Chelating by specific metal–binding proteins
b. Binding of metal to cell wall
c. Compartmentation of ions in vacuoles
d. All of the above

Ans. (d) All of the above

582. The method which employed for producing virus free plants

a. Grafting of meristems on virus-free plants
b. Heat treatment followed by meristems culture
c. Adventitious shoots formation followed by meristems culture
d. All of the above

Ans. (d) All of the above

583. "Mingo" –the first licensed cultivar of ..... was produced using haploid induced *in vitro* based on chromosome elimination, bulbosum method

a. Oat
b. Barley
c. Wheat
d. None of these

Ans. (b) Barley

584. Which of the following propagules are mostly used for synthetic seeds production in *Arachis hypogaea, Asparagus cooperi, Camellia japonica, Doucus carota, Eucalyptus citriodora*?

a. Axillary buds
b. Shoot buds
c. Somatic embryos
d. All of these

Ans. (c) Somatic embryos

585. Which of the following propagules are mostly used for dynthetic seeds production in *Actinidia dliciosa, Musa sp., Betula pendula, Brassica campestris, Zingiber officinale, Rubus sp.*

a. Axillary buds
b. Shoot buds
c. Somatic embryos
d. All of these

Ans. (b) Shoot buds

586. An encapsulation machine can produce ..... embryos per hour

a. 2000
b. 4000
c. 6000
d. None of these

Ans. (c) 6000

587. Alginate artificial seeds are

a. Transparent
b. Non-inhibitory
c. Spherical
d. All of the above

Ans. (d) All of the above

588. Shoot tips excised from the shoot culture of banana are generally encapsulated in .....% sodium alginate solution

a. 1
b. 2
c. 3
d. None of these

Ans. (c) 3

589. ..... gave the concept of artificial seeds for the first time

a. Ganapathy
b. T. Murashige
c. Both A and B
d. None of these

Ans. (b) T. Murashige

590. Desiccated synthetic seeds are produced by coating somatic embryo in

a. Polyoxyethylene glycol
b. Calcium alginate
c. Both A and B
d. None of these

Ans. (a) Polyoxyethylene glycol

591. In hydrated synthetic seed, somatic embryos are encapsulated in

a. Polyoxyethylene glycol
b. Calcium alginate
c. Both A and B
d. None of these

Ans. (b) Calcium alginate

592. Water soaking was described as "Vitrification" by

a. Hussey
b. Debergh
c. Anonymus
d. None of these

Ans. (b) Debergh

593. Which auxin is required for embryo induction as in case of cereal crops?

a. IBA
b. NAA
c. IAA
d. 2, 4-D

Ans. (d) 2, 4-D

594. The somatic embryo can be used for production of synthetic seeds for direct sowing in the field. This statement is true/false

a. False
b. True
c. Not known
d. None of these

Ans. (b) True

595. ..... coined the turn "totipoten" to denote the capacity of cell to develop into an organism by regeneration

a. White
b. Steward
c. Morgan
d. None of these

Ans. (d) None of these

596. Microorganism may be present in nutrient medium at the time of its preparation. These microorganisms can be destroyed by proper plugging and autoclaving the culture flasks. Medium is sterilized completely by maintaining it at ..... °C for about 20 minutes at pressure of ..... kg cm^2 in autoclave

a. 121, 2.0–2.5
b. 121, 1.0–1.5
c. 96, 2.0–2.5
d. None of these

Ans. (b) 121, 1.0–1.5

597. The explants may carry micro-organisms hence these are surface sterilized by

a. Sodium hypochlorite
b. Mercuric chloride
c. Both A and B
d. None of these

Ans. (c) Both A and B

598. Among the following, which of the culture is known as "mericloning"

a. Meristem culture
b. Stem culture
b. Root culture
c. None of these

Ans. (a) Meristem culture

599. Successful culture of tomato roots was demonstrated by

a. Carlson
b. Philip White
c. Steward
d. Morel and Martin

Ans. (d) Morel and Martin

600. Fast achievement of protoplast fusion was shown by

a. Moral and Martin
b. Steward
c. Carlson
d. Power

Ans. (d) Power

601. Selection of biochemical mutants *in vitro* was done by

a. Philip White
b. Skoog and Miller
c. Carlson
d. Tekebe

Ans. (c) Carlson

602. First successful isolation from a suspension culture of *Catharanthus roseus* was by

a. Morel and Martin
b. Gautheret
c. Philip White
d. Erikson and Jonassen

Ans. (d) Erikson and Jonassen

603. Publication of first extensive handbook on plant tissue culture was made by

a. Morel and Martin
b. Gautheret
c. Philip White
d. Erikson and Jonassen

Ans. (b) Gautheret

604. Somatic hybridization of tomato and potato was demonstrated by

a. Melchers
b. Kohn
c. Krens
d. Chilton

Ans. (a) Melchers

605. Discovery of Ti–plasmid was made by

a. Pierik b. Chilton
c. Larebeke d. Melchers

Ans. (c) Larebeke

606. Methods to double the chromosome number in microspores of Datura and Nicotiana were given by

a. Nitsch b. Seibert
c. Melchers d. None of these

Ans. (a) Nitsch

607. The production of transformed tobacco plants following single cell transformation or gene insertion was shown by

a. Melchers b. Chilton
c. Krens d. Kohn

Ans. (b) Chilton

608. Protoplast able to incorporate naked DNA was demonstrated by

a. Melchers b. Chilton
c. Krens d. Kohn

Ans. (c) Krens

609. Shoot initiation from cryopreserved shoot apices of carnation was demonstrated by

a. Melchers b. Chilton
c. Krens d. Seibert

Ans. (d) Seibert

610. Which among the following scientists discovered Somaclonal variations?

a. Melchers b. Chilton
c. Larkin and Scowcroft d. Kohn

Ans. (c) Larkin and Scowcroft

611. Embryogenesis from nuclei of unfertilized ovules of *Citrus sinensis* and *Citrus aurantifolia* is reported by

a. Scowcroft b. Chilton
c. Mitra and Chaturvedi d. None of these

Ans. (c) Mitra and Chaturvedi

612. When a plant organ or tissue is put on a culture medium and maintained under optimum growth conditions, the meristematic cells de-differentiate and proliferate to form a mass of cells called

a. Embryoids b. Callus
c. Both A and B d. None of these

Ans. (b) Callus

613. Which of the following species is highly responsive for haploids regeneration?

a. Ranunculaceae b. Gramineae
c. Solanaceae d. All of these

Ans. (c) Solanaceae

614. Cause of cynogenesis in plant is

a. Abortive pollen
b. Allen pollen
c. Delayed pollination
d. All of these

Ans. (d) All of these

615. ..... and ..... obtained the first haploid plants from isolated anthers of Nicotiana tabacum

a. C. Maheshwari b. Bourgin
c. Nitsch d. None of these

Ans. (d) None of these

616. ..... and ..... reported the direct development of embryoids from microspores of *Datura innaxia* by the culture excised anther

a. C. Maheshwari b. Sipra Guha
c. Both a and b d. None of these

Ans. (c) Both a and b

617 ..... for the first time showed that mature pollen grains of *Ginkgo biloba* can be induced to proliferate in culture to produce haploid callus

a. C. Maheshwari
b. Tulecke
c. Sipra Guha
d. None of these

Ans. (b) Tulecke

618. Which of the following is the best example of Cybrid?

a. *Brassica oleracea + B. napus*
b. *Nicotiana tabacum + N. sylvestris*
c. Both a and b
d. None of these

Ans. (c) Both a and b

619. Which of the following is the best example of interfamilial hybrid?

a. *Oryza sativa + Daucus carota*
b. *Nicotiana tabacum + N. sylvestris*
c. Both a and b
d. None of these

Ans. (c) Both a and b

620. Which of the following is the example of inter-generic hybrid?

a. *Medicago sativa* + *Onobrychis vicifolia*
b. *Nicotiana tabacum* + *N. rustica*
c. *Brassica napus* + *B. nigra*
d. All of the above

Ans. (d) All of the above

621. Which of the following is the example of inter-specific hybrid?

a. *Nicotiana tabacum* + *N. rustica*
b. *Solanum pinnoatisectum* + *S. tuberosum*
c. *Brassica napus* + *C. sativus*
d. All of the above

Ans. (d) All of the above

622. To isolate the fusion products and for selection of plant cells for desirable traits, various strategies have been developed

a. Resistance to anti-metabolites
b. Fluorescence activated cell sorting
c. Direct isolation
d. All of the above

Ans. (d) All of the above

623. The nuclei of two protoplast may or may not fuse together even after fusion of cytoplasm. The binucleate cells are known as heterokaryon. The nuclei when get fused, the cell is called hybrids, and when only cytoplasm fuse and genetic information from one of the two nuclei is lost, is called

a. Heteroplast
b. Cybrid
c. Cytoplasmic hybrids
d. All of the above

Ans. (d) All of the above

624. In electric fusion of protoplast, fusion is initiated by the field pulse of voltage range from ..... for ..... microseconds

a. 100V–1 Kv cm^{-1}, 10–1000
b. 500V–3 Kv cm^{-1}, 10–1000
c. 900V–5 Kv cm^{-1}, 10–1000
d. None of the above

Ans. (b) 500V–3 Kv cm^{-1}, 10–1000

625. In some species protoplasts can directly form somatic embryos, these are

a. *Brassica juncea*
b. Citrus
c. Medicago
d. All of these

Ans. (d) All of these

626. The isolated protoplast regenerates new walls around themselves. This can be demonstrated by staining the reconstructed protoplast for 5 min. with a fluorescent dye .....

a. Evans blue
b. Fluorescein diacetate
c. Calcofluor white
d. All of the above

Ans. (d) All of the above

627. The fusion and fusion product of protoplasts are observed in

a. Electron microscope
b. Inverted microscope
c. Phase contrast microscope
d. None of the above

Ans. (b) Inverted microscope

628. High Ca^{2+} ion concentration and pH (10.5) of the incubation mixture ..... fusion process

a. Decreases
b. Facilitates
c. Do not affect
d. None of these

Ans. (b) Facilitates

629. There are several chemical and physical agents, known as fusogen or fusion agents, which help in fusion between protoplasts. These are

a. Dextran sulphate
b. Sodium nitrate
c. Polyethylene glycol
d. All of these

Ans. (d) All of these

630. The positively charged plasma membrane can be obtained in the presence of

a. Synthetic phospholipids
b. Poly–L–lysine
c. Both a and b
d. None of these

Ans. (c) Both a and b

631. The outer membrane surface is negatively charged and varies from

a. –10 mV to –20 mV
b. –10 mV to –50 mV
c. –20 mV to –60 mV
d. None of the above

Ans. (b) –10 mV to –50 mV

632. The contact of protoplasts depends on surface

a. Heat
b. Charge
c. Permeability
d. None of these

Ans. (b) Charge

633. The protoplast fusion requires ..... contact between membrane surfaces

a. Indirect
b. No contact
c. Direct
d. All of these

Ans. (c) Direct

634. A short heat treatment at 45°C for 5 min. improved protoplast division in

a. Pennisetum
b. Wheat
c. Rice
d. All of these

Ans. (d) All of these

635. Suitable temperature for protoplast culture is

a. 20–28°C
b. 19–28°C
c. 24–28°C
d. None of these

Ans. (c) 24–28°C

636. Protoplasts from highly differentiated cell culture require high

a. Auxin–kinetin
b. Auxin/kinetin
c. Kinetin/auxin
d. None of these

Ans. (c) Kinetin/auxin

637. Protoplasts from actively growing cell culture require high

a. Auxin–kinetin
b. Auxin/kinetin
c. Kinetin/auxin
d. None of these

Ans. (b) Auxin/kinetin

638. The presence of ammonium in culture medium is toxic to protoplast of

a. Several fruit tree species
b. Some species of compositae
c. Potato
d. All of these

Ans. (d) All of these

639. Protoplast viability size test can be done through

a. Change in protoplast size induced by changes in the level of osmoticum
b. Measure of photosynthetic and respiratory activities
c. Exclusion of Evans Blue dye
d. All of the above

Ans. (d) All of the above

640. Intact protoplast form pellet. This statement is

a. False
b. True
c. Not known
d. None of these

Ans. (b) True

641. Protoplast suspension is centrifuged at the speed of

a. 200–250 × g/5 min.
b. 100–150 × g/5 min.
c. 50–100 × g/5 min.
d. None of the above

Ans. (c) 50–100 × g/5 min.

642. Protoplasts are counted by

a. Gigermuller counter
b. Haemocytometer
c. Protocytometer
d. None of the above

Ans. (b) Haemocytometer

643. Isolation of protoplast using mechanical methods involves isolation from vacuolated cells of storage tissue such as

a. Mesocarp of cucumber
b. Onion
c. Radish
d. All of the above

Ans. (d) All of the above

644. Somatic embryogenesis involves many stages/ phases that include

a. Regeneration of plants
b. Culture of protoplast
c. Choice of plant material
d. All of the above

Ans. (d) All of the above

645. The first release of a commercial cultivar obtained from protoplast fusion was in

a. 1980
b. 1990
c. 1999
d. None of these

Ans. (b) 1990

646. ..... *et al* obtained the first interspecific hybrid between protoplast of normal Nicotiana sylvisteris and X-ray irradiated protoplast of male sterile *N. tabacum*

a. Fromm
b. Melchers
c. Zelcer
d. None of these

Ans. (c) Zelcer

647. The first intergeneric hybrid (Pomato) between potato and tomato was demonstrated by

a. Fromm
b. Melchers
c. Zelcer
d. None of these

Ans. (b) Melchers

648. Which of the following scientist, was successful in obtaining the first interspecific somatic hybrid using protoplast fusion between Nicotiana glauca and Nicotiana longsdroffui?

a. Carlson
b. Klerckel
c. Takabe
d. None of these

Ans. (a) Carlson

649. Which of the following scientist, with the help of commercially available enzymes, isolated protoplast and able to regenerate whole tobacco plant from mesophyll protoplast?

a. Carlson
b. Klerckel
c. Takabe
d. None of these

Ans. (c) Takabe

650. Which of the following scientist tried to isolate protoplast from plasmolysed higher plant cells by mechanically cutting the cells?

a. Carlson
b. Klerckel
c. Takabe
d. None of these

Ans. (b) Klerckel

651. Protoplast is a ..... individual cell

a. Non-functional
b. Functional
c. Not known
d. None of these

Ans. (b) Functional

652. Protoplasts are the plant cells with a plasma membrane but no

a. Ribosome
b. Mitochondria
c. Cell wall
d. None of these

Ans. (c) Cell wall

653. Which of the following is not an application of plant tissue culture techniques

a. Cultivation of virus-free potato plants
b. Cultivation of octaploid triticale
c. Cultivation of cabbage-labbage hybrid hybrid plants
d. Production of "artificial seeds"

Ans. (b) Cultivation of octaploid triticale

CHECK YOUR GRASP

1. A spin filter bioreactor is a good example of which of the following

a. Air lift bioreactor
b. Continues flow reactor
c. Fed batch reactor
d. Fluidized bed reactor

2. Micropropagation of woody trees presents which of the following problems?

a. Difficulties in rooting
b. Poor growth *in vitro*
c. Browning of medium
d. All of the above

3. Culturing of unfertilized ovaries to obtained haploid plant from egg cell or other haploid cells of the embryo sac is called

a. Meristem culture
b. Anther culture
c. Ovary culture
d. Stem culture

4. Synthetic seeds are

a. Somatic embryo
b. Somaclone
c. Cybrids
d. Protoplast

5. Preservation of cell, tissues and organs in liquid nitrogen at -196°C is called as

a. Thermopreservation
b. Cryopreservation
c. Hydropreservation
d. Helopreservation

6. Introduction of a tobacco mosaic virus transgene in to plants in 1986 was used to demonstrate a process called as

a. Cross protection
b. Co-transfection
c. Co-transformation
d. Co-suspension

7. Most commonly used medium for tissue culture is

a. BS medium
b. MS medium
c. LS medium
d. B6 medium

8. The culture of whole plants and organ is has been termed as

a. Protoplast culture
b. Callus culture
c. Non organised culture
d. Organised culture

9. Which of the following variety was developed from somaclona variation?

a. Delgold
b. A.C. Chang
c. Sigma
d. All of the above

10. Which of the following requirement must be fulfilled by any tissue culture technique that is used for conservation of germplasm?

a. Plant virus elimination from the stored tissues/ organ
b. Genetic variability of the material to be preserved should be guaranteed.
c. Well defined protocol which guarantees a high percentage of plant recovery form stored tissue
d. All of the above

11. Which of the following involves in haploid production?

a. Somaclonal breeding
b. Analytical breeding
c. Hybrid sorting
d. Both b & c

12. The concept of cellular totipotency was given by

a. Skoog and miller
b. Steward
c. Gottlied Haberlandt
d. Helperin and wetherell

13. Root knots are generally due to

a. Symbiotic bacteria
b. Symbiotic cyanobacteria
c. Nematodes
d. Insect larvae

14. The tumour phenotype, which can be maintained indefinitely in tissue culture, results from the expression of genes on the

a. tDNA
b. cDNA
c. rDNA
d. mRNA

In case of less than 80% score, go through brief review and glance once again from chapter

Key: 1-b 2-d 3-c 4-a 5-b 6-a 7-b 8-d 9-c 10-c 11-d 12-c 13-c 14-a

5

Genomic and Proteomics

1. The proportion of coding to non coding sequence in a genome is known as

a. Exon to intron ratio
b. Heterochromatin/Euchromatin ratio
c. p/q ratio
d. Sequence annotation

Ans. (d) Sequence annotation

2. The sequence that helps to identify the starting point of a gene is known as

a. Kozak sequence
b. TATA box
c. CAAT box
d. Shine-dalgarno sequence

Ans. (a) Kozak sequence

3. Which of the following sequence is conserved at the start point of a mRNA?

a. CCGCAUGG
b. GGCCAUGC
c. CGGGUAAG
d. CCCGAUGC

Ans. (a) CCGCAUGG

4. One of the major landmarks for identification of human gene from the sequence data is

a. Alu sequence
b. CpG islands
c. Retrotransposon sequence
d. EcoRI restriction sites

Ans. (b) CpG islands

5. The amount of DNA occupied by coding exon in human genome is about

a. 4%
b. 5%
c. 3%
d. 7%

Ans. (c) 3%

6. Size of Phix 174 genome is

a. 3000 nt
b. 6542 nt
c. 5375 nt
d. 4523 nt

Ans. (c) 5375 nt

7. Recombinant DNA technology was developed in the year

a. 1983
b. 1984
c. 1977
d. 1972

Ans. (d) 1972

8. Term genomics was coined by

a. P. Berg
b. T. Roderick
c. F. Sanger
d. T.B. Lee

Ans. (b) T. Roderick

9. Technique of two dimensional gel electrophoresis for protein separation was developed by

a. P.H.O. farrell
b. F. Sanger
c. E.M. Southern
d. H. Temin

Ans. (a) P.H.O. farrell

10. In 2DE, separation is done on the basis of

a. Charge
b. Mass
c. Both charge and mass
d. None of these

Ans. (c) Both charge and mass

11. For first dimensional separation in 2-DE, the gels used include

a. Polyacrylamide with IPG
b. Polyacrylamide with SDS
c. Normal polyacrylamide
d. None of these

Ans. (a) Polyacrylamide with IPG

12. Genome of the smallest bacterium, Mycoplasma genitelium codes for

a. 498 protein
b. 456 protein
c. 1022 protein
d. 479 protein

Ans. (d) 479 protein

13. Which of the following genomics technology is being used extensively in diagnostics?

a. Gradient PCR
b. qRT-PCR
c. Automated sequencing
d. None of these

Ans. (b) qRT-PCR

14. The private company that produced human genome sequence is

a. Genetic computer group
b. Affymetrix
c. Celera genomics
d. Applied biosystem

Ans. (c) Celera genomics

15. Draft sequence of human genome was published in

a. 2000 b. 2001
c. 2002 d. 2003

Ans. (a) 2000

16. Sequencing technique used by Celera Genomics for rapid genome sequencing was

a. End sequencing
b. Map based cloning
c. Pyrosequencing
d. Shotgun sequencing

Ans. (d) Shotgun sequencing

17. Draft genome of human was published by

a. Celera genomics
b. National institute of health
c. None of these
d. Both a and b

Ans. (c) None of these

18. Sequencing of Drosophila genome was done by

a. Celera Genomics
b. Berkeley Drosophila Genome Project
c. None of these
d. Both a and b

Ans. (d) Both a and b

19. The genome sequence of the fruit fly was published in the journal

a. Science
b. Nature
c. Genome
d. Genomics

Ans. (a) Science

20. Shotgun sequencing strategy was developed by

a. A. Maxam b. F. Sanger
c. S. Cohen d. J. C. Venter

Ans. (b) F. Sanger

21. The concept of expressed sequence tags was developed by

a. S. Cohen b. J.C. Venter
c. F. Sanger d. None of these

Ans. (b) J.C. Venter

22. EST are

a. Cloned cDNA molecule
b. Cloned cRNA molecule
c. Partially sequenced cloned cDNA molecule
d. None of these

Ans. (c) Partially sequenced cloned cDNA molecule

23. ESTs libraries are sources of

a. Coding regions b. Non coding regions
c. Unique genes d. None of these

Ans. (a) Coding regions

24. First automated sequencing machine was marketed by

a. Bio-rad b. Applied biosystems
c. Perkin-elmer d. Invitrogen

Ans. (b) Applied biosystems

25. The person credited for development of automated sequencer is

a. L. Hood b. J.C. Venter
c. F. Sanger d. None of these

Ans. (a) L. Hood

26. Nobel prize in chemistry in 1980 was received by

a. P. Berg b. F. Sanger
c. W. gilbert d. All of these

Ans. (d) All of these

27. The scientist who received Nobel prize in chemistry in 1958 as well as 1980 was

a. F. Sanger b. P. berg
c. W. gilbert d. None of these

Ans. (a) F. Sanger

28. F. Sanger received Nobel prize in chemistry for developing

a. DNA sequencing methods
b. Protein sequencing

c. Both a and b
d. None of these

Ans. (c) Both a and b

29. Draft sequence of mouse genome was published by

a. Celera genomics
b. National institute of health
c. Department of energy
d. None of these

Ans. (d) None of these

30. Bacterium having anti-tumorigenic activity that has been sequenced recently is

a. *Clostridium novyi*
b. *Bacillus subtilis*
c. *Xanthomonas campestris*
d. None of these

Ans. (a) *Clostridium novyi*

31. Restriction enzymes was first isolated by

a. H. Smith
b. M. Meselson
c. S. Luria
d. D. Baltimore

Ans. (a) H. Smith

32. First type II restriction enzyme was isolated from

a. *E. coli*
b. *S. aureus*
c. *H. influenzae*
d. None of these

Ans. (c) *H. influenzae*

33. Credit for discovery of first type II restriction enzyme goes to

a. S. Luria
b. H. smith
c. B. hohn
d. W. arber

Ans. (b) H. smith

34. The plasmid vector used for development of first recombinant DNA molecule was

a. Puc19
b. Psc101
c. pBR 322
d. Puc18

Ans. (b) Psc101

35. Type II restriction enzyme that was isolated first

a. Eco RI
b. Sma I
c. HindIII
d. Hind II

Ans. (d) Hind II

36. Host controlled restriction modification was discovered in

a. *E. coli*
b. *Sma I*
c. *H. influnzae*
d. *S. aureus*

Ans. (a) *E. coli*

37. Phenomenon of restriction modification was reported by

a. W. Arber
b. D. Nathans
c. J. Lederberg
d. H. Smith

Ans. (a) W. Arber

38. Type I restriction enzymes are

a. ATP independent
b. Methylation sensitive
c. Used in genetic engineering
d. Artificially designed

Ans. (b) Methylation sensitive

39. EcoRI was discovered by

a. J. Hedgepeth, H.M. Goodman and H.W. Boyer
b. S.cohen and H.W. Boyer
c. W. Arber and D. Nathans
d. None of these

Ans. (a) J. Hedgepeth, H.M. Goodman and H.W. Boyer

40. The restriction enzyme used by cohen and boyer to create recombinant DNA molecule was

a. Hind III
b. Hind II
c. Sma I
d. Eco RI

Ans. (d) Eco RI

41. Sma 1 is a

a. Sticky end hexacutter
b. Blunt end hexacutter
c. Sticky end tetracutter
d. Blunt end tetracutter

Ans. (b) Blunt end hexacutter

42. Taq 1 is a

a. Sticky end tetracutter
b. Blunt end hexacutter
c. Blunt end tetracutter
d. Sticky end hexacutter

Ans. (a) Sticky end tetracutter

43. Which of the following restriction enzyme is methylation insensitive?

a. Sma 1
b. Eco RI
c. Sau 3A
d. Hind III

Ans. (c) Sau 3A

44. As carrier host for cloned DNA fragment, a bacterium should be

a. Fast growing
b. Auxotroph
c. Restriction deficient
d. Resistant to antibiotics

Ans. (c) Restriction deficient

45. Nobel prize physiology or medicine in 1978 was awarded for

a. Development of DNA sequencing methods
b. Discovery of restriction endonucleases
c. Discovery of transposons
d. Construction of recombination

Ans. (b) Discovery of restriction endonucleases

46. Nobel prize in physiology or medicine in 1978 was awarded

a. W. Arber
b. H. Smith
c. D. Nathans
d. All of them

Ans. (d) All of them

47. Which of the following vector system is specific for plant?

a. TAC
b. BAC
c. MAC
d. YAC

Ans. (a) TAC

48. Which of the following vector is extensively used for chromosome physical mapping?

a. Plasmid
b. YIP
c. BAC
d. MAC

Ans. (c) BAC

49. *Lac Z* is used as a

a. Reporter gene
b. Promoter sequence
c. Selectable marker
d. Helper plasmid

Ans. (a) Reporter gene

50. pUC vectors have been developed in

a. University of Florida
b. University of California
c. University of Louisiana
d. University of Copenhagen

Ans. (b) University of California

51. A multiple cloning site is present in

a. pBR327
b. pUC19
c. pBR322
d. RSF 2124

Ans. (b) pUC19

52. The number of antibiotic resistance gene present in pBR322 is

a. 2
b. 3
c. 4
d. 5

Ans. (a) 2

53. Which of the following is a common expression vector?

a. pUC 18
b. pUC 327
c. pBR322
d. λ gt11

Ans. (d) λ gt11

54. Which of the following is a replacement vector?

a. Charon-40
b. λgt15
c. λgt11
d. pBR322

Ans. (a) Charon-40

55. A stuffer fragment is present in

a. Insertion vector
b. Replacement vector
c. Both of these
d. None of these

Ans. (b) Replacement vector

56. *In vitro* DNA packaging is observed in

a. BAC
b. YAC
c. MAC
d. Cosmid vector

Ans. (d) Cosmid vector

57. Which of the following is a phagemid vector?

a. pBR322
b. λgt11
c. λ-ZAP11
d. pUC19

Ans. (c) λ-ZAP11

58. Cosmids can clone up to

a. 10 kb DNA
b. 30 kb DNA
c. 40 kb DNA
d. 50 kb DNA

Ans. (d) 50 kb DNA

59. Which of the yeast based vector are present in high copy number?

a. YEps
b. YRPs
c. YAC
d. Yips

Ans. (a) YEps

60. Which of the yeast based vector can carry very large DNA segment?

a. YAC
b. BAC
c. MAC
d. Cosmid

A ns. (a) YAC

61. A yeast shuttle vector can be cloned in

a. Yeast only
b. *E. coli* only
c. Both of these
d. None of these

Ans. (c) Both of these

62. λ-ZAP vector can clone about

a. 20 kb DNA b. 10 kb DNA
c. 30 kb DNA d. 40 kb DNA

Ans. (b) 10 kb DNA

63. Baculovirus vectors are

a. ds DNA b. ss DNA
c. ds RNA d. ss RNA

Ans. (a) ds DNA

64. SV 40 vector are

a. ds DNA b. ds RNA
c. ss DNA d. ss RNA

Ans. (a) ds DNA

65. Retroviral vectors are

a. ds RNA b. ss DNA
c. ds DNA d. ss RNA

Ans. (a) ds RNA

66. Vectors based on BPV have plasmid components of

a. Cosmid vectors b. pBR322
c. pUC vector d. pBluescript vector

Ans. (b) pBR322

67. Which of the following is a retroviral vector used in animal cloning?

a. MLV b. EBV
c. BPV d. SV 40

Ans. (a) MLV

68. *Gag* and *pol* genes are present in

a. Adenoviral vectors b. Retroviral vectors
c. Both of these d. None of these

Ans. (b) Retroviral vectors

69. Which of the following virus uses reverse transcription?

a. HIV b. BPV
c. Baculovirus d. None of these

Ans. (a) HIV

70. Which of the following vectors are used widely in plant genetic transformation?

a. Cosmid vector
b. Plasmid vector
c. Bacteriophage vector
d. BAC vector

Ans. (b) Plasmid vector

71. Which of the following measure is most widely used to construct a genetic map

a. Chromosome mutation
b. Non independent segregation
c. Chromosomal exchange
d. Physical demarcation on chromosome

Ans. (b) Non independent segregation

72. In human, distance between two loci and recombination frequency show

a. Linear relationship for long distance
b. Logarithmic relationship for long distances
c. Curvilinear relationship for long distance
d. Inverse relationship for long distance

Ans. (c) Curvilinear relationship for long distance

73. One of the common techniques for human genetic analysis is

a. Hybridization and segregation analysis
b. Pedigree analysis
c. Both of these
d. None of these

Ans. (c) Both of these

74. For indirect estimation of linkage in human, which method is most common?

a. Monte carlo simulations
b. Maximum likelihood
c. Expectation maximization
d. None of these

Ans. (b) Maximum likelihood

75. LOD score is used for

a. Gene identification b. Genetic mapping
c. Physical mapping d. Gene sequencing

Ans. (b) Genetic mapping

76. A LOD score of 3 indicates

a. No linkage
b. Low probability linkage
c. Independent segregation during meiosis
d. High probability of linkage

Ans. (d) High probability of linkage

77. A map where markers are placed in their most likely position is known as a

a. Saturated map
b. Gene map
c. Comprehensive map
d. Approximate map

Ans. (c) Comprehensive map

78. A map where individual loci are placed in such a way so that each loci is linked to another with LOD score of at least 3 is known as

a. Comprehensive map
b. Framework map
c. Inclusive map
d. Approximate map

Ans. (b) Framework map

79. Which of the following banding technique should be used to located rRNA gene?

a. C-banding
b. N-banding
c. G-banding
d. R-banding

Ans. (b) N-banding

80. Chromosome banding is widely used in

a. Tumor cell diagnosis
b. Detection of somatic cell hybrid
c. Karyotype construction
d. All of these

Ans. (d) All of these

81. Chromosome banding technique was first discovered by

a. J.G. Gall
b. M. L. Pardue
c. T. Casperson
d. All of them

Ans. (c) T. Casperson

82. In R-banding, the stain used is

a. Rhodamine red
b. Texas red
c. Quinacrine mustard
d. Giemsa

Ans. (d) Giemsa

83. Q-banding, was discovered by

a. T. Casperson
b. R. Feulgen
c. J.G. Gall
d. M. L. Pardue

Ans. (a) T. Casperson

84. Concept of chromosome walking was developed by

a. W. Bender
b. E. Lander
c. D. Botstein
d. D. C. Schwart

Ans. (a) W. Bender

85. If the distance between two loci is large, recombination frequency and map distance follows

a. Normal distribution
b. Poisson distribution
c. Binomial distribution
d. None of these

Ans. (b) Poisson distribution

86. The concept of mapping function was developed by

a. K. Pearson
b. R. A. Fisher
c. J.B.S. Haldane
d. S. Wright

Ans. (c) J.B.S. Haldane

87. Human-rodent somatic cell hybridization is a technique of

a. Production of transgenic rodent
b. Somatic cell line identification
c. Assigning of gene to chromosome
d. Comparative genome

Ans. (c) Assigning of gene to chromosome

88. Common fusion agent used in somatic cell hybridization of human and rodent is

a. Calcium phosphate
b. Sendai virus
c. Electric shock
d. Magnesium sulphate

Ans. (b) Sendai virus

89. The number of fragments generated by a restriction enzyme depends on

a. The nature of the restriction enzyme
b. The length of the recognition sequence
c. The GC content of the fragment
d. All of these

Ans. (d) All of these

90. *In situ* hybridization is used for

a. Genetic mapping
b. Physical mapping
c. Both of these
d. None of these

Ans. (b) Physical mapping

91. Radioactivity is used in

a. GISH
b. FISH
c. mcFISH
d. Chromosome painting

Ans. (a) GISH

92. Which of the fluorescing agent produce red color?

a. FITC
b. AMCA
c. Rhodamine
d. None of these

Ans. (c) Rhodamine

93. The color produced by FITC is

a. Green
b. Yellow
c. Orange
d. Red

Ans. (a) Green

94. *In situ* hybridization is performed on

a. Metaphase chromosome
b. Interphase chromosome
c. Both of these
d. None of these

Ans. (c) Both of these

95. Which of the following is a common vector used for large scale human genome sequencing?

a. BAC b. MAC
c. YAC d. PAC

Ans. (a) BAC

96. ESTs are generated from

a. Gene sequence b. mRNA sequence
c. Protein sequence d. None of these

Ans. (b) mRNA sequence

97. FISH can be used for mapping

a. YAC clones
b. Repetitive sequences
c. Centromeric regions
d. All of these

Ans. (d) All of these

98. Physical mapping of a gene avoiding large intron region can be achieved by

a. Chromosome jumping
b. Chromosome walking
c. Chromosome painting
d. Fiber FISH

Ans. (a) Chromosome jumping

99. Which of the following is not a physical mapping procedure?

a. Positional cloning
b. Chromosome banding
c. Radiation hybrid mapping
d. HAPPY mapping

Ans. (a) Positional cloning

100. In FISH, probes are labelled with

a. FITC b. AMCA
c. Biotin d. Texas red

Ans. (c) Biotin

101. Which of the following is not a labeling agent for probe in FISH?

a. Biotin b. Digoxigenin
c. AMCA d. None of these

Ans. (c) AMCA

102. A hapten is a

a. Staining agent b. Clearing agent
c. Reporter molecule d. Conjugative antibody

Ans. (c) Reporter molecule

103. Which of the following is a hapten?

a. Biotin b. FITC
c. Saponin d. Pheny mercuric acetate

Ans. (a) Biotin

104. In chromosome painting, biotin is used for labelling for detection of

a. Texas red b. FITC
c. Both of these d. None of these

Ans. (a) Texas red

105. In chromosome painting, Digoxigenin is used for labelling for detection of

a. Texas red b. FITC
c. Both of these d. None of these

Ans. (b) FITC

106. For separation of individual chromosomes which of the following method can not be used?

a. Somatic cell hybridization
b. Radiation Hybridization
c. FACS
d. None of these

Ans. (b) Radiation Hybridization

107. Somatic cell hybridization is performed by

a. Polyethylene glycol b. Sendai virus
c. Both of these d. None of these

Ans. (c) Both of these

108. Common selection system for identification of human-mouse hybrid cell is

a. Resistance to 8-Azaguanine
b. Mutation in hypoxanthine phosphoribosyl transferase
c. Mutation in thymidine kinase
d. All of these

Ans. (d) All of these

109. HAT medium, a medium for selection of hyman-mouse hybrid cell contain

a. Hypersensitive adenine and thymidine
b. Hypoxanthine, aminopterin and thymidine
c. Hypoxanthine, auxin and tetracycline
d. None of these

Ans. (b) Hypoxanthine, aminopterin and thymidine

110. Radiation hybrid mapping was first described by

a. S.J. Goss and H. Harris b. N.R.Carter *et al*
c. T.R. Chen d. G. Pontecorvo

Ans. (a) S.J.Goss and H. Harris

111. Technique of reverse chromosome painting was described by

a. S.J. Goss and H. Harris
b. N.R. Carter *et al*
c. T.R. Chen
d. G. Pontecorvo

Ans. (b) N.R. Carter *et al*

112. The technique of muticolor FISH was developed by

a. S.J. Goss and H. Harris b. N.R. Carter *et al*
c. T.R. Chen d. P.M. Nederlof *et al*

Ans. (d) P.M. Nederlof *et al*

113. The concept of in situ hybridization was developed by

a. S.J. Goss and H. Harris
b. N.R. Carter *et al*
c. T.R. Chen
d. M.L. Pardue and J.G. Gall

Ans. (d) M.L. Pardue and J.G. Gall

114. T-Banding technique was developed by

a. Sumner b. Pardue and gall
c. Dutrillaux d. Casperson

Ans. (c) Dutrillaux

115. Which of the following banding pattern is reverse to G-Banding?

a. T-banding b. R-banding
c. C-banding d. Q-banding

Ans. (b) R-banding

116. The terminator used in sanger sequencing method is

a. 3′, 4′-dideoxynucleotide riphosphate
b. 2′, 3′-dideoxynucleotide triphosphate
c. 1′, 4′-dideoxynucleotide riphosphate
d. 3′, 6′-dideoxynucleotide riphosphate

Ans. (b) 2′, 3′-dideoxynucleotide triphosphate

117. The vector used in sanger sequencing method is

a. Phage M13 b. Phage T2
c. Coliphage P1 d. Bacteriophage λ

Ans. (a) Phage M13

118. Most widely used automated non-sanger method of DNA sequencing is

a. Pyrosequencing
b. Sequencing by Chemical modification
c. Both of these
d. None of these

Ans. (a) Pyrosequencing

119. Sanger sequencing method use

a. Antibody detection b. Conjugate detection
c. Radioactive detection d. Fluorescent detection

Ans. (c) Radioactive detection

120. Automated sequencing method use

a. Antibody detection b. Fluorescent detection
c. Radioactive detection d. Conjugate detection

Ans. (b) Fluorescent detection

121. Technique of pyrosequencing was described first by

a. F. Sanger b. A.R. Coulson
c. D.J. Harrison d. E. D. Hyman

Ans. (c) D.J. Harrison

122. Idea of capillary array electrophoresis for sequencing was developed by

a. F. Sanger b. A.R. Coulson
c. D.J. Harrison d. E. D. Hyman

Ans. (c) D.J. Harrison

123. In pyrosequencing, light energy is released by the action of

a. ATP sulfurylase b. Luciferase
c. Both of these d. None of these

Ans. (c) Both of these

124. Which of the following is true

a. It involves chain termination method
b. It can sequencing large DNA fragments
c. It involves chain extension by DNA polymerase
d. Pyrosequencing uses a fluorescent detection process

Ans. (c) It involves chain extension by DNA polymerase

125. RNAi was first reported in

a. *A. thaliana*
b. *D. melanogaster*
c. C. elegans
d. Human

Ans. (c) C. elegans

126. The technique of radioimmunoassay was developed by

a. R. S. Yalow and S. A. Berson
b. E. Engvall and P. Periman
c. Both of them
d. None of these

Ans. (a) R. S. Yalow and S. A. Berson

127. ELISA technique was developed by

a. R. S. Yalow and S. A. Berson
b. E. Engvall and P. Periman
c. Both of them
d. None of these

Ans. (b) E. Engvall and P. Periman

128. The term transcriptome was coined by

a. F. Crick
b. D. Baltimore
c. S. Brenner *et al*
d. V. Velculescu *et al*

Ans. (d) V. Velculescu *et al*

129. Gene chip is a microarray system marketed by

a. Promega
b. Sigma
c. Affymetrix
d. bioRad

Ans. (c) Affymetrix

130. The microarray system that do not require cloning is

a. cDNA microarray
b. Oligo-nt microarray
c. Both of these
d. None of these

Ans. (b) Oligo-nt microarray

131. MIAME stands for

a. Mining information about a microarray experiment
b. Major information About a Microarray experiment
c. Minimum information about a Microarray experiment
d. None of these

Ans. (c) Minimum information about a Microarray experiment

132. The guideline of MIAME was proposed to share microarray data by

a. Gene expression omnibas
b. NHGRI
c. Array express
d. Micro array gene expression data society

Ans. (d) Micro array gene expression data society

133. SAGE technique was invented by

a. R.S. Yalow and S.A. Berson
b. E. Engvall and P. Periman
c. V. Velculescu *et al*
d. None of these

Ans. (c) V. Velculescu *et al*

134. The length of ESTs used in SAGE is about

a. 5–10 nt
b. 20–25 nt
c. 9–14 nt
d. 10–20 nt

Ans. (c) 9–14 nt

135. Global expression profiling was accomplished first in

a. Maize
b. Yeast
c. Drosophila
d. Arabidopsis

Ans. (b) Yeast

136. Technique of DNA synthesis on microarray chip was developed by

a. R. S. Yalow and S. A. Berson
b. E. Engvall and P. Periman
c. S. Fodor *et al*
d. Both a and b

Ans. (c) S. Fodor *et al*

137. An Affymetrix gene chip can handle..... probes per square cm

a. 64000
b. 22000
c. 37000
d. 32000

Ans. (a) 64000

138. Higher specific hybridization is observed in

a. Spotted microarray
b. Oligo microarray
c. Both of these
d. None of these

Ans. (a) Spotted microarray

139. *In silico* chip designing is possible in

a. Spotted microarray
b. Oligo microarray
c. Both of these
d. None of these

Ans. (b) Oligo microarray

140. MPSS technique was developed by

a. R.S. Yalow and S.A. Berson
b. E. Engvall and P. Periman
c. Brenner *et al*
d. None of these

Ans. (c) Brenner *et al*

141. Fluorescence based sequencing is used in

a. MPSS b. SAGE
c. ELISA d. RNA dot blot

Ans. (a) MPSS

142. Tags and anti-tags are used in

a. SAGE b. MPSS
c. Two hybrid system d. None of these

Ans. (b) MPSS

143. The enzyme used in homomeric tailing is

a. Terminal transferase
b. Deoxynucleotidyl transferase
c. Reverse transcriptase
d. DNA polymerase

Ans. (b) Deoxynucleotidyl transferase

144. In which of the processes specific and different primers are used for II strand PCR amplification?

a. Homomeric tailing b. Adapter ligation
c. Template switching d. None of these

Ans. (b) Adapter ligation

145. Which of the following technique can not be used for analysis of whole Transcriptome at a time?

a. Template switching b. Adapter ligation
c. Homomeric tailing d. Multiplex-PCR

Ans. (d) Multiplex-PCR

146. Which of the following gene expression technique is quicker to perform?

a. MPSS b. SAGE
c. AP-PCR d. DNA microarray

Ans. (c) AP-PCR

147. The length of the signature sequence of MPSS is

a. 12 nt b. 15 nt
c. 17 nt d. 19 nt

Ans. (c) 17 nt

148. The technique which does not require any previous knowledge about cellular RNA sequence is

a. SAGE b. MPSS
c. Both of these d. None of these

Ans. (b) MPSS

149. The length of tag in SAGE is about

a. 14 nt b. 15 nt
c. 17 nt d. 10 nt

Ans. (a) 14 nt

150. Yeast two hybrid assay for proteome analysis was developed by

a. R.S. Yalow and S.A. Berson
b. E. Engvall and P. Periman
c. S. Fields and O. Song
d. C. Sandchez *et al*

Ans. (c) S. Fields and O. Song

151. The term interactome is related to

a. Protein-protein interaction
b. DNA-RNA interaction
c. DNA-DNA interaction
d. DNA-protein interaction

Ans. (a) Protein-protein interaction

152. Term interactome was coined by

a. R.S. Yalow and S.A. Berson
b. E. Engvall and P. Periman
c. C. Sanchez *et al*
d. None of these

Ans. (c) C. Sanchez *et al*

153. What is the most sensitive method for protein staining in electrophoresis

a. Silver staining
b. Staining with fluorescent molecule
c. Staining with bromopenol blue
d. None of these

Ans. (a) Silver staining

154. Technique of peptide mass fingerprinting was developed by

a. D. J. Pappin *et al* b. S. Brenner *et al*
c. F. Sanger d. None of these

Ans. (a) D. J. Pappin *et al*

155. Protein sequencing method was developed by

a. F. Sanger b. S. Brenner *et al*
c. D.J. Pappin *et al* d. None of these

Ans. (a) F. Sanger

156. Technique of 2-DE was developed by

a. P. H. O'farrell b. F. Sanger
c. D. J. Fappin *et al* d. None of these

Ans. (a) P. H. O'farrell

157. A carrier ampholyte is used in

a. 2-DE b. NMR spectroscopy
c. Mass spectroscopy d. Protein sequencing

Ans. (a) 2-DE

158. The function of carrier ampholyte is

a. Denature protein
b. Create pH gradient
c. Stain protein bands
d. Used as loading mixture

Ans. (b) Create pH gradient

159. In first dimensional analysis of 2-DE proteins migrate to

a. The end of the gel
b. Starting point of the gel
c. The isoelectric point of the protein
d. Do not migrate at all

Ans. (c) The isoelectric point of the protein

160. Immobilized pH gradient is used in

a. 2-DE
b. Mass spectroscopy
c. NMR spectroscopy
d. Protein sequencing

Ans. (a) 2-DE

161. In 2-DE protein get separated on the basis of

a. Isoelectric point
b. Molecular weight
c. Both of these
d. None of these

Ans. (c) Both of these

162. Relation between TOF and molecular weight can be expressed as

a. TOF = k v(m/z)
b. TOF = k v(z/m)
c. TOF = k v(m-z/z)
d. TOF = k v(z-m/z)

Ans. (a) TOF = k v(m/z)

163. MALDI technique was developed by

a. P. H. O′ Farrell
b. M. Karas and F. Hillenkamp
c. Both a and b
d. None of these

Ans. (b) M. Karas and F. Hillenkamp

164. PIR stands for

a. Protein internet resource
b. Protein information resource
c. Protein information report
d. None of these

Ans. (b) Protein information resource

165. Which of the following database is not related to protein sequence characterization?

a. Uniport
b. Swiss port
c. Array express
d. PIR

Ans. (c) Array express

166. GMP is a regulatory system developed by

a. WHO
b. WTO
c. FAO
d. UN

Ans. (a) WHO

167. GMP stands for

a. Genetically modified protein
b. Gross modification of property
c. Good manufacturing practice
d. Good marketing potential

Ans. (c) Good manufacturing practice

168. GMP regulation is applicable to

a. Agrochemical industry
b. Pharmaceutical industry
c. Biotechnology industry
d. Food industry

Ans. (b) Pharmaceutical industry

169. The term franken food is applied by some NGO to describe

a. Genetically modified food
b. Transgenic animal
c. Transgenic plant
d. Harmful elements in food

Ans. (a) Genetically modified food

170. Which of the following gene is not considered desirable in genetically modified foods?

a. Luciferase reporter gene
b. Antibiotic marker gene
c. Gus reporter gene
d. Beta-Galactosidase marker gene

Ans. (b) Antibiotic marker gene

171. Chance of gene escape from plants is higher through

a. Recombination
b. Asexual propagation
c. Intake of food
d. Pollen dispersal

Ans. (d) Pollen dispersal

172. Super bug is

a. Genetically modified bug
b. Supervirulent pathogenic organism created by genetic modification
c. Both a and b
d. None of these

Ans. (b) Supervirulent pathogenic organism created by genetic modification

173. For temporal isolation of transgenic corn, minimum difference in planting days should be

a. 21 days b. 11 days
c. 15 days d. 19 days

Ans. (a) 21 days

174. Environment protection act in India came into effect from

a. 1976 b. 1986
c. 1996 d. 2006

Ans. (b) 1986

175. The guidelines for research in transgenic crops in India was published in

a. 1998 b. 1988
c. 1977 d. 1966

Ans. (a) 1998

176. Recombinant DNA guidelines in India was published in

a. 1980 b. 1990
c. 2000 d. 1988

Ans. (b) 1990

177. National containment facility for testing transgenic plants is available in

a. BARC, Mumbai b. IISC, Bangalore
c. CCMB, Hyderabad d. NBPGR, New Delhi

Ans. (d) NBPGR, New Delhi

178. Genetically modified seeds with ..... technology is banned in India

a. Electroporation b. GURT
c. Antibiotic transfer d. None of these

Ans. (b) GURT

179. GURT stands for

a. Genetic use regulation technology
b. Genetic use regulation treaty
c. Genetic use restriction technology
d. Gene use regulation technology

Ans. (c) Genetic use restriction technology

180. A biosafety protocol in the montreal convention on biological Diversity was developed in the Year

a. 1988
b. 1998
c. 1999
d. 2000

Ans. (b) 1998

181. A guideline of safety in biotechnological application in 1986 was developed by

a. Organization of economic cooperation and development
b. Convention on biological diversity
c. World health organization
d. Food and agricultural organization

Ans. (a) Organization of economic cooperation and development

182. The international protocol on biosafety of living modified organisms developed by CBD is popularly known as

a. Kyoto protocol
b. Geneva protocol
c. Cartagena protocol
d. Nairobi protocol

Ans. (c) Cartagena protocol

183. The guidelines for research on transgenic plants has been developed by

a. Department of science and technology
b. Department of biotechnology
c. Ministry of Health
d. Ministry of Environment and forestry

Ans. (b) Department of biotechnology

184. Which of the following category of transgenic plant research has higher risk as defined by the DBT guideline?

a. Category I
b. Category II
c. Category III
d. Category IV

Ans. (c) Category III

185. The authority of importing transgenic plants in India lies with?

a. National research centre on biotechnology
b. Ministry of environment and forestry
c. National bureau of plant genetic resources
d. None of these

Ans. (b) Ministry of environment and forestry

186. Guidelines on protection of transgenic plant variety is provided in

a. Plant variety protection and farmers' right act
b. Environment protection act
c. Recombinant DNA guidelines
d. Guidelines for research in transgenic crops

Ans. (a) Plant variety protection and farmers' right act

187. A transgenic plant is

a. A new variety
b. An old variety with new gene
c. An essentially derived variety
d. Does not have variety status

Ans. (c) An essentially derived variety

188. The apex regulatory body on GMO in India is

a. Recombinant DNA advisory committee
b. Review committee on genetic manipulation
c. Department of Biotechnology
d. Genetic engineering approval committee

Ans. (d) Genetic engineering approval committee

189. Secretariat of GEAC is associated with?

a. Ministry of health and family welfare
b. Ministry of environment and forestry
c. Ministry of science and technology
d. None of these

Ans. (b) Ministry of environment and forestry

190. Secretariat of GCGM is associated with?

a. Ministry of health and family welfare
b. Ministry of environment and forestry
c. Ministry of science and technology
d. Department of biotechnology

Ans. (d) Department of biotechnology

191. Regulation on quality of transgenic food is defined by

a. Environment protection act
b. Prevention of food adulteration act
c. Guidelines for research in transgenic crops
d. Recombinant DNA guidelines

Ans. (b) Prevention of food adulteration act

192. According to hierarchy, the regulatory committees can be arranged as

a. GEAC > IBSC > RCGM
b. GEAC > RCGM > IBSC
c. IBSC > GEAC > RCGM
d. None of these

Ans. (b) GEAC > RCGM > IBSC

193. The approval for production of GMO by GEAC is valid up to

a. 1 year
b. 2 year
c. 3 year
d. 4 year

Ans. (d) 4 year

194. Field trials on transgenic plants should get approval from

a. RCGM
b. IBSC
c. SBCC
d. GEAC

Ans. (a) RCGM

195. Controversy on toxicity of Bt-maize is related to

a. Danaus plexippus
b. Agrotis ipsilon
c. Papileo demolius
d. None of these

Ans. (a) Danaus plexippus

196. Primary host of monarch butterfly is

a. Grassy weed
b. Milkweed
c. Convolvulus sp.
d. Phalaris sp.

Ans. (b) Milkweed

197. The toxicity of transgenic Bt maize to Lepidoptoran pests is due to

a. Cry toxin
b. Zein
c. Tab toxin
d. Thuringienin

Ans. (a) Cry toxin

198. Undesirable incorporation of genes in a gene pool is known as

a. Genetic pollution
b. Genetic load
c. Genetic erosion
d. None of these

Ans. (a) Genetic pollution

199. First regulatory guideline on rDNA technology was developed by

a. National institute of health, USA
b. Food and agricultural organization
c. World health organization
d. Organization for economic cooperation and development

Ans. (a) National institute of health, USA

200. The transgenic maize variety that persisted in the seed chain as admixture even four years after withdrawal in USA is

a. Roundup ready
b. Star link
c. Boll guard
d. Yield guard

Ans. (b) Star link

201. The multinational company that released GM cotton in india is

a. Novartis
b. ProAgro
c. Aventis
d. Monsanto

Ans. (d) Monsanto

202. First Indian partner of Monsanto in India for release of GM cotton was

a. MAHYCO b. Rasi
c. ProAgro d. None of these

Ans. (a) MAHYCO

203. The Indian company that had highest share in GM cotton business in India in 2006 is

a. Pro agro b. MAHYCO
c. Rasi seeds d. None of these

Ans. (c) Rasi seeds

204. The Cartagena protocol on Biosafety was developed under the framework of

a. Environment protection Act
b. Convention on biological diversity
c. Food and agricultural organization
d. World health organization

Ans. (b) Convention on biological diversity

205. First patent for GURT technology was given to

a. Syngenta b. Aventis
c. Monsanto d. Delta and Pine Co.

Ans. (d) Delta and pine Co.

206. RAFI stands for

a. Rural and farmers' international
b. Rural and advancement foundation international
c. Rural and foundation international
d. Rural agricultural farmers' international

Ans. (b) Rural and advancement foundation international

207. The terminator technology was coined by

a. Syngenta b. Monsanto
c. RAFI d. None of these

Ans. (c) RAFI

208. The promoter used in terminator technology was

a. LEA b. SV 40
c. TA 29 d. CaMV 35S

Ans. (a) LEA

209. Access factor for *E. coli* K12 is

a. 10^{-3} b. 10^{-2}
c. 10^{-1} d. 10^{-4}

Ans. (a) 10^{-3}

210. Which of the following is not true for GLSP?

a. Host should be non pathogenic
b. The vector should not have resistance marker
c. The carrier organism should be non pathogenic
d. Shuttle vector can not be used

Ans. (d) Shuttle vector can not be used

211. Which of the following experiments are exempted from detailed biosafety analysis?

a. Self cloning experiments
b. Experiments involving plant pathogens
c. Experiments involving animal pathogens
d. Agrobacterium mediated transformation

Ans. (a) Self cloning experiments

212. Cloning of GRAS organisms fall in the

a. Category I experiment
b. Category II experiment
c. Category III experiment
d. None of these

Ans. (a) Category I experiment

213. Field testing of transgenic crop for release as a variety is done by

a. ICAR b. DBT
c. GEAC d. MoEF

Ans. (a) ICAR

214. The Indian company not involved in Bt-cotton variety production

a. Ankur seeds
b. Indoi-American Hybrid Seed Company
c. MAHYCO
d. Rasi Seeds

Ans. (b) Indoi-American Hybrid Seed Company

215. Rooty locus of T-DNA codes for

a. Tryptophan monooxygenase
b. Indoleacetamide hydrolase
c. Indole pentenyl transferase
d. Nopaline synthase

Ans. (c) Indole pentenyl transferase

216. Shooty locus of T-DNA indicate genes

a. iaaH b. iaaM
c. Both of these d. None of these

Ans. (c) Both of these

217. Number of genes prescent in vir region of T-DNA is

a. 25 b. 20
c. 15 d. 10

Ans. (a) 25

218. Size of Ti-plasmid is about

a. 100 bp
b. 100 kb
c. 200 kb
d. 200 bp

Ans. (c) 200 kb

219. Hairy root phenotype is caused by

a. A. Rhizogenes
b. A. Tumefaciens
c. Both of these
d. None of these

Ans. (a) A. Rhizogenes

220. Better expression of vir genes takes place at

a. Alkaline pH
b. Acidic pH
c. Neutral pH
d. None of these

Ans. (b) Acidic pH

221. Octopine is converted by Agrobacterium to produce

a. Pyruvate and arginine
b. Glucose and Alanine
c. Sucrose and nopaline
d. Glucose and arginine

Ans. (a) Pyruvate and arginine

222. In binary plasmid for T-DNA transfer, the direct repeats of T-DNA

a. Are trans to vir region
b. Are absent
c. Are about 50 bp
d. Are present in duplicate copies

Ans. (a) Are trans to vir region

223. During infection, the Agrobacterium cell show

a. Phototropic movement
b. Nastic movement
c. Chemotactic movement
d. No movement

Ans. (c) Chemotactic movement

224. During transfer T-DNA remains as

a. Naked, single stranded
b. Naked double stranded
c. SsDNA –Protein complex
d. dsDNA-protein complex

Ans. (c) SsDNA –Protein complex

225. Acetpsuromgpme at lower concentration acts as

a. Regulator of operon
b. Chemoattractant
c. Inhibitor of host-Agrobacterium ecognition
d. Inducer of T-DNA excision

Ans. (b) Chemoattractant

226. Technique of floral dip for transformation was developed by

a. S.J. Clough and A.F. Bent
b. J.R. Kikkert
c. Both of these
d. None of these

Ans. (a) S.J. Clough and A.F. Bent

227. Acetosyringone at higher concentration acts as

a. Inhibitor of host-Agrobacterium recognition
b. Chemoattractant
c. Regulator of chromosomal operon
d. Inducer of T-DNA excision

Ans. (d) Inducer of T-DNA excision

228. Nopaline is converted by Agrobacterium to produce

a. Glucose and arginine
b. Glutamine and Alanine
c. U-ketoglutarate and agrinine
d. Glutamate and Pyruvate

Ans. (c) U-ketoglutarate and agrinine

229. Site specific endonucleases are encoded by

a. Ipt
b. Vir D
c. Vir G
d. Vir A

Ans. (b) Vir D

230. Size of T-DNA in nopaline type Ti-plasmid is

a. 28 kb
b. 30 kb
c. 25 kb
d. 50 kb

Ans. (c) 25 kb

231. The agrolistic method of transformation was developed by

a. J. R. Kikkert
b. G. Hansen and M.D. Chilton
c. J. C. Sanford
d. None of these

Ans. (b) G. Hansen and M.D. Chilton

232. Vacuum infiltration method of transformation was developed by

a. J. R. Kikkert
b. G.H ansen and M.D. Chilton
c. J. C. Sanford
d. N. Bechtold *et al*

Ans. (d) N. Bechtold *et al*

233. Concept of biolistic transformation was given by

a. J. R. Kikkert
b. G. Hansen and M.D. Chilton
c. J. C. Sanford
d. None of these

Ans. (c) J. C. Sanford

234. The method of pollen tube transformation was developed by

a. J. R. Kikkert
b. G. Hansen and M.D. Chilton
c. Z. X. Luo and R. Wu
d. None of these

Ans. (c) Z. X. Luo and R. Wu

235. Pollen tube transformation was first reported in

a. Wheat
b. Rice
c. Brassica
d. Arubulopsis

Ans. (b) Rice

236. A. Rhizogenes infects

a. Monocots only
b. Gymnosperms
c. Dicots only
d. Both a and c

Ans. (c) Dicots only

237. The gene expressing hairy root phenotype in A. Rhizogenes is

a. ipt
b. ocs
c. rol
d. nos

Ans. (c) rol

238. A gene of A. Rhizogenes that can induce male sterility is

a. rolC
b. rolA
c. rolB
d. ocs

Ans. (a) rolC

239. The technique of liposome mediated transformation in plant was developed by

a. A. Deshayes *et al*
b. A. Crossway *et al*.
c. I. Potrykus
d. J. D. Liu

Ans. (a) Deshayes *et al*

240. During Electroporation the potential of electric current passed is

a. 2–5 kv
b. 10–20 kv
c. 20–30 kv
d. None of these

Ans. (a) 2–5 kv

241. More number of stable transformants can be obtained by

a. Lipofection
b. Electroporation
c. Laser beam
d. Agrobacterium

Ans. (d) Agrobacterium

242. Diameter of gene guns are about

a. 2000–4000 nm
b. 200–400 nm
c. 20–40 nm
d. 2–4 nm

Ans. (a) 2000–4000 nm

243. Silicon carbide fiber was used for gene delivery in plants by

a. H. F. Kaeppler *et al*
b. A. Deshayes *et al*
c. J. C. sanfrd
d. None of these

Ans. (a) H. F. Kaeppler *et al*

244. Technique of microinjection for genetic transformation in plant was first used by

a. G. Neuhaus
b. R. L. Brinster *et al*
c. M. R. Capecchi
d. All of them

Ans. (a) G. Neuhaus

245. The plant that was transformed first using microinjection was

a. Arabidopsis
b. Acetabularia
c. Chlamydomonas
d. Alfalfa

Ans. (b) Acetabularia

246. Laser beam mediated gene delivery in plant cell was performed

a. G. Neuhaus
b. R. L. Brinster *et al*
c. M. R. Capecchi
d. G. Weber

Ans. (d) G. Weber

247. The concept of lipofection was developed by

a. G. Neuhaus
b. R. L. Brinster *et al*
c. M. R. Capecchi
d. P. L. Felgner

Ans. (d) P. L. Felgner

248. Leaf disc transformation technique by Agrobacterium was developed by

a. R. B. Horsch *et al*
b. N. Grimsley *et al*
c. Both of them
d. None of these

Ans. (a) R. B. Horsch *et al*

249. The technique of agroinfection was invented by

a. G. Neuhaus
b. R. L. Brinster *et al*
c. M. R. Capecchi
d. N. Grimsley *et al*

Ans. (d) N. Grimsley *et al*

250. Which of the following detection technique involves antibody?

a. Western blotting
b. Northern blotting
c. Southern blotting
d. None of these

Ans. (a) Western blotting

251. Stable transformation is not required for

a. Transient gene expression assay
b. Development of stable transformation
c. Generation of genetically modified crops
d. None of these

Ans. (a) Transient gene expression assay

252. The concept of transgenic plant vaccine was pioneered by

a. C. Arntgen
b. S. Cohen
c. I. Potrykus
d. A. Dutta

Ans. (a) C. Arntgen

253. Genetic transformation was first performed in the plant

a. Wheat
b. Rice
c. Tobacco
d. Tomato

Ans. (c) Tobacco

254. Macroinjection was first performed in

a. Secale
b. Rice
c. Tobacco
d. Arabidopsis

Ans. (a) Secale

255. Golden rice was developed by

a. I. Potrykus
b. P.beyer
c. Both of these
d. None of these

Ans. (c) Both of these

256. Higher provitamin A containing golden rice has been developed by the biotech company

a. Invitrogen
b. Syngenta
c. Monsanto
d. PPL Therapeutics

Ans. (b) Syngenta

257. Technique of plastid transformation was perfected by

a. P. Beyer
b. P. Maliga
c. A. Dutta
d. C. Arntgen

Ans. (a) P. Beyer

258. First transgenic crop developed in india is

a. Potato
b. Tomato
c. Rice
d. Brassica

Ans. (a) Potato

259. Nutritional enhancement of potato by engineering high protein synthesizing gene was achieved by

a. P. Beyer
b. P. Maliga
c. A. Dutta
d. None of these

Ans. (c) A. Dutta

260. The gene used for genetic engineering of potato for high protein content was obtained from

a. Soybean
b. Amaranthus
c. Groundnut
d. Mungbean

Ans. (b) Amaranthus

261. Bacillus thuringiensis is a

a. Gram positive motile bacteria
b. Gram positive spore forming bacteria
c. Gram negative motile bacteria
d. Gram negative spore forming bacteria

Ans. (b) Gram positive spore forming bacteria

262. Toxic activity of the delta-endotoxin is present in the

a. C-terminal end of the protein
b. N-terminal end of the protein
c. Amino terminal end of the protein
d. At both end of the protein

Ans. (c) Amino terminal end of the protein

263. Which of the following enzyme can cleave protoxin?

a. Endonuclease
b. EPSP synthase
c. Trypsin
d. None of these

Ans. (c) Trypsin

264. Which of the following subspecies of Bt was used most for transgenic crop development?

a. Bt. subsp. Kurstaki
b. Bt. Subsp. Finitimus
c. Bt. Subsp. Dendrohmus
d. None of these

Ans. (a) Bt. subsp. Kurstaki

265. The cry gene are coded in Bt

a. Plasmid
b. Nuclear DNA
c. Both of these
d. None of these

Ans. (c) Both of these

266. First Bt transgenic tobacco was produced by

a. Plant genetic system
b. Bayer
c. Syngenta
d. Monsanto

Ans. (a) Plant genetic system

267. First report of transgenic plant development through engineering of a plant gene was published by

a. G. Neuhaus
b. R. L. Brinster *et al*
c. M. R. Capecchi
d. V. A. Hilder *et al*

Ans. (d) V. A. Hilder *et al*

268. The gene that was first transformed from a plant origin was

a. Tomato inhibitor II
b. Delta endotoxin
c. Alpha-amylase
d. Cow pea trypsin inhibitor

Ans. (d) Cow pea trypsin inhibitor

269. The gene CpTI provides resistance against insects of order

a. Coleopteran
b. Orthoptera
c. Lepidoptera
d. All of these

Ans. (d) All of these

270. Which of the following transgenic crop is grown in India

a. Soybean
b. Rice
c. Cotton
d. Maize

Ans. (c) Cotton

271. Transgenic rice is being grown in

a. Iran
b. Spain
c. USA
d. Paraguay

Ans. (a) Iran

272. Which of the following country in Europs does not grow GM crop?

a. Czech republic
b. Germany
c. Spain
d. United kingdom

Ans. (d) United kingdom

273. The number of countries that grow GM crop (till 2006) is

a. 20
b. 21
c. 22
d. 24

Ans. (b) 21

274. Which of the following gene was engineered in transgenic cotton released in India?

a Cry 1 Ac
b. Cry II A
c. Cry 1 Aa
d. None of these

Ans. (a) Cry 1 Ac

275. Identification of pathogen genomics from patient sample is called

a. Proteomics
b. Metagenomics
c. Pangenomics
d. Transcriptomics

Ans. (b) Metagenomics

276. The study of full complement of proteins expressed by genome is called

a. Proteomics
b. Genomics
c. Protein formation
d. Proteome

Ans. (a) Proteomics

277. How much genomic data is required to be processed for medical practice

a. Kilobyte
b. Megabyte
c. Tetrabyte
d. Gigabyte

Ans. (c) Tetrabyte

278. Healthy microbial communities in soil perform

a. Nutrient availability
b. Nutrient reduction
c. Nutrient damage
d. None

Ans. (a) Nutrient availability

279. Which type of testing is required to find risk for recessive diseases

a. Preconception screening
b. Carrier testing
c. Genetic counselling
d. Prenatal screening

Ans. (b) Carrier testing

280. Which type of sequencing is used specifically for microbial genomics

a. 80 S
b. 16 S
c. 70 S
d. None

Ans. (b) 16 S

281. Transcriptomics is the study of

a. mRNA b. Primary transcript
c. DNA d. tRNA

Ans. (b) Primary transcript

282. In *B. thuringiensis* which gene act as insecticidal agent

a. Lac b. Bacteriocins
c. Protease d. Cry toxin

Ans. (d) Cry toxin

283. Which scientist gave the word protein

a. Berzelius b. Wilkins
c. Watson d. Brown

Ans. (a) Berzelius

284. SDS PAGE separate proteins based on

a. pH b. Charge
c. Molecular weight d. None

Ans. (c) Molecular weight

285. Antibody microarray is also known as

a. Protein chip b. Antibody chip
c. Antigen chip d. Lipid chip

Ans. (b) Antibody chip

286. DNA transfer information to mRNA by

a. Replication b. Translation
c. Splicing d. Transcription

Ans. (d) Transcription

287. The collection of data obtained from experiment is called

a. Primary database b. Secondary database
c. Molecular database d. None

Ans. (a) Primary database

288. The term proteomics was first used by

a. Watson b. Wilkins
c. Berzelius d. Brown

Ans. (b) Wilkins

289. In sangers method DNA synthesis is inhibited by

a. dddNTPs b. dNTPs
c. ddNTPs d. None

Ans. (c) ddNTPs

290. The base and sugar are attached by which linkage

a. Glycosidic b. Peptide
c. Phosphodiester d. Ionic

Ans. (a) Glycosidic

291. Biopesticide protein crystal consist of which type of endotoxin

a. Alpha b. Beta
c. Gamma d. Delta

Ans. (d) Delta

292. During electrophoresis smaller molecules migrate

a. Faster b. Slower
c. Medium d. None

Ans. (a) Faster

293. DDBJ database is present at

a. America b. Japan
c. India d. Sri Lanka

Ans. (b) Japan

294. How many nitrogen base are present in DNA

a. 5 b. 4
c. 3 d. 2

Ans. (b) 4

295. SWISSPROT is a database for

a. Protein b. Lipid
c. DNA d. RNA

Ans. (a) Protein

296. In clone contig method DNA is cut into pieces of about

a. 250 Mb b. 550Mb
c. 150 Mb d. 880 Mb

Ans. (c) 150 Mb

297. Rhizobium are bacterial symbionts of which crops

a. Legumes b. Cereals
c. Fodder d. Weed

Ans. (a) Legumes

298. SDS disrupts the structure of

a. Carbohydrates b. Proteins
c. Fats d. Lipids

Ans. (b) Proteins

299. UniProtKB, UniRef and UniPArc are parts of which database

a. UniProt
b. SwissProt
c. NCBI
d. None

Ans. (a) UniProt

300. The complex alterations in the biological system of nervous system is known as

a. Neurology
b. Tumorogenesis
c. Metastasis
d. Neurotrauma

Ans. (d) Neurotrauma

301. How many hydrogen bonds are required for adenine and thymine attachment

a. 4
b. 3
c. 2
d. 1

Ans. (c) 2

302. How many plasmids are present in Rizobium strain 3841

a. 7
b. 6
c. 5
d. 4

Ans. (b) 6

303. Which gelling agent is used in PAGE

a. Agar
b. Acrylamide
c. Dextran
d. None

Ans. (b) Acrylamide

304. The mRNA transfer information in the form of protein by

a. Translation
b. Transcription
c. Splicing
d. Replication

Ans. (a) Translation

305. The formation of insulin from pro-insulin is the example of

a. Covalent modifications
b. Splicing
c. Proteolytic degradation
d. None

Ans. (c) Proteolytic degradation

306. In whole genome sequencing genomic DNA is shredded into

a. 2000 bp
b. 3000 bp
c. 4000 bp
d. 5000 bp

Ans. (a) 2000 bp

307. How many amino acids are present naturally?

a. 20
b. 30
c. 40
d. 50

Ans. (a) 20

308. Which reducing agent is used for breaking disulphide linkages?

a. Mercaptoethanol
b. NADH
c. FADH
d. Tocopherol

Ans. (a) Mercaptoethanol

309. Screening of pathogen genome to find vaccine target is called

a. Reverse vaccinology
b. Reverse genetics
c. Homology
d. None

Ans. (a) Reverse vaccinology

310. What is the percentage of GC content in *B. thirungenesis* MYBT18247?

a. 45
b. 65
c. 35
d. 25

Ans. (c) 35

311. Intervening sequences in certain proteins are called

a. Introns
b. Inteins
c. Exons
d. Exteins

Ans. (b) Inteins

312. Size of genome does not correlate with organism complexity, this is known as

a. A-value paradox
b. T-value paradox
c. G-value paradox
d. C-value paradox

Ans. (d) C-value paradox

313. In PTM, amino acids serine, threonine and tyrosine are subjected to

a. Hydroxylation
b. Phosphorylation
c. Glycosylation
d. None

Ans. (b) Phosphorylation

314. First draft of HGP was published in

a. 2000
b. 2003
c. 2005
d. 2006

Ans. (a) 2000

315. Which type of bond connect two amino acids

a. Ionic bond b. Peptide bond
c. Covalent bond d. Hydrogen bond

Ans. (b) Peptide bond

316. What pH is set for stacking gel

a. 8.8 b. 6.8
c. 7.8 d. 5.8

Ans. (b) 6.8

317. Hydroxylation of proline and lysine leads to formation of

a. Tendon b. Keratin
c. Collagen d. Ligament

Ans. (c) Collagen

318. How many nucleotide base pairs were produced from HGP?

a. 4.2 million b. 3.2 million
c. 3.2 billion d. 4.2 billion

Ans. (b) 3.2 million

319. Alpha helix and beta sheets are part of which protein structure

a. Quaternary b. Tertiary
c. Primary d. Secondary

Ans. (d) Secondary

320. How many genes approx. found through HGP?

a. 25000 b. 35000
c. 45000 d. 55000

Ans. (a) 25000

321. N-linked glycosylation occurs on which amino acid

a. Serine b. Threonine
c. Asparagine d. Valine

Ans. (c) Asparagine

322. The gene dense areas were composed of

a. G and C b. A and T
c. C and A d. T and G

Ans. (a) G and C

323. Which type of gel in PAGE is made of low percentage?

a. Resolving gel b. Agarose gel
c. Stacking gel d. None

Ans. (c) Stacking gel

324. Phosphorylation is performed by enzymes called

a. Kinases b. Phosphatases
c. Acetylation d. Hydroxylation

Ans. (a) Kinases

325. Which chromosome contain maximum genes in humans?

a. X b. 1
c. Y d. 6

Ans. (b) 1

326. Stretches of 30,000 C and G repeating bases are termed

a. AtG islands b. GA island
c. CpG islands d. None

Ans. (c) CpG islands

327. Which protein microarray use well characterised molecules?

a. Analytical b. Functional
c. Proportional d. Bifunctional

Ans. (a) Analytical

328. In clone contig method DNA is inserted into which vector

a. MAC b. BAC
c. PAC d. YAC

Ans. (b) BAC

329. Addition of acetyl group in a protein is called

a. Hydroxylation b. Methylation
c. Acetylation d. Ligation

Ans. (c) Acetylation

330. How many genes are present in chromosome 1 in humans?

a. 3168 b. 5168
c. 7168 d. 8168

Ans. (a) 3168

331. The gene poor areas are rich in

a. G and C b. C and T
c. A and T d. G and A

Ans. (c) A and T

332. Which type of protein microarray used to screen protein activities?

a. Bifunctional b. Analytical
c. Interactional d. Functional

Ans. (d) Functional

333. Which chromosome contain least number of genes in humans?

a. X b. Y
c. 3 d. 12

Ans. (b) Y

334. What pH is set for resolving gel?

a. 8.8 b. 7.8
c. 5.8 d. 4.8

Ans. (a) 8.8

335. The analysis of primary data gives rise to development of

a. Tertiary database b. Secondary database
c. Molecular database d. None

Ans. (b) Secondary database

336. Activation of p53 is example of

a. Acetylation b. Dephosphorylation
c. Phosphorylation d. None

Ans. (c) Phosphorylation

337. Cell surface specific protein microarray is also called

a. Lectin microarray b. Antibody microarray
c. Peptide microarray d. Reverse phase

Ans. (a) Lectin microarray

338. Hydroxylation to the proteins is catalyzed by

a. Methlases b. Hydroxylases
c. Ligases d. Kinases

Ans. (b) Hydroxylases

339. How many genes are present in chromosome Y in humans?

a. 844 b. 744
c. 344 d. 544

Ans. (c) 344

340. Methylation adds methyl group to which amino acid

a. Lysine b. Serine
c. Valine d. Leucine

Ans. (a) Lysine

341. Which database contains motifs to classify protein family?

a. Swissprot b. Prosite
c. Uniport d. NCBI

Ans. (b) Prosite

342. Acrylamide and bis acrylamide forms

a. Diacrylamide b. Triacrylamide
c. Tetraacrylamide d. Polyacrylamide

Ans. (d) Polyacrylamide

343. Dephosphorylation is performed by

a. Phosphatases b. Kinases
c. Reductases d. Oxidase

Ans. (a) Phosphatases

344. How many bases were sequenced in *E. coli* genome?

a. 3.6 million b. 4.6 million
c. 2.6 million d. None

Ans. (b) 4.6 million

345. Reverse phase protein microarray relies on

a. Antibody b. Immobilized lysate
c. antigen d. None

Ans. (b) Immobilized lysate

346. Methylation is achieved by enzymes called

a. Methyl transferases b. Hydroxylases
c. Reductases d. Ligases

Ans. (a) Methyl transferases

347. What is the size of rice genome?

a. 530 million bp b. 630 million bp
c. 430 million bp d. 330 million bp

Ans. (c) 430 million bp

348. What is the function of bis-acrylamide?

a. Peptide formation
b. Cross-linking
c. Cis formation
d. Tetra linking

Ans. (b) Cross-linking

349. SwissProt,TrEMBL,Prosite, Pfam, PRINT are integrated into which database

a. Interpro
b. Pfam
c. Uniport
d. None

Ans. (a) Interpro

350. How many chromosomes are present in rice genome?

a. 15 b. 14
c. 13 d. 12

Ans. (d) 12

351. Reversible addition of AMP to a protein is called

a. Ubiquitination b. Lipidation
c. AMPylation d. Acetylation

Ans. (c) AMPylation

352. When robots place large number of proteins on solid support is known as?

a. Spotting
b. Ink jetting
c. Robotic contact printing
d. None

Ans. (c) Robotic contact printing

353. Polyubiquitinated proteins are targeted for

a. Degradation b. Isomerisation
c. Ligation d. Reduction

Ans. (a) Degradation

354. Asparagine conversion to aspartic acid is an example of

a. Phosphorylation b. Deamidation
c. Oxidation d. Reduction

Ans. (b) Deamidation

355. A typical value for acrylamide: bis ratio is

a. 19:01 b. 20:01
c. 21:01 d. 22:01

Ans. (a) 19:01

356. Which database provides collection of crystal structure of macromolecules?

a. NCBI b. PDB
c. Prosite d. Swissprot

Ans. (b) PDB

357. The covalent binding of a lipid group to a protein is called

a. Ubiquitination b. AMPylation
c. Lipidation d. Acetylation

Ans. (c) Lipidation

358. Single nucleotide point mutation is called

a. VNTR b. SNP
c. SSR d. ISSR

Ans. (b) SNP

359. How much percentage genetic information is given by mitochondrial genome?

a. 0.0005 b. 0.005
c. 0.05 d. None

Ans. (a) 0.0005

360. How much percentage similarity is present between human and mouse?

a. 80 b. 90
c. 70 d. 60

Ans. (b) 90

361. Ubiquitin protein is added to which amino acid

a. Valine b. Proline
c. Tyrosine d. Lysine

Ans. (d) Lysine

362. Low concentration of polyacrylamide separates which protiens

a. High mass b. Low mass
c. Neutral d. Acidic

Ans. (a) High mass

363. Which database classifies structure of protein into families, superfamilies and fold?

a. Prosite b. PDB
c. SCOP d. None

Ans. (c) SCOP

364. How long is the lifecycle of drosophila?

a. 5 weeks b. 2 weeks
c. 10 weeks d. 8 weeks

Ans. (b) 2 weeks

365. The ability of cells to give rise to multiple mature cell types are called

a. Multipotent b. Unipotent
c. Oligopotent d. Totipotent

Ans. (a) Multipotent

366. What is the size of mouse genome?

a. 2.6 billion bp b. 3.6 billion bp
c. 4.6 billion bp d. 5.6 billion bp

Ans. (a) 2.6 billion bp

367. The human mitochondrial genome size is

a. 17,569 bp b. 16,569 bp
c. 18,569 bp d. 19,569 bp

Ans. (b) 16,569 bp

368. Higher concentration of polyacrylamide separates proteins of

a. Low molecular mass b. High molecular mass
c. Basic d. Neutral

Ans. (a) Low molecular mass

369. In CATH database, T stands for

a. Tip b. Topology
c. Tranfer d. None

Ans. (b) Topology

370. How many chromosomes are present in Drosophila genome?

a. 6 pairs b. 5 pairs
c. 4 pairs d. 3 pairs

Ans. (c) 4 pairs

371. What is the genome size of A. thaliana?

a. 130–160 Mb b. 140–170 Mb
c. 150–180 Mb d. 125–150 Mb

Ans. (d) 125–150 Mb

372. How long is the breeding cycle of mouse?

a. 2 months b. 4 months
c. 6 months d. 8 months

Ans. (a) 2 months

373. What is the G + C content of human mitochondrial genome?

a. 55% b. 66%
c. 44% d. 33%

Ans. (c) 44%

374. Study of all genes present in all strains of a species is called

a. Proteomics b. Pan genomics
c. Immunomics d. Vaccinomics

Ans. (b) Pan genomics

375. Precipitating proteins by acetic acid and methanol in gel is called

a. Staining b. Fixing
c. Relaxing d. Bounding

Ans. (b) Fixing

376. Two related sequences are termed

a. Homologous b. pairing
c. Sharing d. Mixed

Ans. (a) Homologous

377. How many protein coding genes are present in humans and mouse?

a. 50,000 b. 40,000
c. 30,000 d. None

Ans. (c) 30,000

378. What is the percentage of similarity between human and drosophila?

a. 44 b. 55
c. 66 d. 77

Ans. (a) 44

379. Which is the last step of drug discovery process?

a. Isolation b. Purification
c. Biochemical assay d. Cytotoxicity Tests

Ans. (d) Cytotoxicity Tests

380. IEF separates proteins based on their

a. pI b. Acidity
c. Basicity d. None

Ans. (a) pI

381. How many chromosomes are present A. thaliana genome?

a. 6 b. 5
c. 4 d. 3

Ans. (b) 5

382. Which among the following is strong anionic detergent that denature proteins?

a. Triton b. Mercaptoethanol
c. SDS d. None

Ans. (c) SDS

383. Sample inlet, ionization source, mass analyzer and ion detector are components of

a. 2DE b. Mass spectrometry
c. PAGE d. AGE

Ans. (b) Mass spectrometry

384. The homologous protein from two different organism is called

a. Ortholog b. Paralog
c. Identical d. Similarity

Ans. (a) Ortholog

385. How many SNPs were identified by International HapMap project?

a. 6.1 milloin b. 5.1 million
c. 3.1 million d. 2.1 million

Ans. (c) 3.1 million

386. At isoelectric point net charge of protein is

a. Four b. Three
c. Zero d. One

Ans. (c) Zero

387. How many genes are present in A. thaliana?

a. 30,000 b. 27,000
c. 25,000 d. 20,000

Ans. (b) 27,000

388. Separation of ions based on their mass and charge ratio is done by

a. Ion source b. Detector
c. SDS d. Mass analyser

Ans. (d) Mass analyser

389. The size of housefly genome is

a. 691 Mb b. 791 Mb
c. 891 Mb d. 991 Mb

Ans. (a) 691 Mb

390. *H. influenzae* causes which disease in children

a. Diabetes b. Meningitis
c. Polio d. None

Ans. (b) Meningitis

391. The ability of cells to give rise to one cell type is called

a. Multipotent
b. Oligopotent
c. Unipotent
d. Pluripotent

Ans. (c) Unipotent

392. The homologous protein with different function in an organism is called

a. Paralog b. Ortholog
c. Similarity d. None

Ans. (a) Paralog

393. IPG strips consist of which gelling agent

a. Acrylamide b. Agarose gel
c. Agar d. None

Ans. (a) Acrylamide

394. Single nucleotide polymorphism genotyping analyze and screen variations among

a. SNPs b. RAPD
c. ISSR d. SSR

Ans. (a) SNPs

395. The human genome project was initiated by

a. DOE and DDBJ b. NIH and EBI
c. NIH and DOE d. NIH and DDBJ

Ans. (c) NIH and DOE

396. What is the genome size of *H.influenzae*?

a. 3 million bp b. 2 million bp
c. 1.8 million bp d. 4 million bp

Ans. (c) 1.8 million bp

397. How many genes were found in housefly?

a. 17,000 b. 15,345
c. 18,000 d. 19,000

Ans. (b) 15,345

398. At initial stage of HGP, the estimated time was

a. 15 years b. 20 years
c. 10 years d. 30 years

Ans. (a) 15 years

399. Which tool compare gene sequences and find similarity regions?

a. PDB b. SCOP
c. NCBI d. BLAST

Ans. (d) BLAST

400. IPG strips with pH 3–10 is used for

a. Whole Genome b. Whole Proteome
c. Antigen d. Antibody

Ans. (b) Whole Proteome

401. Study of medicine and biology with drug action is called

a. Genomics b. Pharmacology
c. Proteomics d. None

Ans. (b) Pharmacology

402. What is the percentage similarity between housefly and drosophila?

a. 84 b. 74
c. 64 d. 54

Ans. (c) 64

403. All are genome sequencing strategies except

a. Edman degradation
b. Short gun
c. Whole genome short gun
d. Gene sequencing

Ans. (a) Edman degradation

404. Genome refers to

a. DNA
b. DNA and RNA
c. DNA, RNA, cDNA
d. Entire genes of an organism

Ans. (d) Entire genes of an organism

405. Which of the following vectors are widely used in HGP?

a. BAC and YAC
b. Plasmid and Cosmid
c. Phage and M13
d. None

Ans. (a) BAC and YAC

406. Study of sequence, assemble and analysis of genome is called

a. Bioinformatics
b. Proteomics
c. Genomics
d. Pharmacology

Ans. (a) Bioinformatics

407. Which compound is mixed with sample in IEF for better migration?

a. Base
b. Acid
c. Ampholytes
d. None

Ans. (c) Ampholytes

408. How many immune related genes are present in housefly?

a. 461
b. 771
c. 550
d. 420

Ans. (b) 771

409. The private company involved in HGP was

a. Roche
b. Gilead
c. Genetech
d. Celera

Ans. (d) Celera

410. Which tool is used to identify vector origins?

a. Splign
b. VecSreen
c. ORF finder
d. None

Ans. (b) VecSreen

411. Study of how genes effect a persons response to drugs

a. Pharmacology
b. Genomics
c. Pharmacogenomics
d. Proteomics

Ans. (c) Pharmacogenomics

412. The IPG strips are rehydrated in a

a. Oxidising buffer
b. Denaturing buffer
c. Simple buffer
d. None

Ans. (b) Denaturing buffer

413. What is the scientific name of house fly?

a. *M. domeatica*
b. *D. melanogaster*
c. *Anopheles*
d. *Aede*

Ans. (b) *D. melanogaster*

414. How many chromosome is present in *H. influenzae* genome?

a. 3
b. 2
c. 1
d. 4

Ans. (c) 1

415. The first draft of HGP was published in the journal

a. Science
b. Nature
c. Cell
d. Plos biology

Ans. (b) Nature

416. PK genes effect a drug in the ADME process, in which M stands for?

a. Mix
b. Metabolized
c. Maintain
d. Matrix

Ans. (b) Metabolized

417. Qualitative and Quantitative protein expression could be studied by

a. 2-DE
b. IEF
c. PAGE
d. AGE

Ans. (a) 2-DE

418. Which tool classifies protein and their genes according to families and subfamilies?

a. GEO
b. NCBI
c. PANTHER
d. BLAST

Ans. (c) PANTHER

419. According to HGP, genetic similarity between all humans is

a. 99.90%
b. 90%
c. 95%
d. 99.50%

Ans. (a) 99.90%

420. In electrophoresis DNA will migrate towards

a. Cathode
b. Anode
c. Negative electrode
d. None

Ans. (b) Anode

421. During action of drug, which genes are responsible for clinical outcome

a. CK genes
b. PC genes
c. PK genes
d. PD genes

Ans. (d) PD genes

422. Which of the following is a protein sequence database?

a. DDBJ
b. EMBL
c. PIR
d. GenBank

Ans. (c) PIR

423. cDNA library is also called

a. EST library b. VNTR
c. ISSR d. SSR

Ans. (a) EST library

424. Name the largest gene in humans

a. Insulin b. Dystrophin
c. Titin d. Kinases

Ans. (b) Dystrophin

425. 2DE was first applied for proteins by which scientist?

a. Farrel b. Watson
c. Buchner d. Kuhne

Ans. (a) Farrel

426. Which database is used for study of relation between genes, variants and drugs?

a. Pharm GGG b. Pharm GKK
c. Pharm GKB d. None

Ans. (c) Pharm GKB

427. Which process leads to production of multiple functional proteins?

a. RNA editing
b. Post translational modifications
c. Base modification
d. None

Ans. (b) Post translational modifications

428. GenBank is maintained by

a. Brookhaven lab b. EMBL
c. DDBJ d. NCBI

Ans. (d) NCBI

429. hsp 60 and 70 are proteins involved in

a. Initiation b. Protein folding
c. Elongation d. Termination

Ans. (b) Protein folding

430. The 3D structure of protein can be determined by

a. NMR b. X-ray crystallography
c. Spectroscopy d. Both A and B

Ans. (d) Both A and B

431. Structure of mitochondrial DNA is

a. Linear b. Circular
c. Ladder like d. None

Ans. (b) Circular

432. Noninvasive prenatal testing is done using

a. Maternal blood b. Maternal urine
c. Paternal blood d. None

Ans. (a) Maternal blood

433. Which method allows separation of all isoforms of a protein?

a. AGE b. 2DE
c. PAGE d. SDS-PAGE

Ans. (b) 2-DE

434. Amino acids are joined by

a. Ionic bond b. Hydrogen bond
c. Peptide bond d. Glycosidic bond

Ans. (c) Peptide bond

435. Elctrospray ionization is used in

a. MS b. NMR
c. SDS d. IEF

Ans. (a) MS

436. Which chemical is used for lowering the freezing point in sample buffer of protein microarray?

a. PEG b. Glycerol
c. Salt d. Sugar

Ans. (b) Glycerol

437. The alignment procedure which align entitre sequence is

a. Global alignment b. Local alignment
c. Pair wise alignment d. Sequence alignment

Ans. (a) Global alignment

438. The collection of proteins produced by a given species is called

a. Genome b. cDNA
c. Proteome d. RNA

Ans. (c) Proteome

139. Personalized medicine describes use of genetic information for how many person

a. One b. Two
c. Three d. Four

Ans. (a) One

140. The IPG strip is layered with which chemical to minimize exposure to oxygen

a. Acetone b. Chloroform
c. Isopropanol d. None

Ans. (c) Isopropanol

441. Which of the following enzyme is used to synthesize DNA using mRNA template?

a. Nuclease b. Reverse transcriptase
c. Taq polymerase d. Phosphatase

Ans. (b) Reverse transcriptase

442. NMR spectroscopy is

a. Emission b. Radiation
c. Diffraction d. Absorption

Ans. (d) Absorption

443. Instrument used for measurement of optical activity is

a. Spectrophotometer b. Polarimeter
c. Calorimeter d. Infantometer

Ans. (a) Spectrophotometer

444. Which of the following is sequence alignment tool?

a. BLAST b. PRINT
c. PROSITE d. PIR

Ans. (a) BLAST

445. Which step saturate focused protein and allow separation with SDS PAGE?

a. Staining b. Destaining
c. Running buffer d. Equilibration

Ans. (d) Equilibration

446. Administration of DNA or RNA to correct genetic abnormality is called

a. Gene therapy b. Genetic engineering
c. Gene gun d. Genetics

Ans. (a) Gene therapy

447. Which is the most common way to determine 3D structure of proteins?

a. Chromatography b. X-ray crystallography
c. SDS PAGE d. 2DE

Ans. (b) X-ray crystallography

448. HIV binds to T-cells by attaching which protein

a. gp120 b. gp150
c. gp40 d. gp41

Ans. (a) gp120

449. Small chemical groups on antigen are called

a. Paratope b. Isotope
c. Allotope d. Epitope

Ans. (d) Epitope

450. Which technique is used for large scale study of proteins?

a. SDS b. IEF
c. Microarray d. 2DE

Ans. (c) Microarray

451. Which type of structure of protein is used to design drugs?

a. 3D b. 2D
c. 1D d. None

Ans. (a) 3D

452. Which enzyme is used to join two DNA molecule?

a. Nuclease b. Restriction enzymes
c. Lyases d. Ligases

Ans. (d) Ligases

453. Which HIV protein opens a passage for entry of virus into the cell?

a. gp40 b. gp120
c. gp41 d. gp121

Ans. (c) gp41

454. X-ray scattering by DNA molecules was given by

a. Rosalyn b. Francis
c. James d. None

Ans. (a) Rosalyn

455. What percentage of gene were common between human and arabidopsis?

a. 20% b. 18%
c. 15% d. 14%

Ans. (b) 18%

456. Which protein binding substrate is used for microarray?

a. Nitrocellulose b. Dextran
c. Agarose d. None

Ans. (a) Nitrocellulose

457. The cells that retain proliferative capacity throughout life are called

a. Kidney cells b. Nerve cells
c. Stem cells d. Liver cells

Ans. (c) Stem cells

458. Vector recombinant vaccines are made of

a. Plasmid vector b. Viral vector
c. Cosmid vector d. Phagemid vector

Ans. (b) Viral vector

459. Which of the following act as chain terminator in sequencing?

a. Exogenous
b. DNA
c. Deoxynucleotides
d. Dideoxynucleotides

Ans. (d) Dideoxynucleotides

460. Crystallography is based on X-ray diffraction by

a. Electrons
b. Protons
c. Neutrons
d. Positron

Ans. (a) Electrons

461. The role of urea in PAGE is

a. Renaturation
b. Denaturation
c. Buffering
d. None

Ans. (b) Denaturation

462. An indicator used to measure and evaluate biological process is called

a. Chip
b. Point
c. Biomarker
d. Target

Ans. (d) Target

463. The cells of inner mass of embryo is called

a. PT cells
b. EM cells
c. ET cells
d. ES cells

Ans. (d) ES cells

464. AIDS is caused by

a. HIV
b. HCC
c. HIC
d. HTT

Ans. (a) HIV

465. The repeating unit of protein is

a. Peptides
b. Fatty acid
c. Amino acids
d. None

Ans. (c) Amino acids

466. NMR is used mostly for protein size smaller than

a. 35 kDa
b. 35 kDa
c. 45 kDa
d. 50 kDa

Ans. (a) 35 kDa

467. Continous stretches of DNA sequence in sequencing is called

a. Contigs
b. Introns
c. Exons
d. None

Ans. (a) Contigs

468. Electrophoresis is not used for the separation of

a. Nucleic acids
b. Proteins
c. Amino acids
d. Lipids

Ans. (d) Lipids

469. Sanger sequencing is also known as

a. Vector generation
b. Antibiotic production
c. Chain termination
d. Gene manipulation

Ans. (c) Chain termination

470. Vaccines containing proteins, peptides and DNA of pathogens are called

a. Attenuated vaccines
b. Subunit vaccines
c. Vector recombinant vaccine
d. None

Ans. (b) Subunit vaccines

471. Transgenic animals can be produced by which type of stem cells

a. Embryonic
b. Epithelial
c. Connective
d. Renal

Ans. (a) Embryonic

472. Microscopic slides that contain series of samples is called

a. ELISA
b. RIA
c. Microarray
d. None

Ans. (c) Microarray

CHECK YOUR GRASP

1. The promoter used in terminator technology was

a. LEA
b. SV 40
c. TA 29
d. CaMV 35S

2. SAGE technique was invented by

a. R.S.Yalow and S.A. Berson
b. E. Engvall and P. Periman
c. V. E. Veculescu *et al.*
d. None of these

3. The length of ESTs used in SAGE is about

a. 5–10 nt
b. 20–25 nt
c. 9–14 nt
d. 10–20 nt

4. The vector used in Sanger sequencing method is

a. Phage M13
b. Phage T2
c. Coliphage P1
d. Bacteriophage ë

5. HAT medium, a medium for selection of hyman-mouse hybrid cell contain

a. Hypersensitive adenine and thymidine
b. Hypoxanthine, aminopterin and thymidine
c. Hypoxanthine, auxin and tetracycline
d. None of these

6. Which of the following banding technique should be used to located rRNA gene?

a. C-banding
b. N-banding
c. G-banding
d. R-banding

7. LOD score is used for

a. Gene identification
b. Genetic mapping
c. Physical mapping
d. Gene sequencing

8. In R-banding, the stain used is

a. Rhodamine red
b. Texas red
c. Quinacrine mustard
d. Giemsa

9. Retroviral vectors are

a. ds RNA
b. ss DNA
c. ds DNA
d. ss RNA

10. Vectors based on BPV have plasmid components of

a. Cosmid vectors
b. pBR322
c. pUC vector
d. pBluescript vector

11. Recombinant DNA technology was developed in the year

a. 1983
b. 1984
c. 1977
d. 1972

12. Nobel prize in chemistry in 1980 was received by

a. P. Berg
b. F. Sanger
c. W. Gilbert
d. All of these

13. Chromosome banding is widely used in

a. Tumor cell diagnosis
b. Detection of somatic cell hybrid
c. Karyotype construction
d. All of these

14. Radioactivity is used in

a. GISH
b. FISH
c. mcFISH
d. Chromosome painting

15. RAFI stands for

a. Rural and farmers' international
b. Rural and advancement foundation international
c. Rural and foundation international
d. Rural agricultural farmers' international

16. Which of the following experiments are exempted from detailed biosafety analysis?

a. Self cloning experiments
b. Experiments involving plant pathogens
c. Experiments involving animal pathogens
d. Agrobacterium mediated transformation

17. Electrosperay ionization is used in

a. MS
b. NMR
c. SDS
d. IEF

In case of less than 80% score, go through brief review and glance once again from chapter

Key: 1-a 2-c 3-c 4-a 5-b 6-b 7-b 8-d 9-a 10-b 11-d 12-d 13-d 14-a 15-b 16-a 17-a

6

Biosafety, IPR and Bioethics

1. Physical containment relates to which of the following?

a. Special procedures
b. Containment equipment
c. None of these
d. Both a and b

Ans. (d) Both a and b

2. Which of the following is considered as primary physical containment?

a. Containment equipment
b. Special procedures
c. Laboratory design
d. Both a and c

Ans. (d) Both a and c

3. Consider the options given in Q. 2 and pick the correct option that lists the secondary physical containment

a. Special procedures
b. Laboratory design
c. Laboratory technique
d. None of these

Ans. (a) Special procedures

4. It is feared that transgenic plants, may lead to which of the following?

a. Transfer of their transgenic feature to weeds
b. May themselves become weeds
c. Degrade the environment
d. All of the above

Ans. (d) All of the above

5. Which of the following statements are correct?

a. Intellectual property is an idea, a design, an invention, a manuscript, etc. which can ultimately give rise to a useful product/application
b. The first law on patent was passed in Venice in 1547
c. The first law on patent was passed in venice in 1647
d. All of the above

Ans. (a) Intellectual property is an idea, a design, an invention, a manuscript, etc. which can ultimately give rise to a useful product/application

6. Which of the following statements are correct about intellectual property rights?

a. The main form of IPR protection are trade secret, patent, copyright, plant breeder's right, trade mark and geographical indication
b. Intellectual property may be a design, an idea, an invention, a manuscript, etc.
c. Both a and b
d. None of these

Ans. (c) Both a and b

7. Trade secret related to which of the following?

a. Formulae
b. Processes
c. Certain material, e.g. bacterial strains
d. All of the above

Ans. (d) All of the above

8. Which of the following is not correct about patent?

a. It is granted by the Government of a country to the applicant for an unlimited period of time
b. When a patent is granted, the inventor becomes the owner of the patent like any other form of property
c. Patents are granted for an invention, innovation/improvement in an invention, process/product of an invention and a concept
d. All of the above

Ans. (a) It is granted by the Government of a country to the applicant for an unlimited period of time

9. In the area of biotechnology, which of the following material can be kept as trade secret?

a. Production process
b. Strains of microorganism

c. Cell lines
d. All of the above

Ans. (d) All of the above

10. In the early 1970s which of the following were considered as the possible potential health hazards of cloning recombinant DNA molecules?

a. Hybrid organisms could be created with biological activities of an unpredictable nature
b. Hybrid organisms may escape from the laboratory with unpredictable consequence
c. None of the above
d. Both a and b

Ans. (d) Both a and b

11. Under which type of agreement royalty is paid on the basis of sale

a. Mining
b. Patent
c. Copy right
d. Licensing

Ans. (c) Copy right

12. A transgenic variety of which of the following crops had to be withdrawn from cultivation following deaths due to allergy?

a. Soybean
b. Tomato
c. Maize
d. Potato

Ans. (a) Soybean

13. Which of the following is not correct about NIH guidelines?

a. The guidelines were revised after two year
b. NIH guidelines were more liberal than the recommendation of the asilomar conference.
c. In 1977, NIH prepared an Environmental impact statement.
d. The first NIH guidelines were prepared

Ans. (b) NIH guidelines were more liberal than the recommendation of the asilomar conference.

14. Which of the following is the chief requirements for the grant of a patent?

a. Not novelty
b. Usefulness is not required
c. Inventiveness
d. All of the above

Ans. (c) Inventiveness

15. Trade secret offers which of the following advantage?

a. Low cost of maintaining the secret.
b. The risk of innovation by someone else is minimized.
c. Not effective for unlimited duration
d. All of the above

Ans. (b) The risk of innovation by someone else is minimized.

16. Trade secrets suffer from which of the following disadvantage?

a. Maintaining a trade secret itself is costly
b. It offers protection from independent innovation/ invention.
c. It can be applied to many inventions.
d. All of these

Ans. (a) Maintaining a trade secret itself is costly

17. Which of the following statements are correct about patents?

a. The subject matter must be ordinary
b. In 1985, the Ammerican Supreme court ruled that a live, human made microorganism can be patented under the American patent law as a manufacture or composition of matter
c. In 1980, the Ammerican Supreme court ruled that a live, human made microorganism can be patented under the American patent law as a manufacture or composition of matter
d. None of these

Ans. (c) In 1980, the Ammerican Supreme court ruled that a live, human made microorganism can be patented under the American patent law as a manufacture or composition of matter

18. Trade secret can not be applied for which of the following invention?

a. Cell lines
b. Strain of microorganism
c. Plant varieties
d. All of the above

Ans. (c) Plant varieties

19. The concerns given as the options of Q.5 were examined by a committee of national academy of Sciences (USA) in 1974; it made which of the following recommendation

1. NIH, USA be requested to set up an advisory committee on recombinant DNA to oversee experimental programmes to develop procedures to minimize hazards and devise guidelines
2. Use of caution in experiments linkage animal DNAs to bacterial, phage or plasmid DNAs
3. Certain types of experiments, e.g. cloning of genes for bacterial toxins, etc. be deferred
4. Human cloning experiments can be exempted from scrutiny

Option:

a. 3, 2, 1 b. 1, 2, 3,4
c. 2, 3, 4, 1 d. 1, 4, 3

Ans. (a) 3, 2, 1

20. In February 1975, a historic international meeting was convened about cloning of recombinant DNA molecule at Asilomar California; it reached which of the following conclusion?

a. Certain experiments should be deferred
b. Most of the work on recombinant DNA could proceed with appropriate safety measures
c. Potential risks were assigned to different types of experiments
d. Such bacteria and plasmids that could not survive in the environment, and their escaped from the laboratory should be avoided
e. All of the above

Ans. (e) All of the above

21. Which of the following terms is not used as synonym of planned introduction?

a. Contained use
b. Deliberate introduction
c. Deliberate release
d. Field testing

Ans. (a) Contained use

22. Which of the following is not correct about NIH guidelines?

a. In USA, the NIH guidelines are followed by all federal agencies that fund research on recombinant DNA
b. Experiments that were previously prohibited, were changed to category requiring review and approval by NIH.
c. In the revision, the containment levels were made more stringent
d. A major revision of the guidelines was effected in 1982

Ans. (c) In the revision, the containment levels were made more stringent

23. For biosafety consideration, modern biotechnology includes which of the following?

a. RDT
b. Direct injection of nucleic acids into cell of organelles
c. Fusion of cells beyond the taxonomic family that overcomes natural physiological, reproductive or recombination barriers
d. All of the above

Ans. (d) All of the above

24. Which of the following statements are correct about plant breeder's righ?

a. A person holding PBR title to a variety can not authorize other interested persons/organizations to produce and sell the propagating material of that variety
b. These are the rights granted by the government to a plant breeder, or owner of a variety to exclude others for producing or commercializing the propagating material of that variety
c. Both a and b
d. None of these

Ans. (b) These are the rights granted by the government to a plant breeder, or owner of a variety to exclude others for producing or commercializing th propagating material of that variety.

25. Which of the following is not correct about breeder's exemption?

a. The PBR for a new variety evolved from the initial variety will be of the breeder who developed the new variety and of the holder of PBR title of the initial variety as well
b. Under the UPOV 1978 Act, all new varieties evolved using a protected variety were exempted from protection under this provision
c. The use of a protected variety for the development of new varieties is exempted from protection
d. All of the above

Ans. (a) The PBR for a new variety evolved from the initial variety will be of the breeder who developed the new variety and of the holder of PBR title of the initial variety as well

26. Which of the following is correct about an essentially derived variety?

a. It is a variety produced by mutation or transfer of gene through backcross method in to another variety
b. It will be covered under the PBR title granted to the initial variety
c. The breeder of such a variety will be required to obtain permission from PBR title holder of the initial variety
d. All of the above

Ans. (d) All of the above

27. Which of the following is correct about farmer's rights?

a. It should not be obligatory and should be relegated as privilege
b. The key question relating to farmer's right remain as to whom to reward, to what extent and in what manner

c. Both of these
d. None of these

Ans. (b) The key question relating to farmer's right remain as to whom to reward, to what extent and in what manner.

28. Which of the following people are considered under farmer's rights for sharing the profit earned from the development of high yielding varieties evolved from the use of raw materials/plant genetic resources?

a. Urban communities
b. Non traditional farming families
c. Tribal people
d. All of the above

Ans. (c) Tribal people

29. An otherwise excellent transgenic variety of which of the following crops developed during 1990s could not be released due to IPR problems?

a. Nicotiana tobaccm
b. Solanum tubrosum
c. Solanum esculantum
d. Brassica napus

Ans. (c) Solanum esculantum

30. India has created a National Biodiversity Authority with headquarters at which of the following?

a. Mumbai
b. Chennai
c. Kolkata
d. Delhi

Ans. (b) Chennai

31. Which of the following intellectual properties can be protected by copyright?

a. Computer hardware
b. DNA chip
c. DNA Sequence
d. None of the above

Ans. (c) DNA Sequence

32. The copyright of a book may be held by which of the following?

a. Author's
b. Printer's
c. Both
d. None of the above

Ans. (a) Author's

33. Which of the following steps are involved in the procedure of patenting?

a. In case a patent is not challenged, the patent is awarded immediately after the expiry of the specified period.
b. If it is found suitable for patenting the invention along with adequate details of the desired patent is published for the information of all concerned.
c. Anyone can challenge the award of patent within a specified period of time.
d. All of the above

Ans. (d) All of the above

34. The NIH, USA guidelines specify the practices for constructing and handling which of the following?

a. Products obtained from organisms and viruses containing RDT
b. Organism and viruses containing RDT
c. Recombinant DNA molecules
d. Both b and c

Ans. (d) Both b and c

35. The bio safety guidelines and developed to ensure and adequate level of protection during which of the following activities of modern biotechnology?

a. Safe transfer
b. Use of GMOs
c. Handling
d. All of the above

Ans. (d) All of the above

36. In case of which of the following products, an empirical approach based on data obtained through experimentation about the source of potential hazards has proved satisfactory?

a. Drugs
b. Vaccines
c. Pesticides
d. All of the above

Ans. (d) All of the above

37. In risk assessment, a lack of scientific knowledge or scientific consensus should not necessarily be interpreted as indicating which of the following?

a. Absence of risk
b. Acceptable risk
c. None of the these
d. Both a and b

Ans. (d) Both a and b

38. The assessment of risk during laboratory research is usually done in which of the following steps?

a. Initial risk assessment
b. Advanced risk assessment
c. Comprehensive risk assessment
d. Both a and c

Ans. (d) Both a and c

39. The chief objectives of risk assessment during laboratory research are to decide about which of the following of the proposed research?

a. Laboratory procedures
b. Biological containment
c. Physical containment
d. All of the above

Ans. (d) All of the above

40. On the basis of their potential effects on a healthy adult human, organisms can be classified in to which of the following?

a. Risk group 1
b. Risk group 2
c. Risk group 3
d. Risk group 4
e. All of the above

Ans. (e) All of the above

41. In which of the following risk group, agents are not associated with disease in heathy humans?

a. Risk group 1
b. Risk group 2
c. Risk group 3
d. Risk group 4

Ans. (a) Risk group 1

42. In USA which of the following systems are available for protection of IPRs related to palnts?

a. The plant patents Act (1945)
b. The plant variety protection Act of 1975
c. The plant patents Act 1930
d. All of the above

Ans. (c) The plant patents Act 1930

43. Which of the following is the most powerful and the most expansive in scope of coverage for protection of IPRs related to palnts?

a. The plant patents Act 1930
b. The plant variety protection Act of 1970
c. The utility patent Act 1985
d. All of the above

Ans. (c) The utility patent Act 1985

44. Which of the following is correct?

a. A patent act to provide patents on plants was first introduced in Germany in 1960
b. A patent act to provide patents on plants was first introduced in Germany in 1866
c. In 1995, UPOV had 20 member states
d. All of the above

Ans. (b) A patent act to provide patents on plants was first introduced in Germany in 1866

45. Which of the following is correct about farmer's privilege?

a. Under UPOV 1978 Act, there was explicit provision for farmer's privilege
b. PBR systems generally allow the farmers to use the seeds of protected varieties produced by themselves
c. It is very important provision for countries like India, where over 90% of the total cropped area is sown by seed produced by the farmers themselves.
d. All of the above

Ans. (d) All of the above

46. The copyright suffers from which of the following limitation?

a. It prevents another person from using either the idea or the information contained in a copyright material.
b. It does not provide protection for a specific period and only from reproduction as such of the copyright material.
c. In case of DNA sequence, one may get around this protection by designing an alternative sequence to encode the same protein.
d. All of the above

Ans. (c) In case of DNA sequence, one may get around this protection by designing an alternative sequence to encode the same protein.

47. Which of the following is correct?

a. The UPOV 1991 Act has not strengthened the PBR in comparison to the UPOV 1978 Act
b. The UPOV 1978 Act is now revised as UPOV 1991 Act
c. The PPVFR Act 2001 is not similar to UPOV Act 1978 in some respects, has not same features of UPOV Act 1991 and is unique in respect to some of its other feature
d. All of the above

Ans. (b) The UPOV 1978 Act is now revised as UPOV 1991 Act

48. PPVFR Act 2001 is similar to UPOV Act 1978 with respect to which of the following?

a. The duration of protection is 5 years
b. Provision for farmer privilege
c. The duration of protection is 8 years
d. All of the above

Ans. (b) Provision for farmer privilege

49. PPVFR Act 2001 is comparable to UPOV Act 1991 with respect to which of the following?

a. Protection extended to commercial use of all the material of the protected variety
b. Requirement of novelty, distinctiveness, uniformity and stability for registration of a variety
c. Essentially-derived varieties being subjected to PBR protection granted to the concerned initial varieties
d. Both b and c

Ans. (d) Both b and c

50. PPVFR Act 2001 has which of the following unique features which of the following unique features which are not provided for the UPOV Act (1978, 1991)?

a. Registration of extant varieties
b. Registration of farmer's varieties
c. It permits farmers to exchange share or sell their farm produce, including seed, except as branded seed
d. All of the above

Ans. (d) All of the above

51. Under the provisions of UPOV Act 1991, a plant variety must satisfy which of the following criteria for protection?

a. Distinctiveness
b. Not novel
c. Not stable
d. Not uniform

Ans. (a) Distinctiveness

52. Which of the following risk group is associated with such serious or lethal human diseases for which preventive or therapeutic interventions may be available?

a. Risk group 1
b. Risk group 2
c. Risk group 3
d. Risk group 4

Ans. (c) Risk group 3

53. Which of the following risk group agent is concerned with organisms, which cause serious or lethal disease for which preventive or therapeutic invention are not usually available?

a. Risk group 1
b. Risk group 2
c. Risk group 3
d. Risk group 4

Ans. (b) Risk group 2

54. Which of the following risk group agent is concerned with organisms, which cause serious or lethal disease for which preventive or therapeutic invention are not usually available?

a. Risk group 1
b. Risk group 2
c. Risk group 3
d. Risk group 4

Ans. (d) Risk group 4

55. Which of the following is not correct about Biosafety Guidelines in India?

a. Initially, the Indian Recombinant DNA safety Guidelines and Regulations were prepared in 1990 by Recombinant DNA Advisory Committee, Deptt. Of Biotechnology, New Delhi
b. The Indian Recombinant DNA safety Guidelines and Regulations were revised in 1994
c. Field trials, in India, using transgenic plants began in 1995
d. Canada becomes the first country to begin commercial use of virus resistant transgenic tobacco and tomato in the early 1990

Ans. (d) Canada becomes the first country to begin commercial use of virus resistant transgenic tobacco and tomato in the early 1990

56. Which of the following statements is correct about comprehensive risk assessment?

a. The level of containment appropriate for an experiment is decided on the basis of comprehensive risk assessment
b. The containment level for the experiment amy, in the end, be comparable to that of the risk group of the agent or it may be raised or lowered as a result of the comprehensive risk assessment
c. It is done after the initial risk assessment
d. All of the above

Ans. (d) All of the above

57. Risk assessment in case of planned release of transgenic crops may take into account which of the following?

I. Nature of marker genes
II. The characteristics of promoters in terms of whether they are organ-specific or constructive
III. Location and proximity of related crops in relation to isolation distance needed for prevention for pollination
IV. Proximity of wild relatives and the distance of inter pollination with such relatives

a. I, II, III
b. I, II, III, IV
c. I, III, IV
d. I, II, IV

Ans. (b) I, II, III, IV

58. In case of transgenic plants, which of the following are the main concerns related to their planned introduction?

a. Virus resistance genes may provide opportunities for evolution of newer virulent strains by recombination
b. Insect resistant plants, would be cultivated on a large scale; this may lead to evolution of resistant insect biotypes.
c. Transgenic plants may affect the flora and fauna of their phyllosphere and rhizosphere.
d. The products of transgenes may pose health hazards
e. All of the above

Ans. (e) All of the above

59. Which of the following countries has 30 years protection for inbred lines of maize, clovers and a few grasses?

a. India
b. France
c. USA
d. Australia

Ans. (b) France

60. PPVFR Act 2001 aims to provide for the establishment of suitable systems for which of the following?

a. Development of new breeds of animals
b. Protection of plant breeder
c. Implementing plant breeders' rights
d. All of the above

Ans. (c) Implementing plant breeders' rights

61. Which of the following are the main considerations for the development of PBR systems?

a. Private sectors are not invest in the plant breeding and seed industry.
b. It is encourages plant breeding activities
c. Both a and b are correct
d. None of these

Ans. (b) It is encourages plant breeding activities

62. Which of the following statements are correct about historical development of intellectual property rights in India?

a. In 1855, the act of protection of invention was introduced
b. In 1875, patents and designs protection act was passed.
c. In 1872, patents and designs protection act was passed
d. None of these

Ans. (c) In 1872, patents and designs protection act was passed

63. Which of the following is not correct about historical development of intellectual property rights in India?

a. The Indian Copyright Act 1957, amended in 1999, is comparable to international standards
b. Trademark protection is in force since August 1947 under the 1950 Act
c. The Indian patents Act 1970 was introduced in the parliament in 1965
d. Protection of designs is covered by the Indian Patent and design Act 1911 with subsequent amendments

Ans. (b) Trademark protection is in force since August 1947 under the 1950 Act

64. Which of the following is not correct about international harmonization of patent laws?

a. The Paris convention also allows inventors to claim in all the member countries by filing a patent application initially in one of the member states.
b. The Paris convention has 50 member states; India joined the convention on July 15, 1995.
c. The Paris convention established equal protection of industrial IPR under the laws of member countries for both nationals and residents of other member countries of the convention.
d. All of the above

Ans. (d) All of the above

65. Government of India has now established the PPVFR Authority with headquarters at which of the following place?

a. Mumbai
b. New Delhi
c. Kolkata
d. Chennai

Ans. (b) New Delhi

66. Which of the following is not correct about international harmonization of patent laws?

a. TRIPs became effective on January 1, 1998
b. WIPO operates by asking member states to ratify a convention and to introduce the agreed basic principles in to their national laws
c. IPRs are administered but not enforced, by the world Intellectual property Organization, Geneva
d. The Trade Related Intellectual Property Rights agreement is the most comprehensive multilateral agreement on IPR

Ans. (a) TRIPs became effective on January 1, 1998

67. Which of the following is not correct?

a. The member countries of WTO have been given a period of 5 year to suitable amend their IPR law according to TRIPs
b. Each member country has the option to frame its own patent laws within the broad framework defined in the GATT agreement
c. The provision of GATT are administered and enforced by WTO, Geneva
d. None of these

Ans. (d) None of these

68. It is feared that genetically engineered microorganisms may disturb the ecosystem and its processes, in which of the following ways?

a. They may transfer genes related to virulence or pathogenesis in to the native bacterial population
b. They may cause unexpected health hazards

c. They may rapidly multiply and out complete the native microbes
d. Both a and c

Ans. (d) Both a and c

69. Genetically modified plants could pose biological and ecological risks that may be summed up as which of the following?

a. Production of toxic or allergenic metabolites
b. Transmission of new traits to related sexually compatible weed species
c. Unexpected new susceptibilities to pathogens
d. The ecosystems may be disturbed by their dispersal, persistence or altered reaction to parasites, symbionts or competitor
e. All of the above

Ans. (e) All of the above

70. During assessment of risk on a case-by-case basis, which of the following factors should be considered?

a. The biological characteristics of the recipient organisms.
b. Genetic characteristics of the DNA insert, the function it specifies and/or characteristics of the modification introduced
c. Characteristics of the vector, including its origin, source and host range
d. Taxonomic status and the relevant biological characteristics of the donor organisms.
e. All of the above

Ans. (e) All of the above

71. During assessment of risk for food obtained from transgenic varieties of crops, which of the following is evaluated?

a. The potential for introduced DNA to encode harmful substances
b. The fold crop that has been modified
c. Proof that known plant toxicants and important nutrients are within acceptable levels in the new variety.
d. The safety of proteins encoded by transgenes
e. All of the above

Ans. (e) All of the above

72. Which of the following is correct about GM foods?

a. GM food includes foods and additives obtained from genetically modified organisms
b. European Union has adopted legislation requiring mandatory labelling of all GM food
c. Japan has announced mandatory evaluation of GM food for potential health risk
d. US food and Drug Administration requires the food to be labelled as genetically modified only if the changes introduced through genetic engineering have an impact on the safety or nutrition of the food itself
e. All of the above

Ans. (e) All of the above

73. Which of the following is not correct?

a. Oral exposure to transgenic tomato containing cry protein poses no additional risk to human and animal health
b. Cowpea trypsin inhibitors do show some adverse affects on rats in nutritional studies
c. In general, the quality of produce from Cry gene carrying transgenic crops is regarded different from that from the nontransgenic plants of the same variety
d. Significant hypertrophy of small intestine and altered enzyme activities in brush border cells occur due to wheat germ agglutinin

Ans. (c) In general, the quality of produce from Cry gene carrying transgenic crops is regarded different from that from the nontransgenic plants of the same variety

74. The α-amylase inhibitor from *Phaseolus vulgaris* caused allergy when expressed in which of the following by Australian Scientists?

a. Maize
b. Peas
c. Soybean
d. Tomato

Ans. (b) Peas

75. The α-amylase inhibitor gene described in Q-40 was transferred to modify which of the following traits?

a. Insect resistance
b. Amino acid balance
c. Food digestibility
d. Both a and c

And. (a) Insect resistance

76. In case of biological containment, initially, NIH guidelines required the use of *E.coli* strains and vectors that were severely debilitated, so that they could not infect humans, survive and spread outside the laboratory, and transfer the introduced foreign genes readily into other organisms. These objectives can be achieved using which of the following?

a. Plasmid vectors that are non-self transmissible and non-mobilizable
b. Autotrophic mutants of *E.coli*

c. Rec A-strain
d. Both a and c

Ans. (d) Both a and c

77. The host vector system for prokaryotes are grouped into which of the following?

a. Host vector 1 system
b. Host vector 3 system
c. Host vector 2 system
d. Both a and c

Ans. (d) Both a and c

78. In case of *E.coli* the host for any HVI system is which of the following?

a. Strain K-12
b. Strain chi 1140
c. Strain K-17
d. Strain K-1777

Ans. (a) Strain K-12

79. The vector under host-vector I system includes which of the following?

a. Variants of bacteriophages
b. Nonconjugative plasmids
c. Derivative of nonconjugative plasmid
d. All of the above

Ans. (d) All of the above

80. Which of the following is correct?

a. Under 'mail box provision' a country will accept patent applications for products related to pharmaceuticals and agricultural chemicals from January 1, 1995 and keep them for consideration after the patent laws are suitably amended
b. The member countries are required to guarantee exclusive marketing right for 5 year to each invention
c. Both a and b
d. None of these

Ans. (c) Both a and b

81. Which of the following is correct about TRIPs in relation to India?

a. India is required to change its patent laws as per the broad framework of TRIPs latest by 2008
b. India was given time till April 1999 to meet the basic commitment to TRIPs, failing which USA could call for appropriate sanctions
c. In 2000, USA complained to WTO that India has failed to meet the basic commitments to TRIPs
d. All of the above

Ans. (b) India was given time till April 1999 to meet the basic commitment to TRIPs, failing which USA could call for appropriate sanctions

82. In India which of the following is correct?

a. Product patent are not allowed
b. A provision for grant of exclusive marketing rights has been made up to July 15, 2000
c. A provision for grant of exclusive marketing right has been made up to December 31, 2004
d. All of the above

Ans. (c) A provision for grant of exclusive marketing right has been made up to December 31, 2004

83. The PPVFR Act 2001 recognizes the farmer's rights in which of the following respects?

a. Registrations of farmer's varieties are not allowed
b. Freedom of farmers to save, use, sow, resow, exchange, share or sell their own farm produces, including seed
c. Reward for the farmers engaged in the conservation of genetic resources provided that the material have been used as donors of genes in varieties registered under PPVFR Act
d. Both b and c

Ans. (d) Both b and c

84. Which of the following features are concerned with protection of plant varieties and farmers Rights Act, 2001?

a. Any variety involving any technology, which is injurious to life or health of human beings, animals or plants can be registered
b. Registration of farmers' are not allowed
c. Variety that has been 'essentially' derived from an initial variety can be registered as a new variety
d. All of the above

Ans. (c) Variety that has been 'essentially' derived' from an initial variety can be registered as a new variety

85. Which of the following features are concerned with the PPVFR Act 2001?

a. Freedom to use any registered variety for research and for creation of new varieties, except essentially derived varieties
b. Registration of variety confers an exclusive right to produce, sell, market, distribute, import or export the varieties
c. Compulsory license may be granted after 3 years of registration of a variety if seed of the variety is not available to the public
d. All of the above

Ans. (d) All of the above

86. Which of the following biotechnological invention can be patented?

a. DNA sequence and the proteins encoded, if any, by them
b. Micro-organism, cell lines, plant lines obtained through biotechnological approach
c. Both a and b
d. None of these

Ans. (c) Both a and b

87. Which of the following feature is not concerned with the PPVFR Act 2001?

a. Application for registration of a variety may be made in India within 2 years from the date of application for registration of the same plant variety made in the convention country
b. The right of PBR holder shall not be deemed infringed by a farmer who was not aware of the existence of such right'
c. Citizens of convention countries will have the same rights as citizens of India under the Act
d. The Central Govt. is to constitute a National Gene fund

Ans. (a) Application for registration of a variety may be made in India within 2 years from the date of application for registration of the same plant variety made in the convention country

88. Which of the following biotechnology related matters can be patented?

a. Process of production
b. Process material
c. Application of material
d. Any of the above

Ans. (a) Process of production

89. Methods for which of the following can be patented?

a. Method of production
b. Treatment of diseases
c. Prevention of diseases
d. Diagnosis of disease

Ans. (a) Method of production

90. In case of PPVFR Act 2001, the gene fund shall be used for which of the following?

a. Conservation of genetic resources
b. Sustainable use of genetic resources
c. Paying compensation to communities for their contributions to the development of a variety
d. All of the above

Ans. (d) All of the above

91. Effective dissemination of plant-associated microorganisms beyond the green house can be prevented by using which of the following?

a. Organisms which require another organisms for their survival
b. Organisms whose natural mode of transmission requires injury to the host
c. Both a and b
d. None of these

Ans. (b) Organisms whose natural mode of transmission requires injury to the host

92. The type of regulation necessary during field trials should depend on which of the following?

a. Ability of the modified plants to survive in nature
b. Their ability for dispersal and reproduction
c. Their ability to hybridize with crop and weed plants
d. All of the above

Ans. (d) All of the above

93. Which of the following is correct about transmission of transgenes from one crop species to another?

a. If male sterility is introduced in to transgenic cross-pollinated crops, it can check the movement of transgenes through pollen grains
b. In case of cross-pollinated species, isolation by distance is rarely sufficient to prevent inter-population mating
c. Both a and b
d. None of these

Ans. (c) Both a and b

94. Which of the following is not correct about Cry proteins?

a. The cry protein present in the soil become associated with soil clay / humus, and become prone to microbial degradation
b. Cry protein are rapidly degraded by the stomach juices of vertebrates
c. They could have harmful effects on non target insect species
d. None of the above

Ans. (a) The cry protein present in the soil become associated with soil clay/ humus, and become prone to microbial degradation

95. The survival of GEMs in nature, and gene transfer from them to native bacterial population can be minimized by which of the following strategies?

a. Use of auxotroph mutant
b. Use of *Rec A*$^-$ strains

c. Integration of the transgene into the bacterial chromosome
d. Use of appropriate lethal genes to limit the survival of GEMs to the specified
e. All of the above

Ans. (e) All of the above

96. Which of the following is not correct?

a. *Rec A*$^-$ strain lack recombination
b. Auxotrophic mutants can survive in nature
c. Transgenes integrated in to plasmids may be transferred to other bacteria
d. Transposon vectors lacking transposase gene are not able to transpose to other bacteria

Ans. (b) Auxotrophic mutants can survive in nature

97. The *gef* containment system is based on which of the following elements?

a. The regulator gene *lac* I linked to the promoter pm.
b. The structural gene *gef* driven by *E.coli* promoter *Plac.*
c. Both of these
d. None of these

Ans. (c) Both of these

98. First recombinant microorganism (Tn5- containing strain of *Pseudomonas fluorescens*) was released in which of the following countries?

a. India
b. Australia
c. Germany
d. Netherland

Ans. (d) Netherland

99. Most of the recombinant microorganism released in the environment consisted of only a simple inactivation of genes by which of the following?

a. Genetic tagging of bacteria with specific marker.
b. Transposon insertion
c. Deletion of genes by molecular genetic procedure *in-vitro*
d. All of the above

Ans. (d) All of the above

100. Which of the following non-infectious illnesses is associated with endotoxin production?

a. Hypotension
b. Hypertension
c. Ferminization of male
d. Both b an c

Ans. (d) Both b an c

101. Which of the following non-infectious illnesses is associated with endotoxin production?

a. Hepatitis
b. Asthma
c. Flu symptoms
d. Dermatitis

Ans. (c) Flu symptoms

102. Which of the following hazards is associated with operation of bioreactor fermentation?

a. Aerosols from reactor
b. Effluent contamination of gases
c. Spillage
d. All of the above

Ans. (d) All of the above

103. Non-infections illnesses like allergic asthma and dermatitis are associated with which of the following production processes?

a. Non antibiotic
b. Brewing
c. Single cell protein
d. Antibiotic

Ans. (c) Single cell protein

104. Which of the following is correct about guidelines and regulation of biosafety?

a. A licensing may be imposed on the export of genetically manipulated organisms
b. A voluntary code of conduct, i.e. an international agreement between industry and governments on various biotechnological products and processes, may be promoted
c. Appropriate legislation should be promoted in those countries that lack them
d. All of the above

Ans. (d) All of the above

105. Which of the following standard micro-biological practices are concerned with biosafety level 1 experiments with microorganism?

a. Access to the laboratory is restricted at the discretion of principle investigator, when the experiments are in progress
b. All contaminated liquid or solid wastes are decontaminated before disposal
c. Mouth pipetting is prohibited
d. All of the above

Ans. (d) All of the above

106. Which of the following is correct about parenting of genes and DNA sequences isolated from naturally occurring organisms?

a. Patents are allowed in Australia
b. The first patent was for the protein Cry A

c. The first patent was for the gene aro A
d. Patent are allowed in India

Ans. (c) The first patent was for the gene aro A

107. Which of the following is correct about gene *Xa21*?

a. The gene was isolated first by Dr. V. Kurian
b. Dr G.S. Khush transferred it into *Oryza Sativa*, named it as *Xa21* and located it on chromosome 11
c. A.G.Tensely identified the molecular markers flanking *Xa21*
d. All of the above

Ans. (b) Dr G.S.Khush transferred it into *Oryza Sativa*, named it as *Xa21* and located it on chromosome 11

108. Which of the following forms can not be patented in India under the provisions of Indian patents Act 1970?

a. Animals
b. DNA sequence
c. Microorganism obtained through biotechnological approach
d. All of the above

Ans. (a) Animals

109. Patent activity is the lowest in which of the following?

a. India
b. Japan
c. USA
d. Europe

Ans. (a) India

110. Which of the following is concerned with broad patents in biotechnological?

a. Patent listed in item I was challenged and the US PTO revoked it in December 1994 as a consequence of its re-examination
b. A similar patent to Agracetus was granted in India in 1991, but it was revoked in 1994
c. The final position of this revocation will be clear only after Agracetus has exhausted all the opportunities of appeal
d. All of the above

Ans. (d) All of the above

111. Column A lists the names of companies and column B lists names of technologies/ processes for which broad patents were granted. Match both the columns carefully and select the correct option from those listed below them

A. Enzo Biochemm, Inc.	I. Gene gun method of genetic engineering of soybean
B. Mycogen corp	II. Any method of modifying the cry gene of B. Thuringiensis
C. W.R. Grace & Co.	III. Antisense 'RNA technology'

a. A-III, B-II, C-I
b. A-II, B-III, C-I
c. A-I, B-II, C-III
d. A-III, B-I, C-II

Ans. (a) A-III, B-II, C-I

112. Column A lists the names of the companies and column B lists the traits for which broad patents were granted. Match both the columns carefully and select the correct option from those given below them.

A. Pioneer Hi-Bred	I. Insect resistance (*cry*. Gene)
B. Dekalb genetic crop	II. Low level of saturated fatty acids
C. Plant genetic system	III. Increased lysine content

a. A-II, B-III, C-I
b. A-III, B-II, C-I
c. A-I, B-II, C-III
d. A-III, B-I, C-III

Ans. (a) A-II, B-III, C-I

113. Column A lists the names of companies and column B lists names of the transgenic plants for which broad patents were granted. Match both the columns carefully and select the correct option from those listed below them

A. W.R.Grace & Co.	I. Brassica family
B. DNA plant technology	II. Pepper
C. Calgene, Inc.	III. Cotton, soybean

a. B-III, A-II, C-I
b. A-III, B-II, C-I
c. A-I, B-II, C-III
d. A-II, B-III, C-I

Ans. (b) A-III, B-II, C-I

114. Which of the following is correct about the convention on biological diversity?

a. CBD recognizes the sovereign rights of nations over their genetic rsources
b. India was a signatory to the International Undertaking on Plant Genetic Resources developed by the FAO in 1983
c. On December 29, 1993, India and 172 other nations signed this
d. All of the above

Ans. (d) All of the above

115. Which of the following technologies and raw material were used to develop Endless Summer tomato by DNA plant Technology?

a. Antisense RNA technology and *Agrobacterium tumefaciens* mediated genetic transformation
b. Selectable marker hpt II
c. Both of these
d. None of these

Ans. (a) Antisense RNA technology and *Agrobacterium tumefaciens* mediated genetic transformation

116. Which of the following laboratory facilities are concerned with BL 1 experiments with micro-organisms?

a. Laboratory furniture must be sturdy and spaces between benches, cabinets and equipments must be accessible for cleaning
b. Each laboratory must have a sink for hand washing
c. Bench tops must be impervious to water, and resistant to acids, alkalis, organic solvents and moderate heat
d. All of the above

Ans. (d) All of the above

117. Which of the following standard microbiological practices are concerned with BL-1 experiments with micro-organism?

a. All procedures must be performed carefully so that a minimum of aerosols are created
b. Eating, drinking, smoking and applying cosmetics are not permitted in the laboratory premises
c. None of these
d. Both a and b

Ans. (d) Both a and b

118. In case of experiments with micro-organisms, BL2 differs from BL1 with respect to which of the following?

a. Spills and accidents involving organisms containing recombinant DNA molecules are immediately reported to the institutional bio safety committee and higher bodies concerned with bio safety
b. Access to the laboratory is limited when the experiment are in progress
c. Both a and b
d. None of these

Ans. (c) Both a and b

119. In case of experiments with microorganisms, BL-3 has which of the following additional chief safety measures over BL-2?

a. Laboratory personnel have specific training in handling pathogenic and potentially lethal agents
b. All procedures involving the manipulation of infectious material are conducted with biological safety cabinets.
c. Both a and b
d. None of these

Ans. (c) Both a and b

120. In case of experiments with microorganisms, which of the following is related to BL-4?

a. Biological materials to be removed from class III cabinets in a viable state are transferred in to non-breakable sealed primary and secondary containers
b. Entry in the laboratory is limited to only those who work in the area
c. Personnel enter and exit the facility only through the clothing change and shower rooms
d. All of the above

Ans. (d) All of the above

121. In case of experiments with animals, which of the following procedures is followed at all biosafety levels?

a. Animal carcass is disposed off to avoid its use as food
b. A permanent record is maintained of the experimental use and disposal of each animal
c. Only b is correct
d. Both a and b is correct

And. (d) Both a and b is correct

122. Which of the following is correct about biosafety level 1 for animals?

a. Access to the containment area shall be limited or restricted when experimental animals are being held
b. The containment area shall not be monitored at frequent intervals
c. The animals shall not be confined to security fenced areas
d. All of the above

Ans. (a) Access to the containment area shall be limited or restricted when experimental animals are being held

123. Biosafety level 3 for animals differs from BL-2N in which of the following respects?

a. Animals room doors shall be kept closed when experiment are in progress
b. The work surfaces of containment equipment shall be decontaminated when work with organisms containing recombinant DNA is finished

c. All animals shall be euthanized at the end of their experimental usefulness
d. Special procedures and IBC approval shall be requied to transfer specimens to a low biosafety level area
e. All of the above

Ans. (e) All of the above

124. In which of the following respects, BL-4 for animals represents greater stringency than BL-3-N?

a. All waste from the animal rooms and laboratories shall not be decontaminated before disposal
b. The animal shower entrance exit area shall not be equipped with an chemical disinfectant shower
c. Individuals under 16 years of age shall not be allowed entry
d. All of the above

Ans. (c) Individuals under 16 years of age shall not be allowed entry

125. Which of the following are related to biosafety level 2 for animals?

a. Appropriate steps should be taken to prevent exposure of laboratory personnel
b. Eating, drinking, smoking and applying cosmetic shall be prohibited
c. Viable biological materials are removed from the containment as in the case of BL-4 plants
d. All of the above

Ans. (d) All of the above

126. Which of the following is correct about biosafety guidelines in India?

a. Every organization involved in research and development using recombinant DNA is required to set up an University Biosafety committee
b. The DBT has a review committee for genetic manipulation which reviews all the approvals of ongoing projects on GMOs
c. The minority of environment and forestry has an international committee, called the Genetic Engineering Approval committee
d. All of the above

Ans. (b) The DBT has a review committee for genetic manipulation which reviews all the approvals of ongoing projects on GMOs

127. Which of the following is related to biosafety guidelines in India?

a. The guidelines recognise three levels of risk in the case of experiments with microorganisms
b. Four different biosafety levels are recognised and containment facilities for each level are recommended for necessary safeguard
c. Biological containment consists of the use of vectors and hosts in such way so that it limits the host vector survival in the environment
d. All of the above

Ans. (d) All of the above

128. According to biosafety guidelines of India, physical containment envisages to limit the spread of dangerous microorganism by which of the following?

a. Laboratory design and facilities
b. Safety equipment
c. Both a and b
d. None of these

Ans. (c) Both a and b

129. According to biosafety guidelines of India, experiments with microorganism, plants and animals are grouped into which of following categories?

a. Category requiring intimation of initiation to competent authority
b. Category requiring review and approval by the competent authority
c. Both of the correct
d. None of these

Ans. (c) Both of the correct

130. Which of the following is related to biosafety guidelines of India?

a. Application for recognition of research facility to carry out genetic manipulation should be made to the department of Environment before the commencement of work
b. All products obtained using recombinant DNA technology shall be subject to the general regulations normally applicable for such products.
c. The controlled release of GMOs should be done under appropriate containment facilities
d. Pre-release tests of GMOs in agriculture should include elucidation of requirements for vegetative growth and persistence and stability in small plots and experimental fields
e. All of the above

Ans. (e) All of the above

131. Risk assessment for transgenic plants takes into account which of the following?

a. Diagram of the expression cassette to describe fully the marker genes used
b. Cell lines used for shuttling and amplification of the cassette

c. None of these
d. Only a is correct

Ans. (d) Only a is correct

132. Crop yield can be stabilized by introducing which of following genes in transgenic varieties?

a. Genes for better tolerance/resistance to biotic and/or abiotic stresses
b. Genes for herbicide resistance
c. Genes for improved nutritional quality
d. All of the above

Ans. (a) Genes for better tolerance/resistance to biotic and/or abiotic stresses

133. The PPVFR Authority began registration of plant varieties in which of the following years?

a. 2004
b. 2000
c. 2007
d. 2010

Ans. (c) 2007

134. In order to survive in an IPR hungry world, systematic, effective and continued effort must be made to train Indian scientists and technologists to enable to provide technical support for which of the following?

a. Defending patents
b. Identifying infringements
c. Writing 'world-class' patent based on their innovation
d. All of the above

Ans. (d) All of the above

135. Which of the following is offered by PBR?

a. Disincentive to private companies to invest in plant breeding activities
b. Decreased competition among various organization engaged in plant breeding
c. Access to varieties developed in other countries and protected by IPR laws
d. All of the above

Ans. (c) Access to varieties developed in other countries and protected by IPR laws

136. In order to survive in an IPR hungry world, efforts must be made to bring about which of the following in India?

a. Modernisation of Indian parliament office
b. Drastic reform of educational system to produce vibrant, innovative, committed and motivated individuals
c. Introduction of IIA in curriculum
d. Creation of Logitech data of our national resources

Ans. (b) Drastic reform of educational system to produce vibrant, innovative, committed and motivated individuals

137. IPR management involves which of the following?

a. Transfer of the IPR appropriately and at optimum value
b. Renewal of patents and designs periodically
c. Monitoring infringements and enforcing IPRs
d. All of the above

Ans. (d) All of the above

138. Which of the following benefits is offered by IPRs?

a. It discourage and not safe intellectual and artistic creations
b. It enables the dissemination of new ideas and technology quickly and widely
c. Discourage investments in R & D efforts
d. None of these

Ans. (b) It enables the dissemination of new ideas and technology quickly and widely

139. Which of the following may be associated with PBR?

a. Polipolies in genetic materials for specific traits
b. Lower than the demand of seed production in order to achieve more profits
c. Decrease cost of seed
d. Higher than the demand of seed production in order to achieve more profits

Ans. (b) Lower than the demand of seed production in order to achieve more profits

140. Which of the following is an example of geographical indications?

a. Scotch whiskey
b. California whiskey
c. Champagne whiskey
d. Champion wine

Ans. (a) Scotch whiskey

141. Which of the following may be the consequence of IPR regime?

a. Adverse effects on biological diversity and ecological balance
b. Detrimental to the livelihood of poor in developing countries
c. Threat to food security
d. All of the above

Ans. (d) All of the above

142. Geographical indication includes which of the following?

a. Natural products
b. Bad for handicraft
c. Not good for agriculture
d. Artificial products

Ans. (a) Natural products

143. In the first instance, PPVFR began registration of varieties in how many of the crops?

a. 10 b. 12
c. 15 d. 20

Ans. (b) 12

144. Which of the following is not correct about geographical indication?

a. The GIs do not cover manufactured products and even food products
b. India has enacted the Geographical indication Act (1999) to claim GI for a variety of goods, including 'Basmati rice'
c. Once enforced by legislation, GIs exclude others from using a GI as trademark
d. The chief requirements for GI protection is that a given quality, reputation or some other characteristic of the product be essentially attributable to the locality of its origin

Ans. (a) The GIs do not cover manufactured products and even food products

145. PPVFR Act (2001) allows registration of which of the following?

a. Breeder varieties b. Wild varieties
c. Farmer varieties d. All of the above

Ans. (c) Farmer varieties

146. Monitoring and tackling the IPR aspects of inventions has which of the following features?

a. May act as a disincentive for R & D efforts.
b. Enhances cost
c. Demands time
d. All of the above

Ans. (d) All of the above

147. GM food may differ from those prepared from the conventionally developed varieties with respect to which of the following?

a. A metabolic product generated by the transgene products
b. Altered levels of natural toxins and important nutrients
c. Both of the above
d. None of these

Ans. (c) Both of the above

148. The potential risk from novel DNA sequences used during transgenic development may be summed up as which of the following?

a. Protein products of transgenes or products generated by them may be toxic
b. The transgene product may be allergenic
c. Antibiotic resistance genes may be taken up by human intestinal microflora. Which, as a consequence, become resistant to these antibiotics
d. All of the above

Ans. (d) All of the above

149. Transgenic plants could serve as vectors for transgene dissemination through which of the following?

a. DNA released form debris of transgenic plant
b. Stigma
c. Flower
d. All of the above

Ans. (a) DNA released form debris of transgenic plant

150. Which of the following is not correct?

a. Volunteers are not likely to pose problems in crops like rapeseed and mustard
b. All foods that contain more than 1% GMOs related to the different ingredients have to be labelled
c. In case of organic farming, utilization and presence of GMOs is excluded
d. In European Union, the maximum permissible limit for GMO content in conventional food products and food ingredients is 1% at the marketing stage

Ans. (a) Volunteers are not likely to pose problems in crops like rapeseed and mustard.

151. The rate of gene flow is affected by which of the following factors?

a. Mode of seed dispersal
b. Mode of pollination
c. Mode of pollution
d. Both a and b

Ans. (d) Both a and b

152. Which of the following is not correct about lectins?

a. They are involved in defence mechanism of plants
b. They are polysaccharides

c. Several lectins have been identified as food allergens.
d. None of the above

Ans. (b) They are polysaccharides

153. The international life science institute advocates which of the following criteria for assessing whether a protein poses no risk of allergy?

a. Known to cause allergies
b. It is not expressed at low levels
c. Lack of amino acid sequence similar to that of known allergens
d. All of the above

Ans. (c) Lack of amino acid sequence similar to that of known allergens.

154. In the assessment of allergenicity, the source of transgene is the first consideration; the transgene may be obtained from which of the following?

a. Less commonly allergenic food
b. Commonly allergenic food
c. Both of these
d. None of these

Ans. (c) Both of these

155. Which of the following toxic effects is associated with proteinase inhibitor?

a. Hypoplasia b. Weight loss
c. Hyperplasia d. None of the above

Ans. (c) Hyperplasia

156. Which of the following compounds is associated with toxic effects and is also involved in plant defence reaction/mechanism?

a. Phytoalexins b. Alcohol
c. Thiamine d. Thyroxin

Ans. (a) Phytoalexins

157. Which of the following is known to be a food allergen?

a. Wheat germ agglutinin b. Tryptophan inhibitor
c. Tyrosin inhibitor d. None of the above

Ans. (a) Wheat germ agglutinin

158. Which of the following is correct about wheat germ agglutinin?

a. It is effective against insects at concentration of 10 mg/kg body weight
b. It produces cytotoxic effects in rats at a lower concentration
c. Safe food has it only at 0.3 mg/kg
d. All of the above

Ans. (d) All of the above

159. Which of the following is not correct?

a. Acute toxic effect depends on the concentration of the compound in question
b. Any outstanding insect resistant whose biochemical basis is not known should be considered as the prime candidate for toxicological evaluations
c. Transgene isolation from a food crop guarantees the food safety of the transgene product
d. None of the above

Ans. (c) Transgene isolation from a food crop guarantees the food safety of the transgene product

160. Which of the following is not correct about bromoxynil?

a. It is toxic to fish and may cause cancer in humans
b. It causes birth defects in laboratory animals
c. It is a non-biodegradable herbicide
d. Bromoxynil is absorbed through the skin

Ans. (c) It is a non-biodegradable herbicide

161. Transgenic crops are perceived by many to pose which of the following threats to the environment?

a. Insect resistant transgenic crops may affect target species
b. They have no adverse impact on biodiversity
c. They may alter the composition of rhizosphere and phyllosphere microflora
d. None of the above

Ans. (c) They may alter the composition of rhizosphere and phyllosphere microflora

162. Which of the following techniques can be used for minimizing pollen-mediated gene flow from transgenic varieties of crops?

a. Gene tagging
b. Integration of transgene in to the chloroplast
c. Female sterility
d. All of the above

Ans. (b) Integration of transgene in to the chloroplast

163. For minimising pollen-mediated gene flow from transgenic varieties of *solanum tuberosum*, how many meters of isolation distance is recommended?

a. 50 b. 20
c. 40 d. 70

Ans. (b) 20

164. Which of the following can be used to minimise transgene transfer from transgenic varieties of crops?

a. Apomixes b. Polyploidy
c. Cleistogamy d. Trisomy

Ans. (c) Cleistogamy

165. Seed sterility can be reduced by using which of the following technique?

a. Recoverable block of function
b. Cleistogamy
c. Apomixes
d. Transgenic mitigation

Ans. (a) Recoverable block of function

166. Strategy of temporal and tissue specific expression for preventing transgene transfer from transgenic varieties of crops is based on which of the following techniques?

a. Inducible promoters allow expression only when the inducer is present
b. Tapetum-specific promoters allow expression only when the suppressor is present
c. Terminator technology
d. Recoverable block of function

Ans. (a) Inducible promoters allow expression only when the inducer is present

167. Which of the following concerns has been expressed about the agriculture performance of transgenic varieties?

a. Unstable transgene expression over environment product
b. Genetic vulnerability due to large scale cultivation of single varieties
c. Yield drag
d. All of the above

Ans. (d) All of the above

168. Roundup ready transgenic variety of soybean showed, on an average, how much yield decrease as compared to the *non-transgenic* parent varieties in USA, in a comparison based on field trials at 8,200 different location?

a. 10 %
b. 20%
c. 5%
d. 8%

Ans. (c) 5%

169. The risk assessment in relation to transgenic crop varieties should include which of following considerations?

a. Occurrence of wild relatives of the concerned crop in the area where transgenic varieties are to be cultivated
b. The degree of pollinator insect activity
c. The pest diversity of the given crop and their relative economic importance
d. All of the above

Ans. (d) All of the above

170. In India, it is insisted upon that field trials with transgenic plants observe which of he following?

a. Within the isolation distance, nontransgenic varieties of the crop should be planted to assess the extent and distance of pollen transfer from the transgenic plants
b. The isolation distance recommended for the foundation seed crop of the concerned crop be maintained
c. Both a and b
d. None of these

Ans. (c) Both a and b

171. In India, it is insisted upon that field trials with transgenic plants observe which of the following?

a. All the vegetative plants and leftover seed be destroyed by burning after the experiment
b. The experimental field be visited by the company authorised personnel only
c. Full account of transgenic seeds produced be maintained and no transgenic seed be transacted or further propagated without authorization
d. All of the above

Ans. (d) All of the above

172. The European Patent Convention excludes from patent protection such inventions that are contrary to the public order of morality is under the act of

a. Article 53 (A)
b. Article 53 (B)
c. Article 54 (A)
d. Article 54 (B)

Ans. (a) Article 53 (A)

173. The European patent convention excludes from patent protection

1. Plant and animal varieties
2. Essential biological processes for the production of plants and animals under the act of

a. Article 53 (A)
b. Article 53 (B)
c. Article 54 (A)
d. Article 54 (B)

Ans. (b) Article 53 (B)

174. Intellectual property is categories into

a. Industrial property
b. Artistic and Literary property
c. Both a and b
d. None of these

Ans. (c) Both a and b

175. The deals with protection of the expression of an idea; however it does not protect the idea itself is called

a. Copy right
b. Industrial design
c. Geographical indication
d. Trade mark

Ans. (a) Copy right

176. The TRIPs agreement came is

a. 1994 b. 1995
c. 1996 d. 1997

Ans. (b) 1995

177. The patent Act, 1970 was amended first time in the year of

a. 1999 b. 1996
c. 1995 d. 1991

Ans. (a) 1999

178. The patent Act, 1970 was amended second time in the year of

a. 1999 b. 2000
c. 2001 d. 2002

Ans. (d) 2002

179. The patent Act, 1970 was amended third time in the year of

a. 1999 b. 2002
c. 2004 d. 2005

Ans. (d) 2005

180. The time period accorded for protection of the invention has been set uniformly for all categories of inventions at

a. 18 year b. 19 year
c. 20 year d. 22 year

Ans. (c) 20 year

181. An 'invention' as a new product or process involving an inventive step and capable of industrial application under

a. Section 2(1) (j)
b. Section 3(j)
c. Section 2(1) (ja)
d. Section 3(ja)

Ans. (a) Section 2(1) (j)

182. Patentability requirements as per the Indian patents act are

a. It should be new
b. It should involve an inventive step
c. It should be capable of industrial application
d. All of these

Ans. (d) All of these

183. Essentially biological process falls under the exclusion of patentability under the section of the Indian Patent Act.

a. Section 2(1) (j) b. Section 2(1) (ja)
c. Section 3(j) d. Section 3(ja)

Ans. (c) Section 3(j)

184. The genes are not patentable when they are in the

a. *In-situ* b. *Ex-situ*
c. Both a and b d. None of these

Ans. (a) *In-situ*

185. The 2001 utility examination guidelines follow the 1999 revised interim Utility Guidelines in adopting the structure of

a. Specific, substantial and credible utility test
b. Well established utility test
c. Both a and b
d. None of these

Ans. (c) Both a and b

186. Under both 1999 and 2001 guidelines establish that a substantial utility is one that defines a

a. Subject matter claimed
b. Real world use
c. DUS test
d. Novelty

Ans. (b) Real world use

187. A US patent (US5, 972,609) has been awarded in 1999 for a utrophin gene promoter that they may be used to control of

a. Transcription of heterologous sequence
b. PPVFR act 2001
c. Distinctiveness
d. Uniformity

Ans. (a) Transcription of heterologous sequence

188. Indian chose to opt for a *Sui generis* System for protection of plant and plant varieties by enacting the

a. Transcription of Heterologous sequence
b. PPVFR act 2001
c. Distinctiveness
d. Uniformity

Ans. (b) PPVFR act 2001

189. There has been a decreasing intellectual property activity in the area of biotechnology since

a. 2000 b. 2001
c. 2002 d. 2003

Ans. (c) 2002

190. Which Indian organisation is more active in the area of patenting?

a. ICAR b. CSIR
c. ICMR d. BARC

Ans. (b) CSIR

191. Some of the Indian companies active in the area of intellectual property right are

a. Ranbaxy b. Dabur
c. Ayur d. All of these

Ans. (d) All of these

192. The institution of CSIR active in the area of intellectual right are

a. NBRI b. IICT
c. CIMAP d. All of these

Ans. (d) All of these

193. The utility patents and the plant protection patents are granted by

a. USPTO b. PVTO
c. Both a and b d. None of these

Ans. (a) USPTO

194. The plant variety protection act is granted by

a. Plant variety protection officer
b. Plant Breeder
c. Plant protection officer
d. All of these

Ans. (a) Plant variety protection officer

195. In India, animals in whole and any part thereof are not patentable under section of PATENT Act

a. Section 2(1) (j) b. Section 2(1) (ja)
c. Section 3 (j) d. Section 3(1) (j)

Ans. (c) Section 3 (j)

196. In biotechnological components that are also patentable

a. Transformation vectors
b. Selectable marker gene
c. Reporter gene
d. All of these

Ans. (d) All of these

197. The first patent of a life form was issued on

a. March 31, 1980
b. March 31, 1981
c. March 31, 1982
d. March 31, 1983

Ans. (c) March 31, 1982

198. Trade secret related to

a. Certain material, e.g. bacterial strain
b. Processes
c. Formulae
d. Any of the above

Ans. (d) Any of the above

199. In the area of biotechnology, which material can be kept as trade secret?

a. Strains of microorganism
b. Cell lines
c. Production process
d. All of these

Ans. (d) All of these

200. Indian has created a National Biodiversity authority with headquarters at

a. Chennai b. New Delhi
c. Kolkata d. Mumbai

Ans. (a) Chennai

201. In USA, which systems are available for protection of IPRs related to plants?

a. The plant patents Act (1930)
b. The plant variety protection act (1970)
c. The utility patents act (1985)
d. All of the above

Ans. (d) All of the above

202. Government of India has now established the PPVFR Authority with headquarters at

a. Chennai
b. Kolkata
c. New Delhi
d. Hyderabad

Ans. (c) New Delhi

203. Which biotechnology related matters can be patented?

a. Method/process of production
b. Products
c. Application
d. Any of these

Ans. (d) Any of these

204. Monitoring and tackling the IPR aspects of invention has

a. Demand time
b. Enhances cost
c. May act as a distinctive for R&D effort
d. All of these

Ans. (d) All of these

205. PPVFR act (2001) allows registration of

a. Farmer's varieties
b. Extant varieties
c. New varieties
d. All of these

Ans. (d) All of these

CHECK YOUR GRASP

1. Which of the following are the chief requirements for the grant of a patent?

a. Not novelty
b. Usefulness is not required
c. Inventiveness
d. All of the above

2. Trade secret offers which of the following advantage?

a. Low cost of maintaining the secret
b. The risk of innovation by someone else is minimized
c. Not effective for unlimited duration
d. All of the above

3. Trade secrets suffer from which of the following disadvantage?

a. Maintaining a trade secret itself is costly
b. It offers protection from independent innovation/ invention.
c. It can be applied to many inventions
d. All of these

4. Which of the following statements are correct about patents?

a. The subject matter must be ordinary
b. In 1985, the American Supreme court ruled that a live, human made microorganism can be patented under the American patent law as a manufacture or composition of matter
c. In 1980, the American Supreme court ruled that a live, human made microorganism can be patented under the American patent law as a manufacture or composition of matter
d. None of these

5. Trade secret can not be applied for which of the following invention?

a. Cell lines
b. Strain of microorganism
c. Plant varieties
d. All of the above

6. PPVFR Act (2001) allows registration of which of the following?

a. Breeder varieties
b. Wild varieties
c. Farmer varieties
d. All of the above

7. Monitoring and tackling the IPR aspects of inventions has which of the following features?

a. May act as a disincentive for R & D efforts.
b. Enhances cost
c. Demands time
d. All of the above

8. In case of which of the following products, an empirical approach based on data obtained through experimentation about the source of potential hazards has proved satisfactory?

a. Drugs
b. Vaccines
c. Pesticides
d. All of the above

9. In risk assessment, a lack of scientific knowledge or scientific consensus should not necessarily be interpreted as indicating which of the following?

a. Absence of risk
b. Acceptable risk
c. None of the these
d. Both a and b

10. The assessment of risk during laboratory research is usually done in which of the following steps?

a. Initial risk assessment
b. Advanced risk assessment
c. Comprehensive risk assessment
d. Both a and c

11. The first patent of a life form was issued on

a. March 31, 1980
b. March 31, 1981
c. March 31, 1982
d. March 31, 1983

12. The TRIPs agreement came is

a. 1994
b. 1995
c. 1996
d. 1997

13. The genes are not patentable when they are in the

a. *In-situ*
b. *Ex-situ*
c. Both a and b
d. None of these

In case of less than 80% score, go through brief review and glance once again from chapter

Key: 1-c 2-b 3-a 4-c 5-c 6-c 7-d 8-d 9-d 10-d 11-c 12-b 13-a

7

General Biochemistry and Metabolism

1. In β vulgaris, the storage product of photosynthesis is

a. Glucose
b. Lactose
c. Sucrose
d. Starch

Ans. (d) Starch

2. Malt sugar consists of two molecules of

a. Sucrose
b. Maltose
c. Glucose
d. Fructose

Ans. (c) Glucose

3. Examples of neutral amino acid are

a. Lysine, Argenine, Valine
b. Proline, Lucine, Isolucine
c. Argentine, Aspatate, Alanine
d. Alanine, glycine, Valine

Ans. (d) Alanine, glycine, Valine

4. The precursor of nicotinamide and IAA is

a. Alanine
b. Tryptophan
c. Proline
d. Glycine

Ans. (b) Tryptophan

5. Adenosine comprises

a. Adenine and sugar
b. Adenine and phosphate
c. Adenine and tyrosine
d. None of these

Ans. (a) Adenine and sugar

6. Which vitamin is a constituent of FMN?

a. Tocoferol
b. Nicotinic acid
c. Riboflavin
d. Nicotinamide

Ans. (c) Riboflavin

7. Nicotinamide-ribose phosphate-adenine are the components of

a. NAD
b. NADH
c. NADP
d. FADH2

Ans. (c) NADP

8. An organelle rich in Mn is

a. SER
b. Mitochondria
c. RER
d. Ribosome

Ans. (b) Mitochondria

9. Enzyme requiring ATP essentially require

a. Na
b. Mg
c. B
d. K

Ans. (b) Mg

10. A polysaccharide made up of arabinose, galactose and galacturonic acid is

a. Pectin
b. Cellulose
c. Hemicelluloses
d. None of these

Ans. (c) Hemicelluloses

11. An element essential for the biosynthesis of protein is

a. Mg
b. Fe
c. N
d. K

Ans. (c) N

12. What type of starch grains are found in wheat?

a. Simple and centric
b. Compound and centric
c. Compound and eccentric
d. All of these

Ans. (b) Compound and centric

13. Algin is a

a. Mucoprotein
b. Mucopolypeptide
c. Mucopolysaccharide
d. None of these

Ans. (c) Mucopolysaccharide

14. The most abundant protein found in the biosphere is met within

a. Cytosol
b. Cytoplasm
c. Chloroplast
d. Legumes

Ans. (c) Chloroplast

15. The most abundantly met organic compound in the biosphere is

a. Protein
b. Fat
c. Carbohydrate
d. Cellulose

Ans. (d) Cellulose

16. Highest percentage of cellulose is found in the fibres of

a. Flax
b. Wood
c. Cotton
d. Linter

Ans. (c) Cotton

17. An ayurvedic medicine isabgol is obtained from

a. Root
b. Leaves
c. Seeds
d. Stem

Ans. (c) Seeds

18. Which one of the following is a water-soluble vitamin?

a. K
b. D
c. C
d. E

Ans. (c) C

19. A vitamin carotenoid in nature is

a. C
b. B
c. A
d. K

Ans. (c) A

20. The protein part of the holoenzyme is called

a. Isoenzyme
b. Ribozyme
c. Apoenzyme
d. Coenzyme

Ans. (d) Coenzyme

21. A co-factor of cytochrome oxidase is

a. Mg
b. Co
c. Cu
d. Fe

Ans. (d) Fe

22. Which of the following enzymes are not involved in galactose metabolism?

a. Galactokinase
b. Glucokinase
c. Galactose-1-Phosphate Uridyltransferase
d. UDP-Galactose 4- epimerase

Ans. (b) Glucokinase

23. A coenzyme constituent of cristae of mitochondria is

a. Ferredoxin
b. Plastocynin
c. Cytochrome
d. NADP

Ans. (c) Cytochrome

24. Which of the following is an imino acid?

a. Serine
b. Alanine
c. Glycinae
d. Prodline

Ans. (d) Prodline

25. Kinase belongs to which group of enzyme?

a. Lyases
b. Transferases
c. Hydrolase
d. Reductase

Ans. (b) Transferases

26. Enzymes which are regularly required throughout the life-time are called?

a. Ligases
b. Transferases
c. Constitutive enzymes
d. Metabolic enzymes

Ans. (c) Constitutive enzymes

27. A rare enzyme that does not contain protein is

a. Transferase
b. Lyases
c. Hydrolase
d. Ribozyme

Ans. (d) Ribozyme

28. An enzyme that brings about rearrangement of molecular structure and forms a compound of the same molecular weight is referred to as

a. Protease
b. Lipase
c. Ligase
d. Isomerase

Ans. (d) Isomerase

29. Blocking of active site of an enzyme is a kind of

a. Feed-back inhibition
b. Non-competitive inhibition
c. Competitive inhibition
d. None of these

Ans. (c) Competitive inhibition

30. Which one of the following is correct in respect to competitive inhibition

a. ES + I = ESI
b. E + I = EI + S = ESI
c. E + I = EI
d. None of these

Ans. (c) E + I = EI

31. The best evidence of enzyme action to support lock and key theory is that

a. All enzymes are made up of protein
b. Enzymes speed up certain reaction
c. Occurrence of competitive inhibitor
d. Enzymes determine the direction of a reaction

Ans. (c) Occurrence of competitive inhibitor

32. Enzyme lipase acts upon

a. Fat
b. Lipid
c. Amino acid
d. Carbohydrate

Ans. (a) Fat

33. Which of the following is not an enzyme?

a. Papain
b. Ptylin
c. Zeatin
d. Bromelain

Ans. (c) Zeatin

34. Nitrite is formed from nitrate in plant cell during nitrogen metabolism. This process is mediated by

a. Nitrate reductase
b. Nitrate oxidase
c. Nitrite reductase
d. Nitrite oxidase

Ans. (c) Nitrite reductase

35. An allosteric enzyme has

a. One active and one allosteric site
b. Two active sites
c. One active site
d. One active site and two type of allosteric sites

Ans. (a) One active and one allosteric site

36. The enzyme catalysing break-down without addition of water are called

a. Ligases
b. Lyases
c. Lipase
d. Oxidoreductase

Ans. (b) Lyases

37. Which one of the following is a constituent of coenzyme?

a. Thiamine
b. Cytosine
c. Inulin
d. Insulin

Ans. (a) Thiamine

38. The presence of c-terminal sequence, KDEL, in the mammalian proteins results in their retention in which of the following compartments of the cell?

a. Endoplasmic reticulum
b. Mitochondria
c. Peroxisome
d. Chloroplast

Ans. (a) Endoplasmic reticulum

39. An example of conjugated protein enzyme is

a. Protease
b. Urease
c. Amylase
d. All of the above

Ans. (b) Urease

40. Which enzyme is required to digest the reserve food material found in castor?

a. Ligase
b. Lipase
c. Diastase
d. Protease

Ans. (b) Lipase

41. Which process is inhibited by ribozyme?

a. Transcription
b. Translation
c. Replication
d. Translocation

Ans. (a) Transcription

42. Non-competitive inhibitor of enzyme?

a. Changes enzyme structure
b. Is a protein
c. Block synthesis of enzyme
d. None of these

Ans. (a) Changes enzyme structure

43. The coenzyme FMN and FAD incorporate a vitamin in its structure which is

a. Vit. C
b. Vit. A
c. Vit. B_2
d. Vit. K

Ans. (c) Vit.B_2

44. Which of the following is a Fe-porphyrin coenzyme?

a. FADH
b. NAD
c. FAD
d. Cytochrome

Ans. (d) Cytochrome

45. Coenzyme is often a

a. Fats
b. Lipids
c. Protein
d. Vitamin

Ans. (d) Vitamin

46. Which enzyme has the efficient activity at pH = 2?

a. Trypsin
b. Lysine
c. Pepsin
d. Ligase

Ans. (c) Pepsin

47. The enzyme concerned with CO_2 assimilation in sugarcane is

a. PEPMO
b. PEPCO
c. PPO
d. PPCA

Ans. (b) PEPCO

48. What amount of light falling on earth is utilized in photosynthesis by plants?

a. 2% b. 4%
c. 0.2% d. 0.3%

Ans. (c) 0.2%

49. Who proposed that impure air is purified in the presence of light and green plants?

a. Priestly b. Fleming
c. De saussure d. None of these

Ans. (a) Priestly

50. The ratio between chlorophyll a and b in most plant is

a. 1:1 b. 2:3
c. 3:1 d. 2:4

Ans. (c) 3:1

51. Photophosphorylation process was discovered by

a. Calvin b. Blackman
c. Arnon d. Emerson

Ans. (c) Arnon

52. Calvin worked on

a. Paramecium b. Euglena
c. Spirogyra d. Scenedesums

Ans. (d) Scenedesums

53. The main function of carotenoids in plants is

a. Protection from photo-oxidation
b. Precursor of vit.b
c. Precursor of vit.c
d. Precursor of ABA

Ans. (a) Protection from photo-oxidation

54. Discovery of Emerson effect revealed the presence of

a. Light and Dark reaction
b. Photorespiration
c. Photophosphorylation
d. Two photochemical reaction

Ans. (d) Two photochemical reaction

55. The main difference between Chl. a and b is that chlorophyll a

a. Has methyl group whereas chl. b has CHO group
b. Is more oxidised from
c. Is more reduced from
d. Is linear whereas Chl.b is branched

Ans. (a) Has methyl group whereas chl. b has CHO group

56. Which colour of light is absorbed maximum in photosynthesis?

a. Red b. Yellow
c. Orange d. Blue

Ans. (d) Blue

57. Chlorella was first used in photosynthesis by

a. Hill b. Blackman
c. Warburg d. Calvin

Ans. (c) Warburg

58. Chlorophyll b is found in

a. Prokaryotes b. Eukaryotes
c. Bacteria d. None of these

Ans. (b) Eukaryotes

59. Chlorophylls are

a. Tetrapyrroles b. Steroids
c. Vitamin d. Chromoproteins

Ans. (a) Tetrapyrroles

60. DCPIP(dichlorophenol indophenols)is used to demonstrate

a. Photolysis is water b. Calvin cycle
c. Cori cycle d. Hill reaction

Ans. (d) Hill reaction

61. The net product/s of non-cyclic electron flow in photosynthesis is /are

a. ATP b. O_2
c. $NADH_2$ d. All of these

Ans. (d) All of these

62. In cyclic flow of electrons during photosynthesis, the electrons from ferredoxin are accepted by

a. Ferrodoxin b. Plastoquinone
c. Cytochromes d. Plastocyanin

Ans. (b) Plastoquinone

63. In photosynthesis, the energy released by the protons when they diffuse across the thylakoid membrane in to the stroma is used to produce

a. NAD b. $NADH_2$
c. ATP d. AMP

Ans. (c) ATP

64. The highest amount of protein in the biome is

a. Rubisco b. Zein
c. Phytochrome d. Gliadin

Ans. (a) Rubisco

65. Photolysis of water occurs in association of

a. PSII
b. PSI
c. Both PSI andPSII
d. Stroma

Ans. (a) PSII

66. ADP from ATP and NADP from NADPH are regenerated in

a. Blackman reaction
b. Hill reaction
c. Calvin cycle
d. None of these

Ans. (c) Calvin cycle

67. The first photochemical reaction in the process of photosynthesis is.

a. Photolysis of water
b. Photorespiration
c. Excitation of chlorophylld
d. Liberation of oxygen

Ans. (c) Excitation of chlorophylld

68. Ferredoxin is a component of

a. PSII
b. PSI
c. Matrix
d. Cristae

Ans. (b) PSI

69. In photosynthesis, the conversion of PGA in to PGAL requires

a. NADP
b. $NADPH_2$
c. ATP
d. Both b and c

Ans. (d) Both b and c

70. The efficiency of photosynthesis is about

a. 25%
b. 30%
c. 35%
d. 40%

Ans. (d) 40%

71. PSI in photosynthesis plays an important role in

a. Reduction of $NADPH_2$
b. Reduction of NADP
c. Release of O_2 from water
d. None of these

Ans. (b) Reduction of NADP

72. Which elements play important role in photolysis of water?

a. Mg and Cl
b. Mg and Mo
c. Mn and Cl
d. Fe and Mg

Ans. (c) Mn and Cl

73. In photosynthetic bacteria, the electron donor is

a. H_2O
b. H_2S
c. O_2
d. Ferredoxin

Ans. (b) H_2S

74. The assimilatory power in photosynthesis are

a. ATP
b. ADP
c. $NADPH_2$ and ATP
d. $NADPH_2$ and ADP

Ans. (c) $NADPH_2$ and ATP

75. Which colour of light is absorbed during bacterial photosynthesis?

a. Orange
b. Far red
c. Red
d. Blue

Ans. (b) Far red

76. The CO_2 acceptor in chlorella or C_3 plant is

a. PGA
b. RuBP
c. PEPCO
d. None of these

Ans. (b) RuBP

77. The first stable compound formed during photosynthesis in C_3 plant is

a. PEP
b. PCAL
c. RuBP
d. PGA

Ans. (d) PGA

78. A process which involves more than one organelle is

a. Translation
b. Transcription
c. Photorespiration
d. Photosynthesis

Ans. (c) Photorespiration

79. How many turns of Calvin cycle are taken to produce one hexose molecule?

a. 3
b. 4
c. 5
d. 6

Ans. (d) 6

80. In C_4 plants, calvin cycle occurs in

a. Stroma of bundle sheath chloroplast
b. Mesophyll of chloroplast
c. Grana of bundle sheath chloroplast
d. None of these

Ans. (a) Stroma of bundle sheath chloroplast

81. For the synthesis of one glucose molecule, how many ATP and $NADPH_2$ molecule are required?

a. 12 and 18 b. 6 and 12
c. 12 and 6 d. 18 and 12

Ans. (d) 18 and 12

82. The inhibitory effect of oxygen on the rate of photosynthesis is called

a. Blackman effect b. Hill effect
c. Warburg effect d. Emerson effect

Ans. (c) Warburg effect

83. The first limiting factor in nature for photosynthesis is

a. H_2O b. CO_2
c. O_2 d. Light

Ans. (b) CO_2

84. The most efficient light for photosynthesis is

a. Orange b. Red
c. Blue d. Yellow

Ans. (b) Red

85. The ratio of photosynthesis to respiration during day time remains

a. 1:5 b. 1:9
c. 10:1 d. 10:12

Ans. (c) 10:1

86. The law of limiting factor in photosynthesis was proposed by

a. F. Blackman
b. R. hill
c. H. Kerb
d. None of these

Ans. (a) F. Blackman

87. Substrate for photorespiration is

a. Malic acid b. Formaic acid
c. Glycolate d. Oxaloacetate

Ans. (c) Glycolate

88. How many ATP molecules are used during synthesis of one hexose molecule in C_4 plant?

a. 20 b. 30
c. 40 d. 18

Ans. (b) 30

89. In C_4 plant, $NADPH_2$ are produced in

a. Mesophyll chloroplast
b. Collenchymas
c. Bundle sheath chloroplast
d. Both a and c

Ans. (c) Bundle sheath chloroplast

90. Kranz type of anatomy is found in the leaves of

a. Most C_4 plant
b. Most C_3 plant
c. Both C_3 and C_4 plant
d. None of these

Ans. (a) Most C_4 plant

91. In most succulent plants, CO_2 is fixed by the activity of

a. PEP carboxylase
b. RuBP carboxylase
c. PEP oxygenase
d. RuBP oxygenase

Ans. (a) PEP carboxylase

92. The CO_2 acceptor in sugarcane is

a. Phosphoglycolic acid
b. Oxaloacetate
c. PEP
d. RuBP

Ans. (c) PEP

93. Dimorphic chloroplast are found in

a. Sugarcane b. Rice
c. Wheat d. Sugarbeat

Ans. (a) Sugarcane

94. PEPCO has an advantage as compared to RUBISCO. It is that

a. RUBISCO fixes CO_2 only in C_3 plants whereas PEPCO does it both in C_3 and C_4 plant.
b. PEPCO is found in all chlorophyllous cells but rubisco is not
c. RUBISCO is subjected to photorespiration but PEPCO is not
d. None of these

Ans. (c) RUBISCO is subjected to photorespiration but PEPCO is not

95. Tropical grasses like sugarcane show high efficiency of CO_2 fixation because of

a. Calvin cycle
b. Double calvin cycle
c. Hatch and slack cycle
d. Warburg effect

Ans. (c) Hatch and slack cycle

96. The ratio of CO_2 reduced and oxygen released during photosynthesis is

a. 1:1 b. 1:2
c. 1:3 d. 1:4

Ans. (a) 1:1

97. The number of quanta energy required for the synthesis of one glucose molecule is

a. 30 b. 38
c. 40 d. 48

Ans. (d) 48

98. The light and dark reaction of photosynthesis are linked by

a. NADP and ATP b. $NADPH_2$
c. $NADPH_2$ and ATP d. None of these

Ans. (c) $NADPH_2$ and ATP

99. C_4 cycle is considered as recently evolved pathway as an adaptation to

a. Hot and dry climate
b. Dry and cold climate
c. Temperate climate
d. Dry and humid climate

Ans. (a) Hot and dry climate

100. Anoxygenic photosynthesis is a characterstic of

a. Bacteria b. Fungi
c. Algae d. Higher plant

Ans. (a) Bacteria

101. One of the following is not a limiting factor in photosynthesis

a. Co_2 b. Water
c. Light d. O_2

Ans. (d) O_2

102. Which of the following algae are used to study calvin cycle?

a. Scenedesmus and chlorococcus
b. Scenedesmus and chlorella
c. Chlorella only
d. None of these

Ans. (b) Scenedesmus and chlorella

103. Photorespiration process found in plant

a. Injurious to plant
b. Is a defense mechanism
c. Increase photosynthetic yield
d. All of these

Ans. (b) Is a defense mechanism

104. The source of energy for CO_2 fixation is

a. O_2 b. Temp
c. Light d. Water

Ans. (c) Light

105. Who received the Nobel prize for working on green plant?

a. Hill b. Khorana
c. Calvin d. Beadle

Ans. (c) Calvin

106. Which one of the following pigments is characteristically not found in the chloroplast?

a. Chlorophyll b. Carotene
c. Xanthophylls d. Anthocyanin

Ans. (d) Anthocyanin

107. An example of photosynthetic inhibitor is

a. DCPIP b. DCMU
c. DPCIP d. DCPIP

Ans. (b) DCMU

108. Besides water, light and CO_2, photosynthesis requires

a. NADP b. ATP
c. RuBP d. ADP

Ans. (c) RuBP

109. During photosynthesis, when PGA is changed in to phosphoglyceraldehyde, the following process occurs

a. Reduction b. Oxidation
c. Hydrolysis d. Electrolysis

Ans. (a) Reduction

110. Cyclic photo-phosphorylation result in the formation of

a. ADP b. ATP
c. NADH d. $NADPH_2$

Ans. (b) ATP

111. In the phosphorylation process, energy is derived from

a. Glucose b. Maltose
c. Electron d. Cytochromes

Ans. (c) Electron

112. Which elements are required for the synthesis of chlorophyll molecule?

a. Iron and chlorine b. Iron and calcium
c. Iron and magnesium d. Iron and potassium

Ans. (c) Iron and magnesium

113. A water soluble pigment is

a. Carotene b. Anthocyanin
c. Chlorophyll d. PEP Carboxylate

Ans. (b) Anthocyanin

114. The chloroplast contains the highest quantity of

a. RuBP carboxylase b. RUBP oxygenase
c. PEP carboxylase d. PEP oxygenase

Ans. (a) RuBP carboxylase

115. An essential raw material for food manufacturing in green plant is

a. CO_2 b. Mineral salt
c. NADPH d. FAD

Ans. (a) CO_2

116. Rate of photosynthetic process is independent of

a. Quality of light
b. Duration of light
c. Duration of temperature
d. Quantity of light

Ans. (b) Duration of light

117. The magnesium in a chlorophyll molecule is located in the

a. Center of chlorophyll b. Center of porpyrin
c. Phytol tail d. None of these

Ans. (b) Center of porpyrin

118. The correct chemical formula for chlorophyll b is

a. $C_{55}H_{72}O_5N_4Mg$ b. $C_{55}H_{77}O_6N_4Mg$
c. $C_{55}H_{70}O_6N_4Mg$ d. $C_{55}H_{72}O_5N_4Mg$

Ans. (c) $C_{55}H_{70}O_6N_4Mg$

119. Scientists who received the Noble prize for physiology and medicine for their work on green plant are

a. Calving and hill
b. Calvin and Borlaug
c. Bateson and purnnet
d. Beadle and tatum

Ans. (b) Calvin and Borlaug

120. Moll's malf leaf experiment shows relationship between

a. Photosynthesis and respiration
b. Photosynthesis and light
c. Photosynthesis and CO_2
d. Photosynthesis and temp.

Ans. (c) Photosynthesis and CO_2

121. In plants, the radiant energy is stored in the form of chemical energy

a. ATP b. ADP
c. $NADPH_2$ d. Glucose

Ans. (d) Glucose

122. Starch containing plastids are called

a. Alyloplast b. Amyloplast
c. Aleuroplasts d. Chloroplast

Ans. (b) Amyloplast

123. Thylakoids in grana have enzymes for

a. C3 cycle b. C4 cycle
c. Photophosphorylation d. None of these

Ans. (c) Photophosphorylation

124. Which one of the following is a correct statement in reference to photosynthesis?

a. ATP molecules are formed
b. NAD molecules are formed
c. ATP molecule are not formed
d. Reduced NAD is generated

Ans. (a) ATP molecules are formed

125. Kranz type of leaf anatomy is found in plants having

a. C_3 and C_4 cycle b. C_2 and C_4 cycle
c. C_2 and C_3 cycle d. C_4 plants cycle

Ans. (d) C_4 plants cycle

126. The first stable product of carbon assimilation is

a. Acetyl CoA b. Pyruvic acid
c. Phosphoglyceric acid d. RuBP

Ans. (c) Phosphoglyceric acid

127. PEPCO enzymes are found in

a. C_3 plant b. C_2 plant
c. C_4 plant d. None of these

Ans. (c) C_4 plant

128. Cyclic photophosphorylation involves

a. PSI
b. PSI and mesophyll cell
c. PSII
d. PSII and thylakoid

Ans. (a) PSI

129. The primary electron acceptor of PSI is

a. Ferredoxin b. Plastoquinone
c. Plastocyanin d. Cytochrome

Ans. (a) Ferredoxin

130. The term assimilatory powers in photosynthesis refers to

a. Reduction of CO_2
b. Oxidation of CO_2
c. Photolysis of water
d. Formation of ATP and $NADPH_2$

Ans. (d) Formation of ATP and $NADPH_2$

131. Manufacturing of fructose in C_4 path way is found in

a. Subsidiary cell
b. Guard cell
c. Bundle sheath
d. Mesophyll cells

Ans. (c) Bundle sheath

132. Which of the following are C_4 plants?

a. Maize and wheat
b. Wheat and rice
c. Maize and Bananas
d. All of these

Ans. (c) Maize and Bananas

133. In C_4 cycle, in the first step

a. CO_2 combined with PGA
b. CO_2 combined with PEP
c. CO_2 combined with RuBP
d. None of these

Ans. (b) CO_2 combined with PEP

134. During ATP synthesis, electrons pass through

a. O_2
b. CO_2
c. Cytochrome
d. Water

Ans. (c) Cytochrome

135. During primary photochemical acts, the first active chlorophyll is located in

a. P_{700}
b. P_{685}
c. P_{680}
d. P_{785}

Ans. (c) P_{680}

136. C4 plants usually lack

a. Photorespiration
b. Transpiration
c. Calvin cycle
d. Photosynthesis

Ans. (a) Photorespiration

137. In zea mays, calvin cycle

a. Occurs in the stroma of bundle sheath chloroplast
b. Occurs in the stroma of mesophyll cell
c. Occurs in the grana of bundle sheath chloroplast
d. None of these

Ans. (a) Occurs in the stroma of bundle sheath chloroplast

138. The initial enzyme of calvin cycle is

a. PEP
b. PEPCO
c. CoA
d. RUBISCO

Ans. (d) RUBISCO

139. The number of ATP and $NADPH^2$ molecules required for the synthesis of one glucose molecule is

a. 12 and 16
b. 12 and 18
c. 18 and 12
d. 18 and 30

Ans. (c) 18 and 12

140. The CO_2 acceptor in C4 cycle is

a. Phosphoenol pyruvate
b. Ribulose 1,5 biphoshpate
c. Oxaloacetic acid
d. Phosphoglycolic acid

Ans. (a) Phosphoenol pyruvate

141. In dark reaction
$6CO_2 + A + 12\ NADPH + H^+ \rightarrow C_6H_{12}O_6 + 6H_2O + B + 18H_3PO_4 + 12NADP$, A and B are respectively

a. 6 ATP and 6 ADP
b. 12 ATP and 12 ADP
c. 18 ATP and 18 ADP
d. none of these

Ans. (c) 18 ATP and 18 ADP

142. Hatch and Slack cycle is not found in

a. *Zea mays*
b. *Triticum aestivum*
c. *Oryza sativa*
d. *Saccharum officinarum*

Ans. (b) *Triticum aestivum*

143. Chemiosmotic phosphorylation depends upon

a. ATP breaking into ADP and Pi
b. An electrochemical gradient
c. ADP breaking into ATP and Pi
d. None of these

Ans. (b) An electrochemical gradient

144. Quantum yield of photosynthesis declines in red light but becomes normal when it is followed by blue light. This phenomenon is called

a. Red drop effect
b. Emerson effect
c. Englemans effect
d. Blackmans effect

Ans. (b) Emerson effect

145. Electrons excited from photosystem II pass directly to

a. Plastoquinone
b. Plastocyanin
c. Ferredoxin
d. None of these

Ans. (a) Plastoquinone

146. Which of the following technique was used by calvin for tracing the pathway of photosynthesis?

a. Electrophoresis
b. Spectrophotometry
c. Chromatography
d. All of these

Ans. (c) Chromatography

147. Solarisation of chlorophyll is

a. Photo-oxidation
b. Photo-reduction
c. Oxido-reduction
d. Oxido-oxidation

Ans. (a) Photo-oxidation

148. What is the common between photosynthesis and respiration?

a. Light
b. Temperature
c. Cytochromes
d. ADP formation

Ans. (c) Cytochromes

149. CO_2 fixation in C_4 pathway takes place in

a. Subsidiary cell
b. Guard cell
c. Bundle sheath
d. Mesophyll cell

Ans. (d) Mesophyll cell

150. Who for the first time experimentally demonstrated that oxygen released during photosynthesis comes from water?

a. Ruben and kamen
b. Calvin
c. Hill and neil
d. Fleming

Ans. (a) Ruben and kamen

151. First law of thermodynamics deals with.

a. Conservation of mass
b. Conservation of both mass and energy
c. Conservation of energy
d. All of these

Ans. (c) Conservation of energy

152. First law of thermodynamics may be stated as

a. $Q = \Delta E - W$
b. $\Delta E = Q + W$
c. $\Delta E = Q - W$
d. $W = \Delta E + Q$

Ans. (c) $\Delta E = Q - W$

153. The heat of formation of carbon dioxide is –90.4 kcal. This shows that

a. CO_2 is isothermal compound
b. CO_2 is exothermic compound
c. CO_2 is endothermic compound
d. All of the above

Ans. (b) CO_2 is exothermic compound

154. The sign of enthalpy change H for an endothermic reaction reaction is

a. Positive
b. Negative
c. May be positive or negative
d. None of the above

Ans. (a) Positive

155. Heat evolved is given

a. –ve sign
b. +ve sing
c. No sign
d. None of the above

Ans. (a) –ve sign

156. If total enthalpy of reactants and products are Hr and Hp respectively, then for an exothermic reaction

a. $H_R > H_P$
b. $H_R < H_P$
c. $H_R = H_P$
d. None of the above

Ans. (a) $H_R > H_P$

157. Select the correct relation

a. $Q_V = \Delta E$
b. $Q_P = -\Delta H$
c. $Q_P = QV$
d. $Q_P = \Delta E$

Ans. (a) $Q_V = \Delta E$

158. The relation between heat of a reaction of constant pressure and at constant volume is

a. $Q_P = Q_V + \Delta n \times RT$
b. $Q_P = Q_V - \Delta n \times RT$
c. $Q_V = Q_P + \Delta n \times RT$
d. $Q_V = Q_P - \Delta n \times RT$

Ans. (a) $Q_P = Q_V + \Delta n \times RT$

159. ΔH is related to ΔE by the equation

a. $\Delta H = \Delta E + \Delta n \times RT$
b. $\Delta H = \Delta E - \Delta n \times RT$
c. $\Delta H = \Delta E \times PV$
d. $\Delta H = \Delta E + RT\Delta n$

Ans. (d) $\Delta H = \Delta E + RT\Delta n$

160. Enthalpy H is defined as

a. $H = E \times PV$
b. $H = E + PV$
c. $H = E - PV$
d. None of the above

Ans. (b) $H = E + PV$

161. By convention the enthalpy of an element in standard state is assumed to be

a. 5
b. 10
c. 0
d. 100

Ans. (c) 0

162. Condition of standard state are

a. 2°C and 1 atm
b. 25°C and 1 atm
c. 15°C and 1 atm
d. 5°C and 1 atm

Ans. (b) 25°C and 1 atm

163. The heat of formation of compounds

a. May be positive or negative
b. Is always negative
c. Is always positive
d. Is zero in standard state

Ans. (a) May be positive or negative

164. Select the correct order

a. 1 erg > 1 joule > 1 cal
b. 1 joule > 1 erg > 1 cal
c. 1 erg > 1 cal > 1 joule
d. 1 cal > 1 joule > 1 erg

Ans. (d) 1 cal > 1 joule > 1 erg

165. The heat of neutralization of a strong acid with a strong base

a. Depends upon the nature of acid
b. Is a constant value
c. Depends upon the nature of base
d. None of the above

Ans. (b) Is a constant value

166. Heat of neutralization of acetic acid with sodium hydroxide is expected to be about

a. –13.7 kcal
b. –14.7 kcal
c. –13.4 kcal
d. –15.5 kcal

Ans. (c) –13.4 kcal

167. "The quantity of heat which must be supplied to decompose a compound into its elements is equal to the heat evolved during the formation of that compound from the elements." This statement is called

a. Le Chatelier's principle
b. Joule's principle
c. Hess's law
d. Lavoisier and Laplace Law

Ans. (d) Lavoisier and Laplace Law

168. "The resultant heat change in a chemical reaction is the same whether it takes place in one or several stage". This statement is called

a. Hess's law
b. Le Chatelier's principle
c. Joule Thomson principle
d. None of the above

Ans. (a) Hess's law

169. Heat of combustion "H", of methane, ethane, ethylene and acetylene gases are –212.8, –373.0, –337.0 and –310.5 kcal respectively at the same temperature. The best fuel among these gases is

a. Ethylene
b. Ethane
c. Methane
d. Acetylene

Ans. (c) Methane

170. The equation,

$$c(s)+\frac{1}{2}O_2(g)=CO(g);\ \Delta H=-26.4\ kcal$$ **shows that**

a. Carbon monoxide is endothermic compound
b. Carbon monoxide is exothermic compound
c. Reaction is endothermic
d. Above reaction is not possible

Ans. (b) Carbon monoxide is exothermic compound

171. If no heat is transferred to and from the system during a process, the process is called

a. Adiabatic
b. Isothermal
c. Isobaric
d. Cyclic

Ans. (a) Adiabatic

172. If temperature is kept constant throughout a process, the process is called

a. Isobestic
b. Isobaric
c. Isothermal
d. Adiabatic

Ans. (c) Isothermal

173. The heat of combustion, ΔH, of hydrogen gas at 25°C is –68.4 kcal. The heat of formation of water at 25°C

a. – 68.4 kcal
b. – 38.4 kcal
c. – 92.4 kcal
d. None of the above

Ans. (a) – 68.4 kcal

174. The apparatus used for measuring the heat of reactions at constant volume is called

a. Colorimeter
b. Pyrometer
c. Calorimeter
d. Pyknometer

Ans. (c) Calorimeter

175. The bond energy of C–H bond in CH_4 from thermo-chemical equation, $C(g) + 4H(g) \rightarrow CH_4(g)$; ΔH= –397.8 kcal is expected to be about

a. +99.45 kcal
b. +379.8 kcal
c. +100 kcal
d. +95.0 kcal

Ans. (a) +99.45 kcal

176. The heat of reaction does not depend upon

a. Physical state of reactants and products
b. The method by which final products are obtained from reactants
c. Temperature of the reaction
d. Whether the reactions is carried out at constant pressure or at constant volume

Ans. (b) The method by which final products are obtained from reactants

177. The reaction, $N_2(g) + O_2(g) = 2NO(g)$; "H" = +21.6 is

a. Isothermic
b. Endothermic
c. Explosive
d. Exothermic

Ans. (b) Endothermic

178. In the reaction, $H_2(g) + Cl_2(g) = 2HCl(g) + 44.0$ kcal

a. Enthalpy of products is equal to the enthalpy of reactant
b. Enthalpy of products is twice the enthalpy of reactant
c. Enthalpy of products is greater than the enthalpy of reactant
d. None of these

Ans. (c) Enthalpy of products is greater than the enthalpy of reactant

179. Heat of formation of CO(g) and CO2(g) are –26.4 and –94.0 kcal respectively. The heat of combustion of carbon monoxide is

a. +120.0 kcal
b. – 67.6 kcal
c. + 35.4 kcal
d. – 68.0 kcal

And. (b) – 67.6 kcal

180. An endothermic reaction is one in which?

a. Heat is converted into electricity
b. Heat is absorbed
c. Heat is given out
d. Heat is converted into mechanical work

Ans. (b) Heat is absorbed

181. Which wavelength of light is absorbed maximum by chlorophyll a?

a. 400 nm
b. 690 nm
c. 695 nm
d. 680 nm

Ans. (d) 680 nm

182. What is the by product of bacterial photosynthesis?

a. H_2S
b. S
c. K
d. O_2

Ans. (b) S

183. Photosynthetic bacteria do not contain

a. PS I
b. Plastocynin
c. PS II
d. Both a and b

Ans. (c) PS II

184. Bacterial photosynthesis involves

a. PS I only
b. PS II only
c. Both PS I and PS II
d. None of these

Ans. (a) PS I only

185. Following are chemosynthetic bacteria

a. Sulphur bacteria
b. Nitrifying bacteria
c. Methane becteria
d. All of these

Ans. (d) All of these

186. Which process was first discovered in *Rhodospirillum rubrum*?

a. Phosphorylation
b. Cyclic photophosphorylation
c. Non-cyclic photophosphorylation
d. Photolysis of water

Ans. (b) Cyclic photophosphorylation

187. Substrate for photorespiration is

a. Malic acid
b. Formic acid
c. Glycolate
d. Glucornic acid

Ans. (c) Glycolate

188. Photorespiration involves

a. Glyoxylate cycle
b. Glycolate cycle
c. Cori cycle
d. None of these

Ans. (b) Glycolate cycle

189. RUBISCO behaves like an oxygenase when

a. Temperature is increased
b. CO_2 is reduce
c. O_2/CO_2 ratio is increased
d. All of these

Ans. (d) All of these

190. Which of the following is produced as a by-product during photorespiration?

a. O_2
b. H_2O
c. CO_2
d. H_2O_2

Ans. (d) H_2O_2

191. Transamination reaction occurs during

a. Respiration
b. Transpiration
c. Photosynthesis
d. Photorespiration

Ans. (d) Photorespiration

192. NAD is reduced to $NADH_2$ in

a. Transpiration b. Respiration
c. Photorespiration d. None of these

Ans. (c) Photorespiration

193. In C3 plants like paddy, the photosynthetic yield is reduced due to

a. Transpiration b. Respiration
c. Photosynthesis d. None of these

Ans. (b) Respiratioin

194. Which of the following processes protect oxidation of chlorophyll?

a. Photorespiration b. Transpiration
c. Photosynthesis d. Respiration

Ans. (a) Photorespiration

195. Banana fruits are rich in starch, but how does it reach in the fruit is correctly explained as

a. Starch grains are transported through xylem
b. Sucrose is transported to fruit where it polymerises in to starch
c. Starch grains are transported through phloem
d. None of these

Ans. (b) Sucrose is transported to fruit where it polymerises in to starch

196. The photosynthetic products are translocated to various parts of plant in the form of

a. Maltose b. Sucrose
c. Glucose d. Starch

Ans. (b) Sucrose

197. In a ringed plant

a. Shoot die first
b. Root die first
c. Both die simultaneously
d. None of these

Ans. (b) Root die first

198. Cucurbitaceous plants are least affected by ringing because of

a. Large cambium cells
b. External phloem
c. Internal phloem
d. Regeneration of phloem

Ans. (c) Internal phloem

199. Photorespiration is favoured by

a. Low O_2 and low CO_2
b. High CO_2 and low O_2
c. High O_2 and low CO_2
d. None of these

Ans. (c) High O_2 and low CO_2

200. A cell organelle associated with photorespiration is

a. Lysosome b. Peroxisome
c. Mitochondria d. Ribosome

Ans. (b) Lysosome

201. Plants are considered purifiers of air due to process of

a. Respiration b. Transpiration
c. Photosynthesis d. Transcription

Ans. (c) Photosynthesis

202. In respiration there is a conversion of

a. Kinetic in to potential energy
b. Potential in to kinetic energy
c. Radiant in to kinetic energy
d. All of these

Ans. (b) Potential in to kinetic energy

203. When fatty seeds are maturing, the R.Q. will be

a. More than unity b. Unity
c. Less than unity d. Equal to unity

Ans. (a) More than unity

204.The connecting link between glycolysis and krebs cycle is

a. Acetyl CoA b. Pyruvic acid
c. Cytochromes d. None of these

Ans. (a) Acetyl CoA

205. Krebs cycle takes place in mitochondria in its

a. Matrix b. F1 partical
c. Inner membrane d. Outermembrane

Ans. (a) Matrix

206. Krebs cycle starts with the formation of a six carbon compound from a reaction in between

a. Pyruvic acid and Acetyl CoA
b. Oxaloacetic acid and Acetyl CoA
c. Oxaloacetic acid and Acetyl CoA
d. None of these

Ans. (c) Oxaloacetic acid and Acetyl CoA

207. During the conversion of pyruvic acid in to acetyl CoA, following are formed

a. CO_2 and water b. O_2 and water
c. CO_2 and $NADH_2$ d. CO_2 and ATP

Ans. (c) CO_2 and $NADH_2$

208. In chlorella, when one molecule of glucose is aerobically and completely oxidised, the number of ATP molecules formed are

a. 6 b. 12
c. 24 d. 36

Ans. (d) 36

209. Guanosine triphosphate is formed during conversion of

a. Succinyl CoA into succinic acid
b. Succinic acid into fumaric acid
c. Fumaric acid into malic acid
d. None of these

Ans. (a) Succinyl CoA into succinic acid

210. The universal hydrogen acceptor is

a. FAD b. NADPH
c. ATP d. NAD

Ans. (d) NAD

211. The efficiency of aerobic respiration is

a. 45% b. 50%
c. 60% d. 75%

Ans. (b) 50%

212. In krebs cycle, the mineral activator required for enzyme aconitase is

a. Mg b. Fe
c. Ca d. Zn

Ans. (b) Fe

213. During aerobic respirations, the substrate which enters the mitochondria is

a. Glucose b. Sucrose
c. Pryuvic acid d. Acetyl CoA

Ans. (c) Pryuvic acid

214. In prokaryotes, the complete oxidation of a molecule of glucose results in net gain of

a. 2 molecules of ATP
b. 36 molecules of ATP
c. 18 molecules of ATP
d. 4 molecules of ATP

Ans. (b) 36 molecules of ATP

215. Stearic acid is oxidised in

a. Ribosome
b. Peroxisome
c. Cytoplasm
d. Mitochondria

Ans. (c and d) Cytoplasm and Mitochondria

216. Cut apple fruits when kept dipped in ascorbic acid do not turn brown because ascorbic acid

a. Inhibits activity of polyphenol oxidase
b. Prevents drying of cut surface
c. Repairs all injury caused by cutting
d. All of these

Ans. (a) Inhibits activity of polyphenol oxidase

217. Which one of the following has an inbibitory effect on respiration?

a. CO_2 b. O_2
c. N d. B

Ans. (a) CO_2

218. The oxidation of ethyl alcohol takes place in

a. Ribosome b. Peroxisome
c. Mitochondria d. Cytosol

Ans. (c) Mitochondria

219. Which one of the following has higher amount of energy?

a. FAD b. NAD
c. FADH2 d. NADH2

Ans. (a) FAD

220. What will be the value of RQ in Bryophyllum leaves during day time?

a. Less than unity b. More than unity
c. Equal to unity d. Zero

Ans. (d) Zero

221. Cut surfaces of fruits and vegetables often become dark because

a. Dirty knife makes it dark
b. Dust of air makes it dark
c. Tannins are formed
d. Oxidation of tannic acid due to presence of iron in traces from knife

Ans. (d) Oxidation of tannic acid due to presence of iron in traces from knife

222. Which one of the following is a polluting organelle?

a. Mitochondria b. Ribosome
c. Lysosome d. Peroxisome

Ans. (a) Mitochondria

223. The enzyme carboxylase requires a mineral activator. It is

a. Mg b. K
c. Ca d. Fe

Ans. (a) Mg

224. How many ATP molecules are formed on complete oxidation of a glucose molecule through hexose monophosphate shunt cycle?

a. 2 b. 4
c. 36 d. 38

Ans. (c) 36

225. The correct sequence of Krebs cycle is

a. Isocitric acid → oxalosuccinic acid → citric acid
b. Isocitric acid → citric acid → alpha keto glutaric acid
c. Isocitric acid → oxalosuccinic acid → alpha ketoglutaric acid
d. None of these

Ans. (c) Isocitric acid → oxalosuccinic acid → alpha ketoglutaric acid

226. How many ATP molecules are formed from complete oxidation of acetyl CoA?

a. 6 ATP b. 12 ATP
c. 18 ATP d. 24 ATP

Ans. (b) 12 ATP

227. The increased rate of respiration during fruit ripening is called

a. Climacteric b. Pasteur effect
c. Photosynthesis d. Fermentation

Ans. (a) Climacteric

228. Which of the following causes loss of two protons and two electron?

a. Fermentation
b. Dehydrogenation
c. Dehydration
d. Carboxylation

Ans. (b) Dehydrogenation

229. Where does formation of Acetyl CoA from pyruvic acid take place?

a. Ribosome
b. Mitochondria
c. Glyoxysome
d. Cytosol

Ans. (b) Mitochondria

230. An organelle involved with the break down of fats before final oxidation is

a. Mitochondria
b. Ribosome
c. Glyoxysome
d. Cytosol

Ans. (c) Glyoxysome

231. Potato tubers are larger in plants grown at Darjeeling than grown in Andhra Pradesh. It is because there the rate of

a. Respiration is high
b. Photosynthesis is high
c. Respiration is low
d. None of these

Ans. (c) Respiration is low

232. An indispensable role in energy metabolism is played by

a. Phosphorus b. Potassium
c. Iron d. Calcium

Ans. (a) Phosphorus

233. In glycolysis, there is a net gain of 2 ATP molecules and two molecules of

a. FADH2 b. NADH2
c. NADPH2 d. NAD

Ans. (b) NADH2

234. In TCA cycle, the hydrogen atoms removed at succinate level are accepted by

a. ATP b. NAD
c. FAD d. CoA

Ans. (c) FAD

235. R.Q. is higher when respiratory substrate is

a. Glucose b. Sucrose
c. Formic acid d. Malic acid

Ans. (d) Malic acid

236. In hexose monophosphate shunt, the hydrogen acceptor is

a. FAD b. NAD
c. NADP d. FADH

Ans. (c) NADP

237. R.Q. of C39H74O6 is

a. 0.55 b. 1.12
c. 0.7 d. 1.3

Ans. (c) 0.7

238. The factors required to link glycolysis with organic acid cycle are

a. NAD and CoA
b. Lipic acid
c. TPP and Mg
d. All of these

Ans. (d) All of these

239. The ratio of energy released between anaerobic and aerobic respiration

a. 1:2 b. 1:3
c. 1:15 d. 1:18

Ans. (d) 1:18

240. The number of CO_2 molecule released between anaerobic and aerobic respiration is

a. 0 b. 1
c. 2 d. 3

Ans. (a) 0

241. How many NADH2 are produced during the aerobic oxidation of alpha ketogutarate?

a. 1 b. 2
c. 3 d. 4

Ans. (b) 2

242. The connecting link between β-oxidation and Krebs cycle is

a. Malic acid b. Citric acid
c. Acetyl CoA d. None of these

Ans. (c) Acetyl CoA

243. In photosynthesis and respiration, the energy is derived form

a. Electron flow across cytochromes
b. Oxygen
c. CO_2
d. All of the above

Ans. (d) All of the above

244. Plants can convert fatty acids to sugars by a process called

a. Calvin cycle
b. Krebs cycle
c. Glycolysis
d. Glyoxylate cycle

Ans. (d) Glyoxylate cycle

245. R.Q. of germinating caster seed is

a. 1 b. >1
c. <1 d. 2

Ans. (c) <1

246. The glycolate metabolism occurs in

a. Mitochondria b. Lysosomes
c. Peroxisomes d. Ribosome

Ans. (c) Peroxisomes

247. Oxidative phosphorylation involves simulataneous oxidation and phosphorylation to finally produce

a. ATP b. NAD
c. FAD d. FADH

Ans. (b) NAD

248. The activity of enzyme hexokinase, which catalyse glucose to glucose 6-posphate. Is inhibited by glucose 6-phosphate, it is an example of

a. Competitive inhibition
b. Non competitive inhibition
c. Feedback allosteric inhibition
d. None of these

Ans. (c) Feedback allosteric inhibition

249. An example of polycistronic enzyme is

a. Pepsin b. Rennin
c. Papin d. RNA polymerase

Ans. (d) RNA polymerase

250. Enzyme ligase is used for

a. Joining the pieces of DNA
b. Denaturation of DNA
c. Digestion of fat
d. Splitting of DNA

Ans. (a) Joining the pieces of DNA

251. A bacterium having radioactive thymidine is allowed to multiply in an medium containing non-radioactive thymidine for two generation. What percentage of bacteria should contain radioactive DNA?

a. 20 b. 30
c. 40 d. 50

Ans. (d) 50

252. Replication of DNA takes place in the presence of

a. DNA polymerase and DNA ligase
b. DNA polymerase, ligase and RNA polymerase
c. Topoisomrase, ligase, nuclease
d. DNA polymerase only

Ans. (b) DNA polymerase, ligase and RNA polymerase

253. DNA replication is

a. Semi-continuous and conservative
b. Discontinuous and semi conservative
c. Conservative and semi discontinuous
d. None of these

Ans. (b) Discontinuous and semi conservative

254. One of the following statement is incorrect with regards to β-DNA

a. A + G = C +T
b. A + T = C + G
c. A + C = G+T
d. None of these

Ans. (b) A + T = C + G

255. Which of the following plays important role in breaking and reassembling one strand of DNA?

a. Topoisomerase
b. Ligase
c. Helicase
d. Single strand binding protein

Ans. (a) Topoisomerase

256. The direction of DNA replication is

a. 5′ → 3′
b. 3′ → 5′
c. 2′ → 3′
d. All of the above

Ans. (a) 5′ → 3′

257. The okazaki fragments consist of

a. DNA + RNA
b. DNA + PRIMER
c. DNA only
d. RNA only

Ans. (c) DNA only

258. The amino acid is attached to t-RNA in its.

a. 5′ end
b. 3′ end
c. Varies from place to place
d. Anticodon end

Ans. (b) 3′ end

259. Which one is the most stable kind of RNA found in a cell?

a. rRNA
b. tRNA
c. mRNA
d. hnRNA

Ans. (a) rRNA

260. The enzyme primase is infact

a. DNA polymerase I
b. RNA polymerase
c. Helicase
d. Topoisomerase

Ans. (b) RNA polymerase

261. The role of sigma factor in transcription is

a. Initiation
b. Elongation
c. Termination
d. Translocation

Ans. (a) Initiation

262. The initiator codon is

a. UUU
b. AUG
c. UGA
d. GGG

Ans. (b) AUG

263. In eukaryotes, mRNA is formed by

a. DNA
b. RNA
c. hnRNA
d. All of these

Ans. (a) DNA

264. In an operon, the RNA polymerase binds to

a. Repressor
b. Promoter
c. Operator
d. Regulator

Ans. (b) Promoter

265. How many sense codons are found in a eukaryotic cell?

a. 46
b. 64
c. 61
d. 62

Ans. (c) 61

266. In mitochondria, how many tRNA can read codons for twenty amino acid?

a. 22
b. 23
c. 24
d. 25

Ans. (a) 22

267. The discovery of replication of DNA has been made on

a. Neurospora crassa
b. Drosophila
c. *E. coli*
d. None of these

Ans. (c) *E. coli*

268. The popular name Kornberg enzyme refer to

a. DNA polymerase
b. RNA polymerase
c. Transcriptase
d. Endonuclease

Ans. (a) DNA polymerase

269. Which one of the following does not code for any protein?

a. Introns
b. Exons
c. Overlapping gene
d. None of these

Ans. (a) Introns

270. When a single anticodon can recognise more than one codon of mRNA, it refers to

a. Gene flow hypothesis
b. Wobble hypothesis
c. Template hypothesis
d. None of these

Ans. (b) Wobble hypothesis

271. The translation termination triplet is

a. UGG b. AAU
c. AUG d. UAA

Ans. (d) UAA

272. DNA is transcribed by some viral RAN using the enzyme

a. Endonuclease b. RNA polymerase
c. Reverse transcriptase d. Helicase

Ans. (c) Reverse transcriptase

273. Constitutive genes are those genes which are active

a. During differentiation stages
b. During developmental stage
c. Throughout life time
d. At any stage of life

Ans. (c) Throughout life time

274. Enzymes synthesised in lac operon are

a. Lactase, permease and glactosidase
b. Permease, glactase and lactase
c. Permease, galactosidse and transacetylase
d. None of these

Ans. (c) Permease, galactosidse and transacetylase

275. In *lac* operon model, an operon consists of

a. One operator gene and one structural gene
b. One promoter gene and one structural gene
c. Regulator gene, promoter gene and operator gene
d. None of these

Ans. (b) One promoter gene and one structural gene

276. In tryptophan operon, a repressor consists of co-repressor and apo-repressor. These two are made up of

a. Tryptophan and protein
b. RNA and tryptophan
c. DNA and tryptophan
d. RNA and protein

Ans. (a) Tryptophan and protein

277. The colinearity hypothesis indicates that

a. The sequence of nucleotides in gene correlates with the sequence of amino acids in protein
b. Genes are arranged linearly in both strands of DNA
c. Genes are arranged linearly in both strands of RNA
d. None of these

Ans. (a) The sequence of nucleotides in gene correlates with the sequence of amino acids in protein

278. Which is the most short lived RNA?

a. r RNA b. m RNA
c. t RNA d. None of these

Ans. (b) m RNA

279. Mark the incorrect match

a. HIV – AIDS
b. TMV – dsDNA
c. TMV – ssDNA
d. Capsid protein coat of virus

Ans. (c) TMV – ssDNA

280. Enzyme important in genetic engineering are

a. Helicase
b. Ligase
c. Topoisomerase
d. Restriction enzymes
e. Both b and d

Ans. (e) Both b and d

281. Which of the following is general formula of monosaccharides?

a. $Cn(H_2O)_{2n}$ b. $C_2n(H_2O)$
c. $Cn(H_2O)_n$ d. $Cn(HO)_n$

Ans. (c) $Cn(H_2O)_n$

282. Reducing sugar having

a. A free keto group
b. A free aldehyde group
c. OH group at one end
d. Free aldenyde or keto group

Ans. (d) Free aldenyde or keto group

283. Which of the following is a imino acid?

a. Asparagines b. Proline
c. Glycine d. Threonine

Ans. (b) Proline

284. Which amino acid have longest side chain?

a. Lysine and leucine b. Arginine
c. Arginine and lysine d. Asparagine

Ans. (c) Arginine and lysine

285. Polysaccharides are polymers of simple sugars which are covalently linked by ?

a. Phosphodiester bonds
b. Glycosidic bonds
c. Peptide bonds
d. Hydrogen bonds

Ans. (b) Glycosidic bonds

286. Cellulose and starch are glucose polymers but differ in which of the following

i. Starch is soluble whereas cellulose is insoluble

ii. Glucose polymers in cellulose linked by b(1– 4) whereas in starch by a(1– 4) linkage

iii. Cellulose is linear whereas starch is branched polymer

iv. a(1– 4) linkage present in starch but absent in cellulose

Choose the correct answer

a. i, ii, iv
b. i, ii, iii, iv
c. i, ii, iii
d. i, ii only

Ans. (b) i, ii, iii, iv

287. Chitin is found in fungal cell walls and in exoskeleton of insects and crustaceans. The monomer unit of chitin is

a. Galactose
b. Fructose
c. Glucose
d. N-acetyl glucosamine

Ans. (d) N-acetyl glucosamine

288. Glycogen is a

a. Polymer of fructose
b. Linear polymer
c. Branched polymer
d. Polymer of galactose

Ans. (c) Branched polymer

289. Which of the following amino acid have aromatic side chains?

a. Tryptophane
b. Tyrosine
c. Phenylalanine
d. All of these

Ans. (b) Tyrosine

290. None-polar aliphatic side chains are present in

a. Glutamine
b. Asparagine
c. Alanine
d. Cystine

Ans. (c) Alanine

291. A-carboxyl group of one amino acid is covalently linked to the α-amino group of next amino acid by

a. Sulphide bond
b. Amide bond
c. Hydrogen bond
d. Phosphodiester bond

Ans. (b) Amide bond

292. α-helix is a sencondary structure of protein. α-right-handed helix contain

a. 2.6 amino acid residues per turn
b. 4.6 amino acid residues per turn
c. 3.6 amino acid residues per turn
d. 5.6 amino acid residues per turn

Ans. (c) 3.6 amino acid residues per turn

293. β-pleated sheet present in

a. Primary proteins
b. Fibroin
c. Globular protein
d. None of these

Ans. (b) Fibroin

294. The correct folding of tertiary proteins *in vivo* is assisted by proteins called

a. Domains
b. Motifs
c. Chaperones
d. Families

Ans. (c) Chaperones

295. Cholesterol and other lipids are transported to specific targets by lipoproteins. In blood cholesterol is carried out by

a. VLDL
b. LDL
c. IDL
d. DDT

Ans. (b) LDL

296. Gangliosides are carbohydrate rich sphingolipids that contain acidic sugars. These acidic sugars are called

a. α-ketoglutaric acid
b. Aspartic acid
c. Sialic acid
d. Amino acids

Ans. (c) Sialic acid

297. Which of the following is fatty acid containing compound?

a. Sugarcane juice
b. Waxes
c. Triacylglycerol
d. Both 'a' 'b'

Ans. (c) Triacylglycerol

298. The double bonds of all naturally occurring unsaturated fatty acids are in the

a. D-configuration
b. Trans-configuration
c. Cis-configuration
d. L-configuration

Ans. (c) Cis-configuration

299. The melting point of fatty acids is influenced by

a. Length and degree of unstauration of hydrocarbon chain
b. Only degree of unsaturation
c. Only length of hydrocarbon chain
d. None of the above

Ans. (a) Length and degree of unstauration of hydrocarbon chain

300. The number of tRNA molecules in every cell is at least

a. 15
b. 10
c. 20
d. 25

Ans. (c) 20

301. The C_4, C_5 and N_3 of pyrimidine base are derived from

a. Aspartic acid
b. Serine
c. Glutamic acid
d. Glycine

Ans. (a) Aspartic acid

302. A portion of uric acid is converted to urea and ammonia by intestinal

a. Urogenolysis
b. Ureotolysis
c. Uricolysis
d. Ureolysis

Ans. (c) Uricolysis

303. The end product of purine catabolism in other mammals except man is

a. Ammonia
b. Allantonin
c. Uric acid
d. Creatinine

Ans. (b) Allantonin

304. The number of nucleotide pairs present in one turn of DNA is

a. 10
b. 6
c. 4
d. 8

Ans. (a) 10

305. The N_3 and N_9 of purine are derived from the amide nitrogen of

a. Glutamate
b. Asparagines
c. Glutamine
d. Aspartic acid

Ans. (c) Glutamine

306. The net excretion of total uric acid in 24 hours in a normal man is

a. 300–500 mg
b. 200–400 mg
c. 100–300 mg
d. 400–600 mg

Ans. (d) 400–600 mg

307. The three important units of DNA are

a. Bases, 3-deoxyribose and phosphoric acid
b. Bases, ribose and phosphoric acid
c. Bases, 2-deoxyribose and phosphoric acid
d. All of these above

Ans. (c) Bases, 2-deoxyribose and phosphoric acid

308. DNA is denatured by

a. Acid
b. Alkali
c. Heat
d. All of these

Ans. (d) All of these

309. Synthesis of RNA molecule is terminated by a signal by a signal which is recognized by

a. δ factor
b. p-(Rho) factor
c. α-factor
d. σ factor

Ans. (b) p-(Rho) factor

310. The carbon atoms at positions 4 and 5 and the N atom at position 7 of purine base are supplied from

a. Valine
b. Glycine
c. Alanine
d. Serine

Ans. (b) Glycine

311. All α-amino acids are optically active *except*

a. Glycine
b. Alanine
c. Serine
d. Phenylalanine

Ans. (c) Serine

312. In many proteins, the hydrogen bonding produces a regular coiled arrangement called

a. γ-helix
b. β-helix
c. α-helix
d. δ-helix

Ans. (c) α-helix

313. α-helix is stabilized by

a. Disulphide bond
b. Covalent bond
c. Ionic bond
d. Hydrogen bond

Ans. (d) Hydrogen bond

314. The distance travelled per turn of α-helix is

a. 0.54 nm
b. 0.44 nm
c. 0.34 nm
d. 0.64 nm

Ans. (a) 0.54 nm

315. The space covered by each amino acid residue of α-helix is

a. 0.25 nm
b. 0.18 nm
c. 0.15 nm
d. 0.35 nm

Ans. (c) 0.15 nm

316. Glutamate dehydrogenase is a

a. Dimer
b. Monomer
c. Tetramer
d. All of these

Ans. (c) Tetramer

317. When egg albumin is coagulated (by heating)?

a. Only tertiary structure is changed
b. Only primary structure is changed
c. Secondary and tertiary structures are changed
d. Only secondary structure is changed

Ans. (c) Secondary and tertiary structures are changed

318. Oxidative conversion of many amino acids to their corresponding α-keto acids occurs in mammalian

a. Adipose tissue
b. Pancreas
c. Intestine
d. Liver and kidney

Ans. (d) Liver and kidney

319. Synthesis of glutamine is accompanied by the hydrolysis of

a. ATP
b. ADP
c. TPP
d. Creatine phosphate

Ans. (a) ATP

320. In brain, the major mechanism for removal of ammonia is the formation of

a. Asparagines
b. Aspartate
c. Glutamine
d. Glutamic acid

Ans. (c) Glutamine

321. The metabolism of protein is integrated with that of carbohydrate and fat through

a. Malate
b. Oxaloacetate
c. Isocitrate
d. Citrate

Ans. (b) Oxaloacetate

322. Sulphur of sulphur containing amino acid is removed as

a. SO_2
b. $BaSO_4$
c. H_2SO_4
d. SO_3

Ans. (c) H_2SO_4

323. Transamination is a

a. Physical process
b. Irreversible process
c. Reversible process
d. None of these

Ans. (c) Reversible process

324. Which of the following can not undergo transamination?

a. Threonine
b. Alanine
c. Serine
d. Valine

Ans. (a) Threonine

325. The process of transamination requires

a. FAD
b. ATP
c. NAD^+
d. PLP

Ans. (d) PLP

326. In small intestine trypsin hydrolyses peptide linkage containing

a. Aspartate
b. Serine
c. Arginine
d. Histidine

Ans. (c) Arginine

327. The unwanted amino acids abstracted from the tissues are either used up by the tissue or in the liver converted into

a. Ammonia
b. Urea
c. Uric acid
d. Ammonium salt

Ans. (b) Urea

328. In humans, nitrogen of amino acid is removed as

a. Uric acid
b. Ammonia
c. Urea
d. All of these

Ans. (c) Urea

329. The building up and breakdown of protoplasm are noncerned with the metabolism of

a. Minerals
b. Proteins
c. Urea
d. All of these

Ans. (b) Proteins

330. The most important sugar concerned with human biochemistry is

a. Lactose
b. Sucrose
c. Glucose
d. Fructose

Ans. (c) Glucose

331. Which of the following is not a monosaccharide?

a. Glucose
b. Fructose
c. Lactose
d. Galactose

Ans. (c) Lactose

332. Possible number of isomers of glucose is

a. 12
b. 4
c. 8
d. 16

Ans. (d) 16

333. Which of the following is not a disaccharide?

a. Sucrose
b. Maltose
c. Starch
d. Lactose

Ans. (c) Starch

334. Which of the following is epimer of glucose?

a. Cellulose
b. Fructose
c. Ribose
d. Galactose

Ans. (d) Galactose

335. Cellulose is made up of the molecules of

a. γ-glucose
b. β-glucose
c. α-glucose
d. δ-glucose

Ans. (b) β-glucose

336. Iodine solution gives no colour with?

a. Cellulose
b. Starch
c. Glycogen
d. Dextrin

Ans. (a) Cellulose

337. Which of the following monosaccharide has maximum rate of absorption in the intestine?

a. Mannose
b. Fructose
c. Glucose
d. Galactose

Ans. (d) Galactose

338. Which of the following sugar does not reduce Fehling's solution?

a. Sucrose
b. Lactose
c. Fructose
d. Glucose

Ans. (c) Fructose

339. Barfoed's solution is not reduced by

a. Sucrose
b. Glucose
c. Ribose
d. Mannose

Ans. (a) Sucrose

340. Each branch of amylopectin is at an interval of glucose units

a. 24–30
b. 34–40
c. 44–50
d. 14–20

Ans. (a) 24–30

341. Human heart muscles contain

a. D-arabinose
b. D-ribose
c. D-xylose
d. D-lyxose

Ans. (d) D-lyxose

342. The absorption of glucose is interfered by the deficiency of

a. Thiamine
b. Fe^{++}
c. Mg^{++}
d. Vitamin A

Ans. (a) Thiamine

343. Glycogen synthetase activity is depressed by

a. Cyclic-AMP
b. Insulin
c. Fructokinase
d. Glucose

Ans. (a) Cyclic-AMP

344. The branching enzyme acts on the glycogen when the main chain is lengthened by

a. 50–100 glucose units
b 1–6 glucose units
c. 6–11 glucose units
d. 200–500 glucose units

Ans. (c) 6–11 glucose units

345. The two triose phosphate molecules involved in one of the important steps of glycolysis are

a. Dihydroxyacetone phosphate and glyceraldehydes-1 phosphate
b. Dihydroxyacetone phosphate and glycol phosphate
c. Dihydroxyacetone phosphate and glyceraldehydes-3 phosphate
d. Dihydroxyacetone phosphate and glyceraldehydes-2 phosphate

Ans. (c) Dihydroxyacetone phosphate and glyceraldehydes-3 phosphate

346. Activation of the inactive phosphorylase is stimulated by

a. Cyclic-AMP
b. ATP
c. NAD^+
d. None of these

Ans. (a) Cyclic-AMP

347. The main product of glycolysis (i.e. anaerobic condition) in skeletal muscles is

a. A-ketoglutarate
b. Pyruvate
c. Lactate
d. succinate

Ans. (c) Lactate

348. Cyclic AMP is formed from ATP by the enzyme adenylate cyclase which is activated by the hormone

a. Epinephrine
b. Insulin
c. Testosterone
d. Progesterone

Ans. (a) Epinephrine

349. Pyruvate is accumulated by the dietary deficiency of

a. Vitamin B_6
b. Vitamin B_2
c. Vitamin B_1
d. Vitamin B_{12}

Ans. (c) Vitamin B_1

350. The synthesis of adenylate cyclase is increased by

a. GH
b. FSH
c. ACTH
d. TH

Ans. (d) TH

351. Hexokinase has a high affinity for glucose than

a. Galactokinase
b. Fructokinase
c. Glucokinase
d. All of these

Ans. (a) Galactokinase

352. Conversion of fructose 1, 6 diphosphate to fructose-6 phosphate is stimulated by

a. Glucagon
b. ACTH
c. Insulin
d. None of these

Ans. (a) Glucagon

353. Fructokinase is present in

a. Brain
b. Intestine
c. Heart
d. Adipose tissue

Ans. (b) Intestine

354. The carrier of the citric acid cycle is

a. Oxaloacetate
b. Malate
c. Fumarate
d. Succinate

Ans. (a) Oxaloacetate

355. Glucose-6-PO_4 is absent in

a. Heart
b. Adipose tissue
c. Kidney
d. Brain

Ans. (b) Adipose tissue

356. The conversion of citrate to isocitrate is catalysed by

a. Isocitrase
b. Citrase
c. Aconitase
d. Decarboxylase

Ans. (c) Aconitase

357. Dihydroxyacetone phosphate and glyceraldehydes-3-phosphate are interconverted by

a. Diphosphotriose isomerase
b. Phosphotriose isomerase
c. Triose isomerase
d. Dihydroxyacetone phosphorylase

Ans. (b) Phosphotriose isomerase

358. Insulin is given in the form of

a. Insulin in alcohol
b. Insulin in water
c. Protamine zinc insulin
d. Insulin in tissue fluid

Ans. (c) Protamine zinc insulin

359. diabetes mellitus is characterised by

a. Glycosuria
b. Polyurea
c. Polydispia
d. All of these

Ans. (d) All of these

360. The amount of sugar in urine of a normal individual is

a. 0.5%
b. 0.05%
c. 1%
d. 71%

Ans. (b) 0.05%

361. The heptose ketose formed in HMP shunt is

a. Mannoheptose
b. Glucoheptose
c. Galactoheptose
d. Sedoheptulosea

Ans. (d) Sedoheptulosea

362. Hexose monophosphate pathway is oxidation of glucose is active only in

a. Liver
b. Lactating mammary gland
c. Adipose tissue
d. All of these

Ans. (d) All of these

363. In human being, galactose is most easily available by conversion of

a. Maltase
b. Fructose
c. Glucose
d. Milk

Ans. (d) Milk

364. Lactose is formed in mammary gland under the influence of lactose synthetase by the reaction of

a. Glucose and galactose
b. UDP galactose and glucose
c. UDP glucose and UDP galactose
d. UDP glucose and galactose

Ans. (b) UDP galactose and glucose

365. Which of the following is not a mucopolysaccharide?

a. Chondriotin
b. Inulin
c. Sialic acid
d. Heparin

Ans. (b) Inulin

366. Mucopolysaccharides consist of repeating units of disaccharide molecule consisting of

a. Three monosaccharides
b. Two monosaccharides
c. Uronic acid + acylated amino sugar
d. Glucose + amino sugar

Ans. (c) Uronic acid + acylated amino sugar

367. Function of brain is disturbed when the blood glucose level falls from the normal fasting value 80 mg /100 ml to

a. 40 mg/100 ml
b. 10 mg/100 ml
c. 20 mg/100 ml
d. 60 mg /100 ml

Ans. (c) 20 mg/100 ml

368. The renal threshold value for glucose is

a. 80 mg/100 ml
b. 120 mg/100 ml
c. 200 mg/100 ml
d. 180 mg/100 ml

Ans. (d) 180 mg/100 ml

369. Which is not glucogenic substance in human being?

a. Glycerol
b. Lactate
c. Amino acid
d. Propionate

Ans. (d) Propionate

370. In one HMP shunt, one molecule of glucose is oxidized with the net generation of

a. 35 moles of ATP
b. 36 moles of ATP
c. 38 moles of ATP
d. 39 moles of ATP

Ans. (a) 35 moles of ATP

371. The hydrogen acceptor used in HMP shunt is

a. ADP
b. NAD^+
c. $NADP^+$
d. ATP

Ans. (c) $NADP^+$

372. In liver, the enzyme fructokinase converts fructose to

a. Fructose-6-PO_4
b. Fructose-1-PO_4
c. Glucose-1-PO_4
d. Fructose 1, 6 diphosphate

Ans. (b) Fructose-1-PO_4

373. The enzyme hexokinase can phosphorylate fructose as well as glucose. The affinity of the enzyme is

a. Equal for glucose and fructose
b. Great for fructose than glucose
c. Great for glucose than for fructose
d. Small for glucose than fructose

Ans. (c) Great for glucose than for fructose

374. One complete Kreb's cycle starting from oxaloacetate produces

a. 12 ATP
b. 6 ATP
c. 3 ATP
d. 24 ATP

Ans. (a) 12 ATP

375. The net number of moles of ATP produced when one glucosyl unit of glycogen undergoes glycolysis under anaerobic conditions is

a. 2
b. 3
c. 4
d. 1

Ans. (b) 3

376. The net number of moles of ATP produced when one free glucose molecule undergoes glycolysis under aerobic conditions is

a. 3
b. 8
c. 9
d. 2

Ans. (b) 8

377. DNA finger printing has proved useful in forensic science. It involves the use of

a. cDNA
b. rRNA
c. Minisatellites
d. bacterial DNA

Ans. (c) Minisatellites

378. The purpose of cloning is to

a. Lost genotype
b. Preserve genotype
c. Replace original genotype
d. None of these

Ans. (b) Preserve genotype

379. Which is a genetic vector?

a. Cosmid
b. Phage
c. Plasmid
d. All of these

Ans. (d) All of these

380. Lipids are

a. Soluble in both water and organic solvents
b. Soluble in water
c. Soluble in organic solvents
d. Insoluble in both water and organic sovents

Ans. (c) Soluble in organic solvents

381. Δ^8 indicates a double bond between carbon atoms

a. 8 and 9
b. 7 and 8
c. 6 and 8
d. 9 and 10

Ans. (a) 8 and 9

382. Esters of long chain fatty acids with long chain monohydric alcohols are called

a. Protein
b. Waxes
c. Fats
d. Carbohydrate

Ans. (b) Waxes

383. Essential fatty acids contain

a. One double bond
b. Three double bond
c. Two double bond
d. All of these

Ans. (d) All of these

384. Naturally occurring fatty acids usually contains

a. Carbon atoms remain absent
b. Odd number of carbon atoms
c. Even number of carbon atoms
d. None of these

Ans. (c) Even number of carbon atoms

385. Animal fats mainly contain

a. Serine and linolenic amino acids
b. Linoleic and linolenic acids
c. Stearic and palmitic acids
d. Citric and oxalic acids

Ans. (c) Stearic and palmitic acids

386. Side chain of archidonic acid contains the number of double bonds

a. 4
b. 3
c. 2
d. 5

Ans. (a) 4

387. Hydrolysis of fat alkali is called

a. Transduction
b. Saponification number
c. Saponification
d. Recombination

Ans. (c) Saponification

388. Lecithin contains a nitrogenous base called

a Choline
b. Ethanolamine
c. Insitol
d. Lecine

Ans. (a) Choline

389. Cephalin are compound lipids which contain

a. Asparagines
b. Myoinositol
c. Ethanolamine
d. Both 'a' and 'b'

Ans. (d) Both 'a' and 'b'

390. Lecithins are soluble in ordinary fat solvents *except*

a. Ethanol
b. Benzene
c. Methanol
d. Acetone

Ans. (d) Benzene

391. Lecithins combine with protein to form

a. Phosphoprotein
b. Lipoprotein
c. Mucoprotein
d. Glycoprotein

Ans. (b) Lipoprotein

392. The protein moiety of lipoprotein is known as

a. Preprotein
b. Apoprotein
c. Pseudoprotein
d. Post protein

Ans. (b) Apoprotein

393. Which of the following is steroid hormone?

a. Androgens
b. Estrogens
c. Corticoids
d. All of these

Ans. (d) All of these

394. In sphingomyelins, the alcoholic moiety is

a. Glycerol
b. Glycol
c. Sphingosine
d. Acetyl alcohol

Ans. (c) Sphingosine

395. Gangiliosides are the glycolipids occurring in

a. Brain
b. Kidney
c. Liver
d. Muscle

Ans. (a) Brain

396. Very low density lipoproteins also known as

a. β-lipoprotein
b. α-lipoprotein
c. Pre-β-lipoprotein
d. γ-lipoprotein

Ans. (c) Pre-β-lipoprotein

397. In gangliosides, the sugar protein may be

a. Amino acid
b. Sialic acid
c. Acetylated amino sugar
d. α-ketoglutaric acid

Ans. (b) Sialic acid

398. The main source of cholesterol is

a. Animal fats
b. Vegetables
c. Egg yolk
d. All of these

Ans. (c) Egg yolk

399. Digestion of fat starts in

a. Stomach
b. Mouth
c. Small intestine
d. Large intestine

Ans. (c) Small intestine

400. Lipids are emulsified by the action of

a. Ergosterol
b. Lipoprotein
c. Cholesterol
d. Bile salts

Ans. (d) Bile salts

401. The majority of the absorbed fat appears in the form of

a. HDL
b. LDL
c. VLDL
d. Chylomicrons

Ans. (d) Chylomicrons

402. Lipase present in the stomach can not hydrolyze fats due to

a. Acidity
b. Neutrality
c. High acidity
d. Alkalinity

Ans. (c) High acidity

403. Fatty acids are mainly oxidized by

a. γ-oxidation
b β-oxidation
c. α-oxidation
d. None of these

Ans. (b) β-oxidation

404. During oxidation, long chain fatty acids are first converted to acetyl-CoA in the

a. Cytosol
b. Lysosome
c. Microsome
d. Mitochondria

Ans. (a) Cytosol

405. Activation of lower fatty acids occurs within the

a. Mitochondria
b. Microsome
c. Lysosome
d. Cytosol

Ans. (a) Mitochondria

406. The enzyme thiokinase catalyzing the activation of fatty acids requires the cofactor

a. Mg^{++}
b. Ca^{++}
c. Mn^{++}
d. K^{+}

Ans. (a) Mg^{++}

407. Long chain fatty acids are activated with in the cytosol while the further steps of oxidation take place in mitochondria. Thus the long chain acetyl-CoA peneterates mitochondria in the presence of

a. Palmitate
b. Sorbitol
c. Carnitine
d. Na^{+}

Ans. (c) Carnitine

408. During one set of β-oxidation of a fatty acid, the number of carbon atoms removed are

a. 1
b. 2
c. 3
d. Not definite

Ans. (b) 2

409. Acetyl-Co- is converted to α, β-unsaturated acetyl-CoA by the enyme acetyl-CoA dehydrogenase in the presence of coenzyme

a. $NADP^{+}$
b. NAD^{+}
c. FAD^{+}
d. ATP

Ans. (c) FAD^{+}

410. The final product of β-oxidation of an odd numbered carboxylic acid is

a. α-ketoglutaric acid
b. Acetyl-CoA
c. Propionyl Co-A
d. Oxalic acid

Ans. (c) Propionyl Co-A

411. Prostaglandins are used for

a. The prevention of conception
b. The induction of menstruation
c. The termination of pregnancy
d. All of these

Ans. (d) All of these

412. Synthesis of prostaglandins is inhibited by

a. Fluoride ion
b. Asprin
c. Cyanide ion
d. Arsenate ion

Ans. (b) Asprin

413. All active prostaglandins have a common double bond which lies

a. Between C_{17} and C_{18} and has *cis* configuration
b. Between C_{13} and C_{14} and has *cis* configuration
c. Between C_{13} and C_{14} and has *trans* configuration
d. Between C_{17} and C_{18} and has *trans* configuration

Ans. (c) Between C_{13} and C_{14} and has *trans* configuration

414. In human blood, the Mg per cent of cholesterol is

a. 50–100
b. 20–80
c. 140–250
d. 300–600

Ans. (c) 140–250

415. Cholesterol contains 27 carbon molecules which are derived from

a. Higher fatty acid molecule
b. Acetate molecule
c. Co-A molecule
d. Carbon dioxide and glucose molecule

Ans. (b) Acetate molecule

416. Of the 27 carbon atoms of cholesterol, how many derived are from the CH_3 group of the acetate (CH_3COO^-) molecule

a. 15 b. 14
c. 13 d. 27

Ans. (a) 15

417. Biosynthesis of cholesterol in the liver is suppressed by

a. Talking b. Fasting
c. Dietary cholesterol d. Both (a) and (b)

Ans. (d) Both (a) and (b)

418. Fatty liver results in the deficiency of

a. Stearic acid b. Pantothenic acid
c. Vitamin A d. Caproic acid

Ans. (b) Pantothenic acid

419. The number of ATP moles liberated during the oxidation of one mole of palmitic acid to CO_2 and H_2O is

a. 130 b. 128
c. 131 d. 129

Ans. (d) 129

420. Under normal conditions the fate of acetyl-Co-A is

a. Conversion to acetoacetate
b. Conversion to acetone
c. Entry to citric acid cycle
d. None of the above

Ans. (c) Entry to citric acid cycle

421. When concentration of ketone bodies in human blood increases, the condition is known as

a. Ketonemia b. Ketonuria
c. Ketosis d. Ketogenesis

Ans. (a) Ketonemia

422. Enzymes responsible for ketone body formation are found mainly in

a. Chromosomes b. Nucleus
c. Mitochondria d. Extrahepatic tissue

Ans. (c) Mitochondria

423. Ketone bodies are utilized in

a. Chromosomes
b. Nucleus
c. Mitochondria
d. Extrahepatic tissue

Ans. (d) Extrahepatic tissue

424. Under prolonged starvation brain takes energy from

a. Carbohydrates b. Acetoacetate
c. Fats d. Proteins

Ans. (b) Acetoacetate

425. Fatty acid synthesis takes place in

a. Mitochondria b. Cytosol
c. Microsomes d. Chloroplast

Ans. (b) Cytosol

426. Fatty acid oxidation takes place in

a. Cytosol b. Mitochondria
c. Chloroplast d. Microsomes

Ans. (b) Mitochondria

427. Acetyl CoA carboxylase, involved in the carboxylation of acetyl CoA contain

a. Cyanocobalmine b. Biotin
c. Pyridoxal d. None of these

Ans. (b) Biotin

428. The dehydrogenating steps in the β-oxidation of fatty acid utilize

a. $NADP^+$ b. NAD^+
c. NADH d. NADPH

Ans. (b) NAD^+

429. Lengthening of fatty acid in mitochondria and microsomes takes place by the addition of

a. Leucine and arginine respectively
b. Citric acid and oxalic acid respectively
c. Acetyl CoA and propionyl CoA respectively
d. Alanine and lysine respectively

Ans. (c) Acetyl CoA and propionyl CoA respectively

430. In terms of containment, which of the following is an advantage of chloroplast transformation over nuclear transformation?

a. Chloroplasts are surrounded by a double membrane
b. There are no chloroplasts in pollens of most species
c. Chloroplasts are smaller than the nucleus
d. Chloroplast genome resembles more to plasmid

Ans. (d) Chloroplast genome resembles more to plasmid

431. Bacteria use positive supercoiling to

a. Make genes more accessible
b. Help in replication
c. Make circular chromosomes linear
d. Make their chromosomes more compact

Ans. (b) Help in replication

432. When linear form of glucose cyclises, the product is a/an?

a. Anhydride
b. Glycoside
c. Hemiacetal
d. Lactone

Ans. (c) Hemiacetal

433. A DNA vaccine is

a. A DNA molecule that is recognized by an antibody
b. A vaccine that works by stimulating the immune system to recognise pathogen's DNA sequences
c. A vaccine that is administered as DNA, the DNA is then expressed to produce a protein which stimulates an immune response
d. Gene knockout by homologous recombination

Ans. (c) A vaccine that is administered as DNA, the DNA is then expressed to produce a protein which stimulates an immune response

434. What cellular compartment becomes acidic during mitochondrial electron transport?

a. Mitochondrial stroma
b. Cytoplasm
c. Endoplasmic reticulum
d. Space between inner and outer mitochondrial membranes

Ans. (d) Space between inner and outer mitochondrial membranes

435. The primary effect of the consumption of proteins beyond the body's immediate needs will be

a. Excretion of the excess proteins in the urine
b. An increased synthesis of muscle proteins
c. An enhancement in the amount of circulating plasma proteins
d. An increase in the amount of adipose tissue

Ans. (a) Excretion of the excess proteins in the urine

436. The end product of uracil degradation is

a. Urea
b. NH
c. Allantoate
d. β-alanine

Ans. (d) β-alanine

437. Transketolase activity is affected in

a. Biotin deficiency
b. Pyridoxine deficiency
c. PABA deficiency
d. Thiamine deficiency

Ans. (d) Thiamine deficiency

438. A flavoprotein in pyruvate dehydrogenase complex is

a. Pyruvate dehydrogenase
b. Dihydrolipoyl transacetylase
c. Dihydrolipoyl dehydrogenase
d. Acetyl-dihydrolipoamide

Ans. (c) Dihydrolipoyl dehydrogenase

439. A biochemical indication of vitamin B_{12} deficiency can be obtained by measuring the urinary excretion of

a. Pyruvic acid
b. Malic acid
c. Methylmalonic acid
d. Urocanic acid

Ans. (c) Methylmalonic acid

440. The enzyme whose catalytic efficiency (Kcat/KM) is close to the diffusion-controlled limit is

a. Nitrogenase
b. RuBisCo
c. Fumarase
d. None of the above

Ans. (c) Fumarase

441. The specificity constant Kcat/KM is a

a. First order rate constant
b. Second order rate constant
c. Zero-order rate constant
d. Unit-less rate constant

Ans. (b) Second order rate constant

442. The concentration of a competitive inhibitor which apparently doubles the value of Michaelis-Menten (KM) constant is known as

a. Inhibitor constant
b. Specificity constant
c. Catalytic constant
d. Steady state constant

Ans. (d) Steady state constant

443. The carbon and energy source for nitrogen reduction is provided by legume plants to *Rhizobia* in the form of

a. Malate and succinate
b. Acetate and pyruvate
c. Flavanoids and isoflavanoids
d. Chitolipo-oligosaccharides

Ans. (c) Flavanoids and isoflavanoids

444. Chemically, nod-inducers and nod-factors respectively are

a. Flavonoids and chitolipo-oligosaccharides
b. Chitolipo-oligosaccharides and flavonoids
c. Glycoproteins and proteoglycans
d. Glycoproteins and lipoproteins

Ans. (a) Flavonoids and chitolipo-oligosaccharides

445. Choline is not required for the formation of

a. Lecithin
b. Acetyl choline
c. Sphingomyelin
d. Cholic acid

Ans. (d) Cholic acid

446. The apparent KM of creatine kinase for ATP immobilized on CM-cellulose is likely to be

a. Greater than that of free enzyme
b. Lesser than that of free enzyme
c. Equal to that of free enzyme
d. Equal to the equilibrium constant of free enzyme

Ans. (a) Greater than that of free enzyme

447. 'Drosha' and 'Dicer' involved in the biosynthesis of mature micro-RNAs are

a. DNase and RNase, respectively
b. RNase and DNase, respectively
c. DNases
d. RNases

Ans. (d) RNases

448. The isoelectric point of glutamate is

a. Considerably lower than that of glycine
b. Much higher than that of glycine
c. Equal to glycine
d. Arithmetic mean of two pKa values for carboxyl and amino groups, respectively

Ans. (d) Arithmetic mean of two pKa values for carboxyl and amino groups, respectively

449. Isopentenyl pyrophosphate is a precursor of which of the following

I – Cholesterol
II – Farnesyl groups on proteins
III – Steroid hormones

a. I and II only
b. I and III only
c. II and III only
d. I, II and III

Ans. (a) I and II only

450. Which of the following best describes the hyperchromicity of DNA?

a. The shift in UV absorbance to longer wavelength upon denaturation
b. The increase in absorbance at 260 nm upon denaturation
c. The shift in UV absorbance to longer wavelength upon annealing
d. The increase in absorbance at 260 nm upon annealing

Ans. (b) The increase in absorbance at 260 nm upon denaturation

451. The unit of molar extinction coefficient is

a. L. mole-1. cm^{-1}
b. L. mole. cm^{-1}
c. mole-1. cm^{-1}
d. M-1. cm^{-1}

Ans. (d) M-1. cm^{-1}

452. RuBisCo activase cause the activation of RuBisCo by

a. Decarbamylation of an active site lysine residue of RuBisCo
b. Facilitating the removal of 2-carboxyarabinitol-1-phosphate (CA1P) from RuBisCo
c. ADP-ribosylation of RuBisCo
d. Binding RuBP to the E-form of RuBisCo

Ans. (b) Facilitating the removal of 2-carboxyarabinitol-1-phosphate (CA1P) from RuBisCo

453. RNA silencing acts at

a. Transcription level
b. Post-transcriptional level
c. Translational level
d. Post-translational level
e. Both a and b

Ans. (e) Both a and b

454. The reason, the herbicide glyphosate kills plants but is not toxic to mammals is that glyphosate specifically inhibits an enzyme involved in the synthesis of aromatic acids, but in mammals

a. Liver tissue degrades glyphosate rapidly
b. An analogous enzyme does not exist
c. Glyphosate is rapidly conjugated and excreted in urine
d. A diet containing adequate quantities of the aromatic amino acids will compensate for the inhibition of aromatic amino acid's biosynthesis

Ans. (c) Glyphosate is rapidly conjugated and excreted in urine

455. According to the Nernst equation

a. A negative redox potential indicates a spontaneous reaction
b. A positive redox potential indicates a spontaneous reaction
c. The redox potential is independent of temperature
d. There is no relationship between redox potential and DG

Ans. (b) A positive redox potential indicates a spontaneous reaction

456. Electrons farther out from the nucleus

a. Are at a higher energy level than those that are closer to nucleus
b. Absorb energy as they move closer to the nucleus

c. Are at lower energy level than those that are closer to nucleus
d. Are not under the influence of nucleus

Ans. (a) Are at a higher energy level than those that are closer to nucleus

457. The Bohr effect refers to the

a. Reduced affinity of hemoglobin for O_2 at lower pH
b. Higher pH in actively metabolising tissues
c. Increased affinity of hemoglobin for O_2 at lower pH
d. pH in actively metabolising tissues

Ans. (a) Reduced affinity of hemoglobin for O_2 at lower pH

458. The human immunodeficiency virus primarily infects

a. Plasma cells
b. Helper T-cells
c. Killer T-cells
d. Red blood cells

Ans. (b) Helper T-cells

459. A purely ketogenic amino acid is

a. Leucine
b. Isoleucine
c. Phenylalanine
d. Threonine

Ans. (a) Leucine

460. For DNA amplification to occur, which of these are needed?

a. Loose ribonucleotides
b. RNA primers
c. Thermostable DNA polymerase
d. All of the above

Ans. (d) All of the above

461. Trypsin cleavage sites in a polypeptide can be added by treating it with?

a. Maleic anhydride
b. Citraconic anhydride
c. Cyanogen bromide
d. 2-bromo-ethylamine

Ans. (c) Cyanogen bromide

462. Which chemical entity is not a part of the folic acid's chemical structure?

a. Pteridine
b. p-amino benzoic acid (PABA)
c. Glutamic acid
d. α-amino butyric acid (GABA)

Ans. (d) α-amino butyric acid (GABA)

463. Which of the following proteins is absent in H1N1 virus?

a. Hexosaminidase
b. Haemagglutinin
c. Neuraminidase
d. Nucleocapsid protein

Ans. (a) Hexosaminidase

464. The reactions that utilize and therefore drain citric acid intermediates are called

a. Cataplerotic reactions
b. Anaplerotic reactions
c. Amphibolic reactions
d. Degenerative reactions

Ans. (b) Anaplerotic reactions

465. Hemicellulose is a

a. Precursor of cellulose
b. Major matrix polysaccharide in the cell wall of plants
c. Major microfibrillar polysaccharide in the cell wall of plants
d. Group of polysaccharides that cannot be extracted by 4M KOH

Ans. (b) Major matrix polysaccharide in the cell wall of plants

466. Fetal hemoglobin (HbF) has higher affinity for oxygen than does maternal hemoglobin (Hb A) because of

a. More concentration of D-2,3-bisphosphoglycerate (BPG) in fetal erythrocytes than adult erythrocytes
b. Less concentration of BPG in fetal erythrocytes than adult erythrocytes
c. Higher binding of BPG to deoxy HbA than to deoxy HbF
d. Loose binding of BPG to deoxy HbA than to deoxy HbF

Ans. (c) Higher binding of BPG to deoxy HbA than to deoxy HbF

467. During the purification of an enzyme by the conventional biochemical techniques, generally following changes are observed after each purification step

a. Total enzyme activity and total protein decrease while specific activity of enzyme increases
b. Total enzyme activity and total protein increase while specific activity of enzyme decreases
c. Total enzyme activity, total protein and specific activity of enzyme increase
d. Total enzyme activity increases while total protein and specific activity decrease

Ans. (a) Total enzyme activity and total protein decrease while specific activity of enzyme increases

468. When two phosphatidyl glycerol moieties join with each other with the elimination of one glycerol molecule, the resulting phospholipid formed is

a. Cardiolipin
b. Cephalin
c. Ceramide
d. Ganglioside

Ans. (a) Cardiolipin

469. RNA interference was first discovered in a

a. Virus
b. Bacteria
c. Fungi
d. Nematode

Ans. (d) Nematode

470. Pyrosequencing derives its name from the fact that

a. The bases are detected by pyrolysis
b. It uses the enzyme apyrase to detect the bases
c. It detects pyrophosphate released during nucleotide incorporation
d. It generates pyrogram as output

Ans. (c) It detects pyrophosphate released during nucleotide incorporation

471. Protein binding regions of DNA are generally identified by one of the following techniques

a. Fingerprinting
b. Footprinting
c. Western blotting
d. MALDI-TOF

Ans. (c) Western blotting

472. Which of the following repetitive motifs is responsible for the formation of triple-helix in collagen?

a. Ala-X-Y
b. Gly-X-Y
c. Cys-X-Y
d. Pro-X-Y

Ans. (b) Gly-X-Y

473. Phosphinothricin is an active ingredient of the herbicide 'BASTA'. It is an analogue of which of the following amino acids?

a. L-Glutamic acid
b. L-Glutamine
c. L-Aspartic acid
d. L-Asparagine

Ans. (a) L-Glutamic acid

474. The greatest buffering capacity at physiological pH would be provided by a protein rich in which of the following amino acids?

a. Lysine
b. Histidine
c. Cysteine
d. Serine

Ans. (b) Histidine

475. Before assimilation into bio-organic compounds, the sulfate must be activated

i. by adenylation
ii. with ATP sulfurylase
iii. to adenosine-5-phosphate
iv. with APS kinase

a. Both i and iv are correct
b. Both i and ii are correct
c. Both iii and iv are correct
d. i, ii and iii are correct

Ans. (b) Both i and ii are correct

476. Over-expression of Adenosine-5-Phosphosulfate APS) reductase and disruption of APS kinase in *Arabidopsis* is most likely to result in reduced formation of which of the following sulphur-containing compounds?

a. Glucosinolates
b. Sulfite
c. Glutathione
d. Thiosulfate

Ans. (a) Glucosinolates

477. The highest concentration of cysteine can be found in which of the following proteins?

a. Collagen
b. Keratin
c. Myosin
d. Haemoglobin

Ans. (b) Keratin

478. How many reading frame(s) can be derived from a double stranded DNA sequence?

a. 1
b. 2
c. 3
d. 6

Ans. (d) 6

479. Microsatellites are mostly produced by

a. Mutation
b. Transposition
c. Recombination
d. Unequal crossing over

Ans. (a) Mutation

480. In diabetes mellitus, there is reduced oxidation of carbohydrates; what will be the effect of insulin administration on respiratory quotient (RQ)?

a. It will increase
b. It will decrease
c. No detectable effect
d. Initial rise and then fall

Ans. (b) It will decrease

481. Emerson effect proves the

a. Concept of two photosystems in plants
b. Occurrence of photophosphorylation
c. Occurrence of photorespiration
d. Fact that there are light and dark reactions in photosynthesis

Ans. (a) Concept of two photosystems in plants

482. An attenuator would function most effectively at

a. 5 of the transcriptional start site
b. 5 of the last gene in the operon
c. Between the transcriptional start site and the translational initiation site
d. Between the –10 and –35 sequences

Ans. (c) Between the transcriptional start site and the translational initiation site

483. A complete replacement of animal protein in the diet by vegetable protein

a. Would not satisfy protein requirement of an individual
b. Might reduce the total amount of iron and vitamin B_{12} available
c. Would reduce the total amount of food consumed for the same number of calories
d. Would be expected to have no effect at all on the overall diet

Ans. (d) Would be expected to have no effect at all on the overall diet

484. An 'electron hole' created in photosystem-II is filled by electrons from

a. Photosystem-I
b. NADPH
c. H_2O
d. Reduced ferredoxin

Ans. (c) H_2O

485. In serine protease mechanism, His 57 functions as a

a. General acid
b. General base
c. Nucleophile
d. Both a and b are correct

Ans. (c) Nucleophile

486. In CAM plants, the accumulation of organic acid

a. Increases during the day
b. Decreases during the day
c. Increases during night
d. Decreases during night

Ans. (c) Increases during night

487. Carbohydrates are commonly found as starch in plant's storage organs. Which of the following five properties of starch make it useful as a storage compound?

i. Easily translocated
ii. Chemically nonreactive
iii. Easily digested by animals
iv. Osmotically inactive
v. Synthesized during photosynthesis

a. i and v
b. ii and iii
c. ii and iv
d. i, iii and v

Ans. (c) ii and iv

488. Photosynthesis cannot continue for long if during light reactions, only cyclic photophosphorylation takes place. This is because?

a. Only ATP is formed; NADPH + H^+ is not formed
b. There is no evolution of O_2
c. There is unidirectional cyclic movement of electrons
d. PSI stops getting excited after a while

Ans. (d) PSI stops getting excited after a while

489. Which of the followings is a diaminodicarboxylic acid?

a. Cystine
b. Lysine
c. Aspartic acid
d. Proline

Ans. (a) Cystine

490. A 1.37×10^{-4} M solution of NADH exhibits an absorbance of 0.85 at a wavelength of 340 nm in a 1 cm cell, then its molar extinction coefficient would be

a. 6.2 $cm^2\ mol^{-1}$
b. $6.2 \times 10^2\ cm^2\ mol^{-1}$
c. $6.2 \times 10^4\ cm^2\ mol^{-1}$
d. $6.2 \times 10^6\ cm^2\ mol^{-1}$

Ans. (a) 6.2 $cm^2\ mol^{-1}$

491. Keeping in view the "Fluid Mosaic Model" for the structure of cell membrane, which of the following statements is correct with respect to the movement of lipids and proteins from one lipid monolayer to the other?

a. Neither lipids, nor proteins can flip-flop
b. Both lipids and proteins can flip-flop
c. While lipids can occasionally flip-flop, proteins cannot
d. While proteins can flip-flop, lipids cannot

Ans. (c) While lipids can occasionally flip-flop, proteins cannot

492. Which of the following statements about *vir* genes in Ti plasmid is incorrect?

a. They are capable of functioning in *trans* orientation
b. *Vir* A and *Vir* G are polycistronic with other *vir* genes
c. *Vir* A and *Vir* G gene products regulate the expression of other *vir* genes
d. *Vir* A product probably acts as a chemoreceptor which senses the presence of acetosyringone

Ans. (b) *Vir* A and *Vir* G are polycistronic with other *vir* genes

493. When you chop onions, your eyes can burn because a chemical reaction produces

a. Acetic acid
b. Hydrochloric acid
c. Sulphuric acid
d. Nitric acid

Ans. (c) Sulphuric acid

494. Which of the following compounds serves as a primary link between the citric acid cycle and the urea cycle?

a. Malate
b. Succinate
c. Citrate
d. Fumarate

Ans. (d) Fumarate

495. Which of the following methods is dependent on the intact peptide bond for the assay of protein content?

a. Biuret reaction
b. Kjeldahl titration
c. Ultraviolet absorption
d. Ninhydrin reaction

Ans. (a) Biuret reaction

496. The metabolite which regulates the urea cycle by allosterically activating carbamoyl phosphate synthetase I is

a. Citrulline
b. Ornithine
c. D-Isoglutamate
d. N-acetyl glutamate

Ans. (d) N-acetyl glutamate

497. The atoms of pyrimidine skeleton are derived from

a. Glutamate
b. Erythrose-4-phosphate
c. PRPP
d. Aspartic acid and carbamoyl phosphate

Ans. (d) Aspartic acid and carbamoyl phosphate

498. Agarose, commonly used for the separation of nucleic acids on a gel, is a

a. Neutral polysaccharide
b. Anionic polysaccharide
c. Cationic polysaccharide
d. Glycoprotein

Ans. (a) Neutral polysaccharide

499. The products of which two *nif* genes interact stoichiometrically to function as activator/anti-activator system for the control of expression of other *nif* genes?

a. *nif* D and *nif* K
b. *nif* A and *nif* L
c. *nif* N and *nif* Q
d. *nif* H and *nif* E

Ans. (b) *nif* A and *nif* L

500. Oxygen inhibits the polymerization of polyacrylamide gel because

a. It mops up free radicals
b. It oxidizes acrylamide
c. It forms a complex with Bis-acrylamide
d. It makes TEMED unavailable for polymerization

Ans. (a) It mops up free radicals

501. Which of the following categories of genes are not symbiotic genes?

a. *nif* genes
b. *nod* genes
c. *ntr* genes
d. *fix* genes

Ans. (b) *nod* genes

502. In studies of the mechanism of bacterial DNA replication, 5-bromouracil often is used as an analogue of thymidine in order to

a. Cause specific frameshift mutations for sequencing studies
b. Stop DNA synthesis at sites of thymidine incorporation
c. Synthesize a denser DNA that can be identified by centrifugation
d. Create specific sites in the DNA for mild chemical cleavage

Ans. (b) Stop DNA synthesis at sites of thymidine incorporation

503. Which of the following is not a DNA-binding motif?

a. Basic region-leucine zipper (bZIP)
b. cAMP responsive element (CRE)
c. Helix-turn-helix (HTH)
d. Zinc finger

Ans. (b) cAMP responsive element (CRE)

504. Actinomycin D inhibits the process of transcription by

a. Deforming the DNA
b. Inactivating RNA polymerase through covalent modifications
c. Preventing the binding of transcription factors
d. Destabilizing the mRNA

Ans. (b) Inactivating RNA polymerase through covalent modifications

505. The enzyme which does not belong to a group of enzymes referred to as the molybdenum hydroxylases

a. Xanthine oxidase
b. Purine dehydrogenase
c. Nitrate reductase
d. Uptake hydrogenase

Ans. (d) Uptake hydrogenase

506. *Cot* values or DNA reassociation kinetics experiments tell us about

a. DNA complexity
b. Copy number of genes
c. Genome size
d. Ploidy level

Ans. (a) DNA complexity

507. In the maple syrup urine disease of human beings, the metabolic defect is related to

a. Deficiency of the vitamin niacin
b. Oxidative decarboxylation
c. Transamination of an amino acid
d. Synthesis of branched chain amino acids

Ans. (d) Synthesis of branched chain amino acids

508. What is the maximum Rf value for any molecule in paper chromatography?

a. 0.1
b. 1.0
c. 10.0
d. Depends on the composition of the sample loaded

Ans. (b) 1.0

509. What is the minimum resting energy expenditure of an awake, alert person called?

a. BMI
b. BMR
c. Respiratory quotient
d. NPU

Ans. (b) BMR

510. The most rapid method to resynthesize ATP during exercise is through

a. Glycolysis
b. Phosphocreatine breakdown
c. Gluconeogenesis
d. Tricarboxylic acid cycle

Ans. (b) Phosphocreatine breakdown

511. In *lac* operon, the operator is

a. *Cis*-recessive and *trans*-recessive
b. *Cis*-dominant and *trans*-recessive
c. *Cis*-dominant and *trans*-dominant
d. *Cis*-recessive and *trans*-dominant

Ans. (b) *Cis*-dominant and *trans*-recessive

512. DNA with alternate purine and pyrimidines exists in which form?

a. A-form
b. B-form
c. C-form
d. Z-form

Ans. (d) Z-form

513. What prevents ribonucleotides from being incorporated into growing strand during DNA replication?

a. The active site of the enzyme cannot accommodate ribonucleotide
b. Ribonucleotides are not present in the vicinity
c. There is very less competition between deoxyribonucleotides and ribonucleotides as the concentration of the latter is very low
d. Ribonucleotides are cleared by the enzyme

Ans. (a) The active site of the enzyme cannot accommodate ribonucleotide

514. Short-term diet plans are usually successful at achieving weight loss because they

a. Decrease appetite
b. Cause body to lose water
c. Burn large amount of stored fat
d. Increase digestion rate

Ans. (d) Increase digestion rate

515. Which one of the following is not an application of analytical ultracentrifuge?

a. Determination of relative molecular mass
b. Estimation of purity of macromolecules
c. Detection of conformational changes in macromolecules
d. Determination of isoelectric pH of a protein

Ans. (d) Determination of isoelectric pH of a protein

516. Covalent modification of some enzymes catalyzed either by protein kinases or phosphatases is a mean of regulation of their activity. Which one of the following enzymes is converted into its active form on being phosphorylated by a kinase?

a. Acetyl CoA carboxylase
b. Glycogen synthase
c. Hormone sensitive lipase
d. Pyruvate dehydrogenase

Ans. (d) Pyruvate dehydrogenase

517. Which of the following is an inhibitor of glycosylation?

a. Penicillin
b. Tunicamycin
c. Glucosamine
d. Streptomycin

Ans. (b) Tunicamycin

518. Which of the following is an omega-3 fatty acid?

a. Alpha-linolenic acid
b. Gamma-linolenic acid
c. Arachidonic acid
d. Linoleic acid

Ans. (a) Alpha-linolenic acid

519. Consider a 'radioanalogy' for *E. coli* lac operon transcription, then

a. The promoter site and start site are the volume control
b. CAP/cAMP is the on/off switch; repressor is the volume control

c. RNA polymerase is both the on/off switch and volume control
d. The repressor is the on/off switch; CAP/cAMP is the volume control

Ans. (b) CAP/cAMP is the on/off switch; repressor is the volume control

520. The number of supercoils in a covalently closed circular DNA can only be changed if

a. At least one of the phosphodiester chains is cleaved
b. Both the phosphodiester chains are cleaved
c. Histones are bound to the DNA
d. The salt concentration is increased >1.0M

Ans. (b) Both the phosphodiester chains are cleaved

521. The half-life of 32P is

a. 14.28 hours
b. 8.04 days
c. 14.28 days
d. 59.4 days

Ans. (c) 14.28 days

522. The light emitting group in Green Fluorescent Protein (GFP) is a derivative of following three consecutive amino acids

a. Serine, tyrosine and glycine
b. Glycine, alanine and cysteine
c. Phenylalanine, tryptophan and tyrosine
d. Histidine, glutamic acid and phenylalanine

Ans. (a) Serine, tyrosine and glycine

523. Intrinsically disordered proteins are characterized by sequences

a. Lacking polar and charged amino acids
b. Lacking bulky hydrophobic groups
c. Rich in D-amino acids
d. Rich in unusual amino acids

Ans. (b) Lacking bulky hydrophobic groups

524. Amyloids, the insoluble fibrous aggregates deposited in certain tissues, result in development of many fatal human diseases. These are basically

a. Misfolded proteins
b. Extensively branched amylopectins
c. Phytoglycogens
d. A mixture of amylose and amylopectin

Ans. (a) Misfolded proteins

CHECK YOUR GRASP

1. Which vitamin is a constituent of FMN?

a. Tocoferol
b. Nicotinic acid
c. Riboflavin
d. Nicotinamide

2. Which of the following is general formula of monosaccharides?

a. $Cn(H_2O)_{2n}$
b. $C_2n(H_2O)$
c. $Cn(H_2O)_n$
d. $Cn(HO)_n$

3. Which of the following is epimer of glucose?

a. Cellulose
b. Fructose
c. Ribose
d. Galactose

4. The connecting link between glycolysis and krebs cycle is

a. Acetyl CoA
b. Pyruvic acid
c. Cytochromes
d. None of these

5. Which elements play important role in photolysis of water?

a. Mg and Cl
b. Mg and Mo
c. Mn and Cl
d. Fe and Mg

6. One of the following is not a limiting factor in photosynthesis

a. CO_2
b. Water
c. Light
d. O_2

7. An ayurvedic medicine isabgol is obtained from

a. Root
b. Leaves
c. Seeds
d. Stem

8. The term assimilatory powers in photosynthesis refers to

a. Reduction of CO_2
b. Oxidation of CO_2
c. Photolysis of water
d. Formation of ATP and $NADPH_2$

9. In gangliosides, the sugar protein may be

a. Amino acid
b. Sialic acid
c. Acetylated amino sugar
d. α-ketoglutaric acid

10. One complete Kreb's cycle starting from oxaloacetate produces

a. 12 ATP
b. 6 ATP
c. 3 ATP
d. 24 ATP

11. Biosynthesis of cholesterol in the liver is suppressed by

a. Talking
b. Fasting
c. Dietary cholesterol
d. Both (a) and (b)

12. One of the following statement is incorrect with regards to β-DNA

a. A + G = C +T
b. A +T = C + G
c. A + C = G + T
d. None of these

13. How many ATP molecules are formed on complete oxidation of a glucose molecule through hexose monophosphate shunt cycle?

a. 2
b. 4
c. 36
d. 38

14. the coenzyme FMN and FAD incorporate a vitamin in its structure which is

a. Vit. C
b. Vit. A
c. Vit.B_2
d. Vit. K

15. Cholesterol and other lipids are transported to specific targets by lipoproteins. In blood cholesterol is carried out by

a. VLDL
b. LDL
c. IDL
d. DDT

16. The ratio of CO_2 reduced and oxygen release during photosynthesis is

a. 1:1
b. 1:2
c. 1:3
d. 1:4

17. The heat of neutralization of a strong acid with a strong base

a. Depends upon the nature of acid
b. Is a constant value
c. Depends upon the nature of base
d. None of the above

In case of less than 80% score, go through brief review and glance once again from chapter

Key: 1-c 2-c 3-d 4-a 5-c 6-c 7-c 8-d 9-b 10-a 11-d 12-b 13-c 14-c 15-b 16-a 17-b

8

Enzyme Engineering

1. In plants, enzymes are present

a. Only in leaves
b. Only in storage organs
c. Only in flowers
d. In all the living cells of the plant body

Ans. (d) In all the living cells of the plant body

2. Enzymes are useful because they

a. Catalyse biochemical reactions in the plant body
b. Supply energy
c. Enhance the absorption of water
d. Are important structural components

Ans. (a) Catalyse biochemical reactions in the plant body

3. The enzymes which act normally within cells are called

a. Endoenzymes
b. Exoenzymes
c. Apoenzymes
d. Ferment

Ans. (a) Endoenzymes

4. The scientists associated with the study of enzymes include

a. Buchner
b. Went
c. Sumner
d. Both a and c

Ans. (d) Both a and c

5. "Enzymes are proteins", was suggested by

a. Pasteur
b. Leeuwenhoek
c. Miller
d. Sumner

Ans. (d) Sumner

6. Noble Prize for discovering enzyme was given to

a. Fischer
b. Altmann
c. Fleming
d. Buchner

Ans. (d) Buchner

7. Which of the following enzymes was first isolated and purified in the form of crystal?

a. Amylase
b. Ribonuclease
c. Urease
d. Pepsin

Ans. (c) Urease

8. Urease, the first enzyme crystallized, was crystallized by

a. J. Northrop
b. E. Buchner
c. Louis Pasteur
d. J.B. Sumner

Ans. (d) J.B. Sumner

9. Number of enzymes known now-a-days is approximately

a. 1,000
b. 2,000
c. 3,000
d. 4,000

Ans. (b) 2,000

10. Enzymes are basically made up of

a. Proteins
b. Vitamins
c. Carbon
d. Fats

Ans. (a) Proteins

11. Enzymes are made up of which macromolecule

a. Carbohydrates
b. Fats
c. Proteins
d. DNA

Ans. (c) Proteins

12. An enzyme can be synthesized by chemically bonding together the molecules of

a. Carbohydrates
b. Amino acids
c. Lipase
d. CO_2

Ans. (b) Amino acids

13. Enzymes are polymers of

a. Amino acids
b. Hexose carbon
c. Fatty acids
d. Inorganic phosphate

Ans. (a) Amino acids

14. Which one of the following statement if true for the enzyme?

a. All enzymes are proteins
b. All proteins are enzymes
c. All enzymes are not proteins
d. All enzymes are vitamins

Ans. (c) All enzymes are not proteins

15. Which enzyme is not proteinaceous?

a. Isozyme
b. Ribozyme
c. Holozyme
d. Trypsin

Ans. (b) Ribozyme

16. Ribozyme is

a. RNA without sugar
b. RNA without phosphate
c. RNA having enzyme activity
d. RNA with extra phosphate

Ans. (c) RNA having enzyme activity

17. The non-protein part of an enzyme is called

a. Holoenzyme
b. Prosthetic group
c. Apoenzyme
d. None of the above

Ans. (b) Prosthetic group

18. The protein part of an enzyme is called

a. Holoenzyme
b. Prosthetic group
c. Apoenzyme
d. All of the above

Ans. (c) Apoenzyme

19. When coenzyme combines with apoenzymes, it is called?

a. Holoenzyme
b. Cofactor
c. Isoenzyme
d. Prosthetic group

Ans. (a) Holoenzyme

20. Coenzyme is

a. Always a protein
b. Often a vitamin
c. Always an inorganic compound
d. Often a metal

Ans. (b) Often a vitamin

21. Cytochrome oxidase contains

a. Iron
b. Magnesium
c. Cobalt
d. Mercury

Ans. (a) Iron

22. Some metal known as cofactors of enzymes are

a. Ca^{++}, Zn^{++}, Mn^{++}
b. Zn^{++}, Ca^{++}
c. K^{+}, Co^{++}
d. All of the above

Ans. (d) All of the above

23. What will happen to an enzyme when apoenzyme is separated from its metal component?

a. Activity will be increased
b. Activity will be lost
c. Activity will be decreased
d. There will be no change in the activity

Ans. (b) Activity will be lost

24. NADP is

a. An enzyme
b. A part of soluble RNA
c. A part of transfer RNA
d. A coenzyme

Ans. (d) A coenzyme

25. FAD or FMN is a coenzyme; which vitamin is incorporated in its structure

a. Vitamin B_1
b. Vitamin B_2
c. Vitamin B_6
d. Vitamin C

Ans. (b) Vitamin B_2

26. The nature of coenzyme is

a. Non proteinaceous
b. Proteinaceous
c. Both a and b
d. None of the above

Ans. (a) Non proteinaceous

27. During enzyme activity, the coenzyme

a. Acts as a donor or acceptor of atoms which are added to or removed from the substrates
b. Are important in oxidation-reduction reactions
c. Both a and b
d. None of the above

Ans. (c) Both a and b

28. Which of the following are coenzymes?

a. NAD, NADP, FAD, FMN
b. Vitamin, Fe, Cu
c. $NADPH_2$, Ca, Co
d. NAD, K, CoA

Ans. (a) NAD, NADP, FAD, FMN

29. Out of total enzymes present in the cell, mitochondrion alone has

a. 95%
b. 20%
c. 64%
d. 70%

Ans. (d) 70%

30. Which of the following is iron porphyrin coenzyme or cofactor?

a. Coenzyme A
b. Cytochrome
c. NAD
d. FAD

Ans. (b) Cytochrome

31. The ratio of enzyme: substrate molecules can be as high as

a. 1:1000
b. 1:10,000
c. 1:50,000
d. 1:100,000

Ans. (d) 1:100,000

32. The turnover number of the fastest enzyme is

a. 10^5
b. 10^4
c. 18×10^4
d. 4×10^6

Ans. (d) 4×10^6

33. Which among the following has highest turnover number?

a. Urease
b. Carbonic anhydrase
c. Catalase
d. Pepsin

Ans. (c) Catalase

34. Which among the following has highest catalytic efficiency?

a. Catalse
b. Urease
c. Carbonic anhydrase
d. Pepsin

Ans. (c) Carbonic anhydrase

35. The number of enzyme units per mg of protein is known as

a. Molecular activity
b. Specific activity
c. Turnover number
d. Molar activity

Ans. (b) Specific activity

36. Amount of enzyme transforming 1 µmole of substrate per minute at 25°C under optimal conditions of measurement is called

a. Specific activity
b. Unit of enzyme (activity)
c. Catalytic centre activity
d. Enzyme purity

Ans. (b) Unit of enzyme (activity)

37. Which of the following statements is incorrect?

a. At optimum pH, the activity of enzyme is maximum
b. Enzymes are not affected by hydrogen ion concentration
c. The optimum pH for pepsin is 2.0
d. The optimum pH for trypsin is 8.8

Ans. (b) Enzymes are not affected by hydrogen ion concentration

38. At temperature below the freezing point, an enzyme is

a. Slightly activated
b. Killed
c. Inactivated
d. Unaffected

Ans. (c) Inactivated

39. How is the rate of enzyme-catalyzed reactions affected by every 10°C rise of temperature?

a. Halves
b. Doubles
c. Becomes four times
d. Remains unchanged

Ans. (b) Doubles

40. At which temperature, the enzyme activity would be maximum?

a. 35°C
b. 45°C
c. 55°C
d. 60°C

Ans. (a) 35°C

41. Most of the enzymes are inactivated at temperature above

a. 25°C
b. 45°C
c. 55°C
d. 80°C

Ans. (b) 45°C

42. At boiling temperature, an enzyme is

a. Killed
b. Denatured
c. Inactivated
d. Unaffected

Ans. (b) Denatured

43. On boiling/treating with strong acid or alkali/ treating with pepsin, an enzyme loses its catalytic activity because

a. It is a protein
b. It burns
c. It is a functional substances
d. It is a lipoprotein

Ans. (a) It is a protein

44. Which part of an active enzyme is denatured by heat?

a. Apoenzyme
b. Holoenzyme
c. Coenzyme
d. Activator

Ans. (a) Apoenzyme

45. Enzymes catalyses a reaction in

a. Forward direction
b. Backward direction
c. Both ways
d. Either ways

Ans. (d) Either ways

46. Enzymes differ from inorganic catalysts in

a. Having a high diffusion rate
b. Working at high temperature
c. Not being used up in reactions
d. Being proteinaceous in nature

Ans. (d) Being proteinaceous in nature

47. What is true about enzymes?

a. All act best at pH 7.0
b. All are amino acids
c. All are proteins
d. All act best at 0° C

Ans. (c) All are proteins

48. Which of the following is not an attribute of enzymes?

a. These are proteinaceous in nature
b. These speed up the rate of biochemical reaction
c. These are specific in nature
d. These are used up in reaction

Ans. (d) These are used up in reaction

49. Enzymes are sensitive to

a. Light
b. Wind velocity
c. Change in pH
d. Rainfall

Ans. (c) Change in pH

50. Dry seeds can endure higher temperature than the germinating seeds because?

a. Dry seeds are hard
b. Seedlings are tender
c. Dry seeds have more reserve food
d. Hydration makes the enzyme more sensitive to temperature

Ans. (d) Hydration makes the enzyme more sensitive to temperature

51. Zymogens are

a. Enzyme acting upon starch
b. Groups of zymase enzymes
c. Inactive enzyme precursors
d. None of the above

Ans. (c) Inactive enzyme precursors

52. Enzymes which are slightly different in molecular structure, but can perform identical activities are called

a. Isoenzymes
b. Homoenzymes
c. Apoenzymes
d. Coenzymes

Ans. (a) Isoenzymes

53. Lactic dehydrogenase (LDH) which catalyses pyruvate to lactate is an example of?

a. Apoenzyme
b. Antienzyme
c. Isoenzyme
d. Coenzyme

Ans. (c) Isoenzyme

54. An enzyme which catalyses the rearrangement of molecular structure and forms a compound of same molecular weight is called?

a. Ligase
b. Oxidoreductase
c. Isomerase
d. Hydrolase

Ans. (c) Isomerase

55. The transfer of a group from a donor molecule to an acceptor molecule is catalysed by

a. Transferase
b. Isomerase
c. Protease
d. Hydrolytic enzymes

Ans. (a) Transferase

56. Transferases are involved in the transfer of

a. Methyl group
b. Amino group
c. Phosphate group
d. All of these

Ans. (d) All of these

57. Oxidative enzymes occur in

a. Lysosomes
b. Golgi bodies
c. Mitochondria
d. Ribosomes

Ans. (c) Mitochondria

58. Hydrolases are involved in the hydrolysis of

a. Esters
b. Lipids
c. Proteins
d. All of these

Ans. (d) All of these

59. Ligases are involved in the synthesis of

a. C-C bonds
b. C-N bonds
c. C-O bonds
d. All of these

Ans. (d) All of these

60. Esterase belongs to

a. Oxidoreductases b. Carboxylases
c. Hydrolases d. Transferases

Ans. (c) Hydrolases

61. Which of the following is a hydrolytic enzyme?

a. Esterase b. Carbohydrase
c. Protease d. All of these

Ans. (d) All of these

62. The enzyme converting starch into maltose is

a. Invertase b. Hydrogenase
c. Maltase d. Diastase

Ans. (d) Diastase

63. Diastase enzyme helps in the digestion of

a. Starch b. Proteins
c. Fats d. Amino acids

Ans. (a) Starch

64. Which of the following enzymes acts upon fatty acids?

a. Amylase b. Ligase
c. Trypsin d. Peptidase

Ans. (b) Ligase

65. Lipase enzyme acts upon

a. Water b. Protein
c. Fat d. Sugar

Ans. (c) Fat

66. Which enzyme is required to digest the reserve food material (lipid) in castor seeds?

a. Lipase b. Diastase
c. Amylase d. Protease

Ans. (a) Lipase

67. In seeds, digestion is made possible at relatively low temperature by

a. Auxins
b. Proteins
c. Enzymes
d. Nitrogenous complex substances

Ans. (c) Enzymes

68. In the cell, digestive enzymes are mostly located in

a. Lysosomes
b. Cell wall
c. Chromosomes
d. Ribosome

Ans. (a) Lysosomes

69. An enzyme acts by

a. Reducing activation energy
b. Increasing activation energy
c. Increasing reaction time
d. Decreasing reaction time

Ans. (a) Reducing activation energy

70. Which of the following is correct in an enzyme-controlled reaction (E = enzyme; S = Substrate, P = Product)?

a. $E + S \leftrightarrow E + P$ b. $E + S \leftrightarrow ES \leftrightarrow E + P$
c. $E + S \leftrightarrow ES \leftrightarrow E$ d. $E + S \leftrightarrow P \leftrightarrow E + P$

Ans. (b) $E + S \leftrightarrow ES \leftrightarrow E + P$

71. Turnover number of enzyme depends upon

a. Molecular weight of enzyme
b. Size of enzyme molecule
c. Active sites of enzyme molecule
d. Concentration of substrate molecule

Ans. (c) Active sites of enzyme molecule

72. Which of the following is the best evidence for template theory of enzyme action?

a. Compounds similar in structure to the substrate inhibit the reaction
b. Enzymes speed up reaction by definite amount
c. Enzymes determine the direction of a reaction
d. Enzymes are found in living organisms and increase the rate

Ans. (a) Compounds similar in structure to the substrate inhibit the reaction

73. The enzyme is said to be working at maximum efficiency

a. When substrate concentration is increased to point of saturation
b. When substrate concentration is low
c. When substrate coming in contact with active site are negligible
d. None of the above is true

Ans. (a) When substrate concentration is increased to point of saturation

74. When the action of the enzyme is inhibited in the presence of a substance which closely resembles the substrate molecule, then the inhibition is known as?

a. Feedback inhibition
b. Non-competitive inhibition
c. Allosteric inhibition
d. Competitive inhibition

Ans. (d) Competitive inhibition

75. In competitive inhibition, which of the following is true

a. $E + I \leftrightarrow EI$
b. $E + I \leftrightarrow EI + S \leftrightarrow ESI$
c. $S + I \leftrightarrow SI$
d. $ES + I \leftrightarrow ESI$

Ans. (a) $E + I \leftrightarrow EI$

76. Non-competitive inhibitors are those which?

a. Alter the structure of protein molecule
b. Get attached on the active site
c. Activate the enzyme
d. Break the bonds which are responsible for the formation of active sites

Ans. (a) Alter the structure of protein molecule

77. The product of an enzyme-catalyzed reaction can act as inhibitor of the reaction. This mechanism of control is known as

a. Feedback inhibition
b. Competitive inhibition
c. Metabolic antagonism
d. Repression

Ans. (a) Feedback inhibition

78. In feedback inhibition, a metabolic pathway is switched off by

a. Competitive inhibition
b. Denaturation
c. Accumulation of end product
d. Allosteric inhibition

Ans. (d) Allosteric inhibition

79. Which of the following statements is incorrect?

a. Enzymes hasten the completion of a reaction
b. The two terms 'substrate' and 'product' signify the starting and ending materials of a reaction
c. Enzymes are affected by the reactions they catalyse
d. Enzyme exhibit specificity for the reactions they catalyse

Ans. (c) Enzymes are affected by the reactions they catalyse

80. Enzymes, vitamins and hormones can be classified in a single category of biological chemicals because all of them

a. Are proteins
b. Are synthesized in organisms
c. Enhance the oxidative metabolism
d. Aid in regulating metabolism

Ans. (d) Aid in regulating metabolism

81. Which enzymes can digest plant protein?

a. Pepsin
b. Erepsin
c. Rennin
d. All the above

Ans. (a) Pepsin

82. Enzymes as they exist inside the cell are

a. In solid form
b. In crystalline form
c. In solution form
d. In colloidal form

Ans. (d) In colloidal form

83. Feedback inhibition is affected by

a. End product
b. First product
c. Enzymes
d. External factor

Ans. (a) End product

84. K_m value refers to

a. Maximum reaction velocity
b. Near maximum reaction velocity
c. One half of the maximum reaction velocity
d. Threshold value

Ans. (c) One half of the maximum reaction velocity

85. The substrate concentration at which an enzyme attains half its maximum velocity is called?

a. Threshold value
b. Half life
c. Michaelis Menton constant
d. Concentration coefficient

Ans. (c) Michaelis Menton constant

86. For the enzyme action

a. Value of K_m is low
b. Value of K_i is low
c. Value of K_m is high
d. Value of K_i is high

Ans. (b) Value of K_i is low

87. The function of an enzyme is

a. To cause chemical reactions which would not occur otherwise
b. To change the rates of chemical reactions
c. To control the equilibrium points of reactions
d. To change the direction of reactions

Ans. (b) To change the rates of chemical reactions

88. The organic compounds which have transient association with apoenzymes are called?

a. Holoenzyme
b. Coenzyme
c. Prosthetic group
d. None of these

Ans. (b) Coenzyme

89. Iron is a cofactor responsible for the catalytic action of

a. Sucrose
b. Lipase
c. Catalase
d. Cellulose

Ans. (c) Catalase

90. The fastest acting enzyme is

a. Peroxidase
b. Amylase
c. Carbonic anhydrase
d. Phosphoglyceromutase

Ans. (c) Carbonic anhydrase

91. The enzyme bromelain is obtained from

a. Papaya
b. Pineapple
c. Saliva
d. Witches broom

Ans (b) Pineapple

92. The evolution of oxygen from H_2O_2 in a living tissue is catalysed by

a. MnO_2
b. Peroxidase
c. SnO_2
d. Invertase

Ans. (b) Peroxidase

93. The enzyme sucrose acts on

a. Sucrose only
b. Any disaccharide
c. Starch and sucrose
d. Any organic molecule

Ans. (a) Sucrose only

94. The active site of an enzyme is formed by some of its

a. R groups on the amino acids
b. Amino groups of amino acids
c. Carboxyl groups of the amino acids
d. Exposed sulphur bonds

Ans. (a) R groups on the amino acids

95. Upon binding the substrate at one site, other sites on an enzyme become more reactive. This is called

a. Allosteric inhibition
b. Specificity
c. Co-operativity
d. Activation

Ans. (c) Co-operativity

96. Which of these inactivates an enzyme by changing enzyme shape?

a. Allosteric inhibitor
b. Competitive inhibitor
c. Irreversible inhibitor
d. Multienzyme complex

Ans. (a) Allosteric inhibitor

97. Which of these inactivates an enzyme by denaturing it?

a. Allosteric inhibitor
b. Competitive inhibitor
c. Irreversible inhibitor
d. Multienzyme complex

Ans. (c) Irreversible inhibitor

98. The specificity of an enzyme is governed by the tertiary structure. In forming a tertiary structure, bonds develop between certain amino acids. The resulting shape provides for the substrate

a. Spatial fit
b. Bonding fit
c. Spatial and bonding fit both
d. Neither spatial nor bonding fit

Ans. (c) Spatial and bonding fit both

99. Only a substrate with a particular shape is held by the enzyme. It is due to

a. Spatial fit of the active site
b. Bonding fit of the active site
c. Both spatial and bonding fit of the active site
d. Neither spatial nor bonding fit of the active site

Ans. (a) Spatial fit of the active site

100. Bonding fit of an enzyme is the presence of certain active sites

a. Within the grooves in the surface of tertiary structure
b. Outside the grooves on the surface of tertiary surface
c. Both within and outside the grooves in the surface of tertiary structure
d. Formed as a result of quaternary structure

Ans. (a) Within the grooves in the surface of tertiary structure

101. Specificity of the bonding fit for a particular reaction is the result of

a. R groups on the amino acids
b. Amino groups of amino acids
c. Carboxyl groups of the amino acids
d. Exposed sulphur bonds

Ans. (a) R groups on the amino acids

102. Which of the following statements is correct?

a. Enzymes can substitute one another
b. No other enzyme can substitute for a missing enzyme
c. A few enzymes can substitute a given enzyme
d. While some enzymes can be substituted by other enzymes, there is no substitute for most of the enzymes

Ans. (b) No other enzyme can substitute for a missing enzyme

103. All the enzymes of a multienzyme complex are arranged together in

a. Solution of ATP
b. Membrane
c. Quaternary protein
d. Coenzyme

Ans. (b) Membrane

104. During feedback inhibition, the high concentrations of the end product of a metabolic pathway

a. Slow down the enzymes which control earlier steps in the pathway
b. Switch off the enzymes which control earlier steps in the pathway
c. Slow down or switch off the enzymes which control earlier steps in the pathway
d. Denature the enzymes which control earlier steps in the pathway

Ans. (c) Slow down or switch off the enzymes which control earlier steps in the pathway

105. Feedback inhibition quite often involves

a. Competitive inhibition
b. Irreversible inhibition
c. Allosteric inhibition
d. All the above

Ans. (c) Allosteric inhibition

106. Glutamate pyruvate transaminase enzyme is an example of

a. Qxidoreductases
b. Transferases
c. Lyases
d. Ligases

Ans. (b) Transferases

107. Most of the digestive enzymes belongs to the category

a. Qxidoreductases
b. Transferases
c. Hydrolases
d. Lyases

Ans. (c) Hydrolases

108. Histidine decarboxylase enzyme belongs to the category

a. Qxidoreductases
b. Isomerases
c. Lyases
d. Ligases

Ans. (c) Lyases

109. Which enzyme require energy for their action and obtain it from the hydrolysis of ATP?

a. Qxidoreductases
b. Transferases
c. Ligases
d. Lyases

Ans. (c) Ligases

110. The enzyme pyruvate carboxylase combines pyruvic acid and CO_2 to form oxaloacetic acid at the expense of ATP. The enzyme is

a. An isomerase
b. A ligase
c. A lyase
d. A transferase

Ans. (b) A ligase

111. The activity of an enzyme declines

a. Above the optimum temperature
b. Below the optimum temperature
c. Both above and below the optimum temperature
d. Below the minimum and above the maximum temperature

Ans. (c) Both above and below the optimum temperature

112. Pepsinogen (inactive form of enzyme pepsin) is converted into its active form by

a. Isomerism
b. Hydrolysis
c. Oxidation
d. Reduction

Ans. (b) Hydrolysis

113. Most intracellular enzymes function best

a. At neutral pH
b. In acidic conditions
c. In basic conditions
d. Either neutral or acidic conditions

Ans. (a) At neutral pH

114. The protein-digesting enzyme trypsin functions best is

a. pH 7.0
b. pH 6.5
c. pH 7.5
d. pH 8.5

Ans. (d) pH 8.5

115. On reaching the stomach, the enzyme salivary amylase is inactivated by

a. Pepsinogen
b. Pepsin
c. Hydrochloric acid
d. Mucous

Ans. (c) Hydrochloric acid

116. The inhibition of succinic acid dehydrogenase by malonic acid is an example of

a. Competitive inhibition
b. Allosteric inhibition
c. Feedback inhibition
d. Irreversible inhibition

Ans. (a) Competitive inhibition

117. Sulpha drugs are used for the control of bacterial pathogens because they cause

a. Competitive inhibition of folic acid synthesis
b. Allosteric inhibition of folic acid synthesis
c. Feedback inhibition of folic acid synthesis
d. Irreversible inhibition of folic acid synthesis

Ans. (a) Competitive inhibition of folic acid synthesis

118. Cyanide kills an organism by inhibiting

a. Hexokinase
b. Cytochrome oxidase
c. Succinate dehydrogenase
d. Histidine decarboxylase

Ans. (b) Cytochrome oxidase

119. How many categories of enzymes have been recognized by IUB?

a. 5 b. 6
c. 7 d. 8

Ans. (b) 6

120. Which ions are toxic for enzyme activity?

a. Mn^{++} b. K^{+}
c. Na^{++} d. Hg^{++}

Ans. (d) Hg^{++}

121. The enzyme Hexokinase which catalyses glucose to Glucose-6-phosphate in glycolysis is inhibited by Glucose-6-phosphate. This is an example of

a. Feedback allosteric inhibition
b. Positive feedback
c. Competitive inhibition
d. Non-competitive inhibition

Ans. (a) Feedback allosteric inhibition

122. If temperature is increased from 3°C to 45°C, the rate of enzyme activity will

a. Only increase
b. Only decrease
c. Initially increase then decrease
d. Initially decrease then increase

Ans. (c) Initially increase then decrease

123. The name enzyme was coined by

a. Kuhne
b. Buchner
c. Berzelius
d. Dubrunfaut

Ans. (a) Kuhne

124. Nobel Prize for discovering emzymes was given to

a. Kuhne b. Duclaux
c. Buchner d. Dubrunfaut

Ans. (c) Buchner

125. Who confirmed protein nature of enzymes?

a. Monod *et al* b. Arber *et al*
c. Berzelius d. Northrop

Ans. (d) Northrop

126. Number of known enzymes is

a. 500 b. 5400
c. 1500 d. Over 2000

Ans. (d) Over 2000

127. Molecular weight of the smallest enzyme (bacterial ferredoxin) is

a. 6000 b. 5400
c. 4500 d. 3500

Ans. (a) 6000

128. A nonproteinaceous enzyme is

a. Lysozyme b. Ribozyme
c. Ribonuclease-P d. Both b and c

Ans. (d) Both b and c

129. Many enzymes are produced in inactive state called

a. Allosteric enzyme
b. Enzyme precursor
c. Proenzyme or zymogen
d. Both b and c

Ans. (d) Both b and c

130. An autocatalytic enzyme is

a. Pepsin b. Trypsin
c. Chymotrypsin d. All the above

Ans. (d) All the above

131. Pepsin is

a. Simple enzyme b. Exoenzyme
c. Endoenzyme d. Both a and b

Ans. (d) Both a and b

132. Which one is a conjugate enzyme?

a. Succinate dehydrogenase
b. Urease
c. Trypsin
d. Both a and b

Ans. (a) Succinate dehydrogenase

133. An enzyme made of both protein and nonprotein parts is together called

a. Coenzyme
b. Endoenzyme
c. Exoenzyme
d. Holoenzyme

Ans. (d) Holoenzyme

134. An apoenzyme is a

a. Vitamin
b. Amino acid
c. Carbohydrate
d. Protein

Ans. (d) Protein

135. Nonprotein part of holoenzyme is

a. Vitamin
b. Cofactor
c. Fatty acid
d. Zymogen

Ans. (b) Cofactor

136. Vitamins are generally involved in forming component of enzyme called

a. Apoenzyme
b. Holoenzyme
c. Prosthetic group
d. Coenzyme and prosthetic group

Ans. (d) Coenzyme and prosthetic group

137. Loosely attached organic cofactor of holoenzyme is called

a. Modular
b. Prosthetic group
c. Coenzyme
d. Ligase

Ans. (c) Coenzyme

138. Firmly attached organic cofactor of holoenzyme is

a. Transferase
b. Activator
c. Modulator
d. Prosthetic group

Ans. (d) Prosthetic group

139. Coenzyme is often a

a. Carbohydrate
b. Protein
c. Vitamin
d. Fatty acid

Ans. (c) Vitamin

140. Part of enzyme where substrate is changed into product is called

a. Allosteric site
b. Active site
c. Cofactor
d. Prosthetic group

Ans. (b) Active site

141. Which one gives rise to coenzyme?

a. B_2
b. B_1
c. Nicotinamide
d. All the above

Ans. (d) All the above

142. Each step of a metabolic pathway has its

a. Own cofactor
b. Enzyme
c. Coenzyme
d. One to several enzymes

Ans. (b) Enzyme

143. In certain metabolic pathways, a number of enzymes are required. These multienzyme complexes occur enclosed in

a. Membrane
b. Area with ATP
c. Microbodies
d. Endoplasmic reticulum

Ans. (a) Membrane

144. Inorganic cofactor is often called

a. Coenzyme
b. Prosthetic group
c. Modulator
d. Activator

Ans. (d) Activator

145. Active site of an enzyme is formed of

a. Amino groups of some amino acids
b. Carboxyl groups of some amino acids
c. –HS bonds of amino acids
d. R-groups of selected amino acids

Ans. (d) R-groups of selected amino acids

146. Different molecular forms of an enzyme having the same substrate specificity are

a. Zymogens
b. Coenzymes
c. Isoenzymes
d. Allosteric enzymes

Ans. (c) Isoenzymes

147. An allosteric enzyme has

a. One active site
b. One active site and one allosteric site
c. Active site and two types of allosteric sites
d. Two types of active sites

Ans. (c) Active site and two types of allosteric sites

148. Allosteric enzymes have allosteric sites for

a. Both activation and inhibition
b. Inhibition only
c. Activation only
d. Reduction in activation energy

Ans. (a) Both activation and inhibition

149. Turn-over number of the fastest enzyme is

a. 18×10^4 b. 10^4
c. 36×10^6 d. 10^5

Ans. (c) 36×10^6

150. The fastest enzyme is

a. Urease b. Carbonic anhydrase
c. Trypsin d. Pepsin

Ans. (b) Carbonic anhydrase

151. Substrate concentration at which an enzyme attains half its maximum velocity is?

a. Threshold value
b. Half life
c. Michaelis-Menten constant
d. Concentration coefficient

Ans. (c) Michaelis-Menten constant

152. Enzyme that does not follow K_m values is

a. Exoenzyme b. Allosteric enzyme
c. Isoenzyme d. Pepsin

Ans. (b) Allosteric enzyme

153. K_m value is

a. Maximum reaction velocity
b. Near maximum reaction velocity
c. One half of maximum reaction velocity
d. Threshold value

Ans. (c) One half of maximum reaction velocity

154. The word appended at the end of enzyme name is

a. –ose b. –ase
c. –in d. –sin

Ans. (b) –ase

155. The word –ase added to enzyme is

a. Suffix b. Prefix
c. Interpolation d. Conjugation

Ans. (a) Suffix

156. The suffix -ase to enzyme names was proposed by

a. Duclaux b. Buchner
c. Northrop d. Pasteur

Ans. (a) Duclaux

157. The enzymes catalysting breakdown without addition of water are called

a. Lyases b. Hydrolases
c. Ligases d. Oxidoreductases

Ans. (a) Lyases

158. The enzymes that act on starch are

a. Esterases b. Amylases
c. Proteases d. Lipases

Ans. (b) Amylases

159. Enzyme aldolase which helps in combining dihydroxy acetone phosphate with glyceraldehydes phosphate belongs to the category of

a. Ligases b. Hydrolases
c. Transferases d. Lyases

Ans. (d) Lyases

160. Enzyme taking part in converting dihydroxyacetone phosphate to glyceraldehydes phosphate belongs to the class of

a. Isomerases b. Hydrolases
c. Ligases d. Transferases

Ans. (a) Isomerases

161. Enzyme lipase is capable of hydrolyzing

a. Starch b. Fat
c. Protein d. Cellulose

Ans. (b) Fat

162. Substrate for enzyme sucrase is

a. Any disaccharide
b. Starch and cane sugar
c. Cane sugar
d. Milk sugar

Ans. (c) Cane sugar

163. Enzyme required for hydrolyzing the food reserve in castor seed is

a. Amylase b. Lipase
c. Protease d. Diastase

Ans. (b) Lipase

164. Epimerase belongs to the class of enzymes

a. Hydrolases
b. Ligases
c. Isomerases
d. Oxidoreductases

Ans. (c) Isomerases

165. Enzymes catalyzing bonding of two components with the help of ATP are

a. Transferases
b. Ligases
c. Lyases
d. Phosphorylases

Ans. (b) Ligases

166. Enzymes used in breaking DNA at specific sites are

a. DNA-ases
b. Endonucleases
c. Restriction endonucleases
d. Exonucleases

Ans. (c) Restriction endonucleases

167. Restriction endonucleases were discovered by

a. Arber *et al* b. Monod *et al*
c. Cech *et al* d. Altman *et al*

Ans. (a) Arber *et al*

168. IUB has divided enzymes into classes

a. 4 b. 5
c. 6 d. 7

Ans. (c) 6

169. Most of the digestive enzymes belong to the class of

a. Lyases b. Hydrolases
c. Oxidoreductases d. Transferases

Ans. (b) Hydrolases

170. Constitutive enzymes are

a. Operational all the time
b. House keeping enzymes
c. Alloenzymes
d. Both a and b

Ans. (d) Both a and b

171. Repressible enzyme is

a. Present all the time
b. Functional almost all the time
c. Repressed in presence of a specific chemical
d. All the above

Ans. (d) All the above

172. Gaucher's disease is due to the deficiency of the enzyme

a. α-Fucosidase b. β-Galactosidase
c. β-Glucosidase d. Sphingomyelinase

Ans. (c) β-Glucosidase

173. An example of ligases is

a. Succinate thiokinase
b. Alanine racemase
c. Fumarase
d. Aldolase

Ans. (a) Succinate thiokinase

174. An example of lyases is

a. Glutamine synthetase
b. Fumarase
c. Cholinesterase
d. Amylase

Ans. (b) Fumarase

175. Activation or inactivation of certain key regulatory enzymes is accomplished by covalent modification of the amino acid

a. Tyrosine b. Phenylalanine
c. Lysine d. Serine

Ans. (d) Serine

176. The enzyme which can add water to a carbon-carbon double bond or remove water to create a double bond without breaking the bond is

a. Hydratase
b. Hydroxylase
c. Hydrolase
d. Esterase

Ans. (a) Hydratase

177. Fischer's 'lock and key' model of the enzyme action implies that?

a. The active site is complementary in shape to that of substance only after interaction.
b. The active site is complementary in shape to that of substance
c. Substrates change conformation prior to active site interaction
d. The active site is flexible and adjusts to substrate

Ans. (b) The active site is complementary in shape to that of substance

178. From the Lineweaver-Burk plot of Michaelis-Menten equation, Km and Vmax can be determined when V is the reaction velocity at substrate concentration S, the X-axis experimental data are expressed as

a. 1/V b. (B) V
c. 1/S d. (D) S

Ans. (c) 1/S

179. A sigmoidal plot of substrate concentration ([S]) verses reaction velocity (V) may indicate

a. Michaelis-menten kinetics
b. Co-operative binding
c. Competitive inhibition
d. Non-competitive inhibition

Ans. (b) Co-operative binding

180. The K_m of the enzyme giving the kinetic data as below is

a. –0.50 b. –0.25
c. +0.25 d. +0.33

Ans. (d) +0.33

181. The kinetic effect of purely competitive inhibitor of an enzyme

a. Increases K_m without affecting V_{max}
b. Decreases K_m without affecting V_{max}
c. Increases V_{max} without affecting K_m
d. Decreases V_{max} without affecting K_m

Ans. (a) Increases K_m without affecting V_{max}

282. Diastase takes part in digestion of which one

a. Protein
b. Starch
c. Amino acid
d. Fat

Ans. (b) Starch

183. An inducer is absent in the type of enzyme

a. Allosteric enzyme
b. Constitutive enzyme
c. Co-operative enzyme
d. Isoenzymic enzyme

Ans. (b) Constitutive enzyme

184. In reversible non-competitive enzyme activity inhibition

a. V_{max} is increased
b. K_m is increased
c. K_m is decreased
d. Concentration of active enzyme is reduced

Ans. (d) Concentration of active enzyme is reduced

185. In reversible non-competitive enzyme activity inhibition

a. Inhibitor bears structural resemblance to substrate
b. Inhibitor lowers the maximum velocity attainable with a given amount of enzyme
c. K_m is increased
d. K_m is decreased

Ans. (b) Inhibitor lowers the maximum velocity attainable with a given amount of enzyme

186. In competitive enzyme activity inhibition

a. The structure of inhibitor generally resembles that of the substrate
b. Inhibitor decreases apparent K_m
c. K_m remains ineffective
d. Inhibitor decreases V_{max} without affecting K_m

Ans. (a) The structure of inhibitor generally resembles that of the substrate

187. In enzyme kinetics V_{max} reflects

a. The amount of an active enzyme
b. Substrate concentration
c. Half the substrate concentration
d. Enzyme substrate complex

Ans. (a) The amount of an active enzyme

188. In enzyme kinetics K_m implies

a. The substrate concentration that gives one half V_{max}
b. The dissocation constant for the enzyme substrate complexes
c. Concentration of enzyme
d. Half of the substrate concentration required to achieve V_{max}

Ans. (b) The dissocation constant for the enzyme substrate complexes

189. In competitive enzyme activity inhibition

a. Apparent K_m is decreased
b. Apparent K_m is increased
c. V_{max} is increased
d. V_{max} is decreased

Ans. (b) Apparent K_m is increased

190. In non competitive enzyme activity inhibition, inhibitor

a. Increases K_m b. Decreases K_m
c. Does not effect K_m d. Increases K_m

Ans. (c) Does not effect K_m

191. An enzyme catalyzing oxidoreduction, using oxygen as hydrogen acceptor is

a. Cytochrome oxidase
b. Lactate dehydrogenase
c. Malate dehydrogenase
d. Succinate dehydrogenase

Ans. (a) Cytochrome oxidase

192. The enzyme using some other substance, not oxygen as hydrogen acceptor is

a. Tyrosinase
b. Succinate dehydrogenase
c. Uricase
d. Cytochrome oxidase

Ans. (b) Succinate dehydrogenase

193. An enzyme which uses hydrogen acceptor as substrate is

a. Xanthine oxidase
b. Aldehyde oxidase
c. Catalase
d. Tryptophan oxygenase

Ans. (c) Catalase

194. Enzyme involved in joining together two substrates is

a. Glutamine synthetase
b. Aldolase
c. Gunaine deaminase
d. Arginase

Ans. (a) Glutamine synthetase

195. The pH optima of most of the enzymes is

a. Between 2 and 4
b. Between 5 and 9
c. Between 8 and 12
d. Above 12

Ans. (b) Between 5 and 9

196. Coenzymes are

a. Heat stable, dialyzable, non protein organic molecules
b. Soluble, colloidal, protein molecules
c. Structural analogue of enzymes
d. Different forms of enzymes

Ans. (a) Heat stable, dialyzable, non protein organic molecules

197. An example of hydrogen transferring coenzyme is

a. CoA
b. NAD^+
c. Biotin
d. TPP

Ans. (b) NAD^+

198. An example of group transferring coenzyme is

a. NAD^+
b. $NADP^+$
c. FAD
d. CoA

Ans. (d) CoA

199. Cocarboxylase is

a. Thiamine pyrophosphate
b. Pyridoxal phosphate
c. Biotin
d. CoA

Ans. (c) Biotin

200. A coenzyme containing non aromatic hetero ring is

a. ATP
b. NAD
c. FMN
d. Biotin

Ans. (d) Biotin

201. A coenzyme containing aromatic hetero ring is

a. TPP
b. Lipoic acid
c. Coenzyme Q
d. Biotin

Ans. (a) TPP

202. Isoenzymes are

a. Chemically, immunologically and electrophoretically different forms of an enzyme
b. Different forms of an enzyme similar in all properties
c. Catalysing different reactions
d. Having the same quaternary structures like the enzymes

Ans. (a) Chemically, immunologically and electrophoretically different forms of an enzyme

203. Isoenzymes can be characterized by

a. Proteins lacking enzymatic activity that are necessary for the activation of enzymes
b. Proteolytic enzymes activated by hydrolysis
c. Enzymes with identical primary structure
d. Similar enzymes that catalyse different Reaction

Ans. (b) Proteolytic enzymes activated by hydrolysis

204. The isoenzymes of LDH

a. Differ only in a single amino acid
b. Differ in catalytic activity
c. Exist in 5 forms depending on M and H monomer contents
d. Occur as monomers

Ans. (c) Exist in 5 forms depending on M and H monomer contents

205. The normal value of CPK in serum varies between

a. 4–60 IU/L
b. 60–250 IU/L
c. 4–17 IU/L
d. > 350 IU/L

Ans. (a) 4–60 IU/L

206. Factors affecting enzyme activity

a. Concentration
b. pH
c. Temperature
d. All of these

Ans. (d) All of these

207. Which of the following is a substrate specific enzyme?

a. Hexokinase
b. Thiokinase
c. Lactase
d. Aminopeptidase

Ans. (c) Lactase

209. Coenzymes combine with?

a. Proenzymes b. Apoenzymes
c. Holoenzymes d. Antienzymes

Ans. (b) Apoenzymes

210. Coenzymes are required in which of the following reactions?

a. Oxidation-reduction
b. Transamination
c. Phosphorylation
d. All of these

Ans. (d) All of these

211. Which of the following coenzyme takes part in hydrogen transfer reactions?

a. Tetrahydrofolate b. Coenzyme A
c. Coenzyme Q d. Biotin

Ans. (c) Coenzyme Q

212. Which of the following coenzyme takes part in oxidation-reduction reactions?

a. Pyridoxal phosphate
b. Lipoic acid
c. Thiamin diphosphate
d. None of these

Ans. (b) Lipoic acid

213. In conversion of glucose to glucose-6-phsophate, the coenzyme is

a. Mg^{++} b. ATP
c. Both (A) and (B) d. None of these

Ans. (b) ATP

214. A coenzyme required in transamination reactions is

a. Coenzyme A
b. Coenzyme Q
c. Biotin
d. Pyridoxal phosphate

Ans. (d) Pyridoxal phosphate

215. Coenzyme A contains a vitamin which is

a. Thiamin b. Ascorbic acid
c. Pantothenic acid d. Niacinamide

Ans. (c) Pantothenic acid

216. Cobamides contain a vitamin which is

a. Folic acid b. Ascorbic acid
c. Pantothenic acid d. Vitamin B_{12}

Ans. (d) Vitamin B_{12}

217. A coenzyme required in carboxylation reactions is

a. Lipoic acid b. Coenzyme A
c. Biotin d. All of these

Ans. (c) Biotin

218. Which of the following coenzyme takes part in tissue respiration?

a. Coenzyme Q b. Coenzyme A
c. NADP d. Cobamide

Ans. (a) Coenzyme Q

219. The enzyme hexokinase is a

a. Hydrolase b. Oxidoreductase
c. Transferase d. Ligase

Ans. (c) Transferase

220. Which of the following is a proteolytic enzyme?

a. Pepsin b. Trypsin
c. Chymotrypsin d. All of these

Ans. (d) All of these

221. Enzymes which catalyse binding of two substrates by covalent bonds are known as

a. Lyases
b. Hydrolases
c. Ligases
d. Oxidoreductases

Ans. (c) Ligases

222. The induced fit model of enzyme action was proposed by

a. Fischer b. Koshland
c. Mitchell d. Markert

Ans. (b) Koshland

223. Allosteric inhibition is also known as

a. Competitive inhibition
b. Non-competitive inhibition
c. Feedback inhibition
d. None of these

Ans. (c) Feedback inhibition

224. An allosteric enzyme is generally inhibited by

a. Initial substrate of the pathway
b. Substrate analogues
c. Product of the reaction catalysed by allosteric enzyme
d. Product of the pathway

Ans. (d) Product of the pathway

225. When the velocity of an enzymatic reaction equals V_{max}, substrate concentration is?

a. Half of K_m b. Equal to K_m
c. Twice the K_m d. Far above the K_m

Ans. (d) Far above the K_m

226. In Lineweaver-Burk plot, the y-intercept represents

a. V_{max} b. K_m
c. K_m d. $1/K_m$

Ans. (b) K_m

227. In competitive inhibition, the inhibitor

a. Competes with the enzyme
b. Irreversibly binds with the enzyme
c. Binds with the substrate
d. Competes with the substrate

Ans. (d) Competes with the substrate

228. Competitive inhibitors

a. Decrease the K_m b. Decrease the V_{max}
c. Increase the K_m d. Increase the V_{max}

Ans. (c) Increase the K_m

229. Competitive inhibition can be relieved by raising the

a. Enzyme concentration
b. Substrate concentration
c. Inhibitor concentration
d. None of these

Ans. (b) Substrate concentration

230. Physostigmine is a competitive inhibitor of

a. Xanthine oxidase
b. Cholinesterase
c. Carbonic anhydrase
d. Monoamine oxidase

Ans. (b) Cholinesterase

231. Carbonic anhydrase is competitively inhibited by

a. Allopurinol b. Acetazolamide
c. Aminopterin d. Neostigmine

Ans. (b) Acetazolamide

232. Serum lactate dehydrogenase rises in

a. Viral hepatitis
b. Myocardial infarction
c. Carcinomatosis
d. All of these

Ans. (d) All of these

233. Which of the following serum enzyme rises in myocardial infarction?

a. Creatine kinase b. GOT
c. LDH d. All of these

Ans. (d) All of these

234. From the following myocardial infarction, the earliest serum enzyme to rise is

a. Creatine Kinase b. GOT
b. GPT d. LDH

Ans. (a) Creatine Kinase (b) GOT

235. Proenzymes

a. Chymotrysinogen
b. Pepsinogen
c. Both a and b
d. None of these

Ans. (b) Pepsinogen

236. Alkaline phosphatase is present in

a. Liver b. Bones
c. Placenta d. All of these

Ans. (d) All of these

237. Which of the following isoenzyme of lactate dehydrogenase is raised in serum in myocardial infarction?

a. LD_1 b. LD_2
c. LD_1 and LD_2 d. LD_5

Ans. (c) LD_1 and LD_2

238. Enzymes which are always present in an organism are known as

a. Inducible enzymes
b. Constitutive enzymes
c. Functional enzymes
d. Apoenzymes

Ans. (b) Constitutive enzymes

239. Inactive precursors of enzymes are known as

a. Apoenzymes b. Coenzymes
c. Proenzymes d. Holoenzymes

Ans. (c) Proenzymes

240. Whcih of the following is a proenzyme?

a. Carboxypeptidase
b. Aminopeptidase
c. Chymotrypsin
d. Pepsinogen

Ans. (d) Pepsinogen

241. Allosteric enzymes regulate the formation of products by

a. Feedback inhibition
b. Non-competitive inhibition
c. Competitive inhibition
d. Repression-derepression

Ans. (a) Feedback inhibition

242. Regulation of some enzymes by covalent modification involves addition or removal of

a. Acetate
b. Sulphate
c. Phosphate
d. Coenzyme

Ans. (c) Phosphate

243. Covalent modification of an enzyme generally requires a

a. Hormone
b. cAMP
c. Protein kinase
d. All of these

Ans. (d) All of these

244. An inorganic ion required for the activity of an enzyme is known as

a. Activator
b. Cofactor
c. Coenzyme
d. None of these

Ans. (b) Cofactor

245. The first enzyme found to have isoenzymes was

a. Alkaline Phosphatase
b. Lactate dehydrogenase
c. Acid Phosphatase
d. Creatine kinase

Ans. (b) Lactate dehydrogenase

246. Lactate dehydrogenase is located in

a. Lysosomes
b. Mitochondria
c. Cytosol
d. Microsomes

Ans. (c) Cytosol

247. Lactate dehydrogenase is a

a. Monomer
b. Dimer
c. Tetramer
d. Hexamer

Ans. (c) Tetramer

248. Ceruloplasmin is absent in

a. Cirrhosis of liver
b. Wilson's disease
c. Menke's disease
d. Copper deficiency

Ans. (b) Wilson's disease

249. Ceruloplasmin oxidizes

a. Copper
b. Iron
c. Both a and b
d. None of these

Ans. (b) Iron

250. Creatine kinase is present in all of the following *except*

a. Liver
b. Myocardium
c. Muscles
d. Brain

Ans. (a) Liver

251. Alkaline phosphatase is present in

a. Liver
b. Bones
c. Intestinal mucosa
d. All of these

Ans. (d) All of these

252. All of the following are zinc-containing enzymes *except*

a. Acid phosphatase
b. Alkaline phosphatase
c. Carbonic anhydrase
d. RNA polymerase

Ans. (a) Acid phosphatase

253. All of the following are iron-containing enzymes *except*

a. Carbonic anhydrase
b. Catalase
c. Peroxidase
d. Cytochrome oxidase

Ans. (a) Carbonic anhydrase

254. Biotin is a coenzyme for

a. Pyruvate dehydrogenase
b. Pyruvate carboxylase
c. PEP carboxykinase
d. Glutamate pyruvate transminase

Ans. (b) Pyruvate carboxylase

255. Enzymes accelerate the rate of reactions by

a. Increasing the equilibrium constant of reactions
b. Increasing the energy of activation
c. Decreasing the energy of activation
d. Decreasing the free energy change of the reaction

Ans. (c) Decreasing the energy of activation

256. Kinetics of an allosteric enzyme are explained by

a. Michaelis-Menten equation
b. Lineweaver-Burk plot
c. Hill plot
d. All of these

Ans. (c) Hill plot

257. Covalent modification of an enzyme usually involves phosphorylation/dephosphorylation of

a. Serine residue
b. Proline residue
c. Hydroxylysine residue
d. Hydroxyproline residue

Ans. (a) Serine residue

258. V_{max} of an enzyme may be affected by

a. pH
b. Temperature
c. Non-competitive inhibitors
d. All of these

Ans. (d) All of these

259. In enzyme assays, all the following are kept constant *except*

a. Substrate concentration
b. Enzyme concentration
c. pH
d. Temperature

Ans. (b) Enzyme concentration

260. If the substrate concentration is much below the k_m of the enzyme, the velocity of the reaction is

a. Directly proportional to substrate concentration
b. Not affected by enzyme concentration
c. Nearly equal to V_{max}
d. Inversely proportional to substrate concentration

Ans. (a) Directly proportional to substrate concentration

261. Enzymes requiring NAD as co-substrate can be assayed by measuring change in absorbance at

a. 210 nm
b. 290 nm
c. 340 nm
d. 365 nm

Ans. (c) 340 nm

262. Different isoenzymes of an enzyme have the same

a. Amino acid sequence
b. Michaelis constant
c. Catalytic activity
d. All of these

Ans. (c) Catalytic activity

263. The Michaehis-menten hypothesis

a. Postulates the formation of an enzyme substrate complex
b. Enables us to calculate the isoelectric point of an enzyme
c. States that the rate of a chemical reaction may be independent of substrate concentration
d. States that the reaction rate is proportional to substrate concentration

Ans. (a) Postulates the formation of an enzyme substrate complex

264. Schardinger's enzyme is

a. Lactate dehydrogenase
b. Xanthine dehydrogenase
c. Uric oxidase
d. L amino acid dehydrogenase

Ans. (b) Xanthine dehydrogenase

265. Tryptophan pyrolase is currently known as

a. Tryptophan deaminase
b. Tryptophan dioxygenase
c. Tryptophan mono oxygenase
d. Tryptophan decarboxylase

Ans. (b) Tryptophan dioxygenase

266. An enzyme which brings about lysis of bacterial cell wall is

a. Amylase
b. Lysozyme
c. Trypsin
d. Lipase

Ans. (b) Lysozyme

267. Trypsin has no action on

a. Hemoglobin
b. Albumin
c. Histone
d. DNA

Ans. (d) DNA

268. Multiple forms of the same enzymes are known as

a. Zymogens
b. Isoenzymes
c. Proenzymes
d. Pre-enzymes

Ans. (b) Isoenzymes

269. In non-competitive enzyme action

a. V_{max} is increased
b. Apparent k_m is increased
c. Apparent k_m is decreased
d. Concentration of active enzyme molecule is reduced

Ans. (c) Apparent k_m is decreased

270. An allosteric enzyme influences the enzyme activity by

a. Competiting for the catalytic site with the substrate
b. Changing the specificity of the enzyme for the substrate

c. Changing the conformation of the enzyme by binding to a site other than catalytic site
d. Changing the nature of the products formed

Ans. (c) Changing the conformation of the enzyme by binding to a site other than catalytic site

271. Which of the following regulatory reactions involves a reversible covalent modification of an enzyme?

a. Phosphorylation of serine OH on the enzyme
b. Allosteric modulation
c. Competitive inhibition
d. Non-competitive inhibition

Ans. (a) Phosphorylation of serine OH on the enzyme

272. A competitive inhibitor of an enzyme has which of the following properties?

a. It is frequently a feedback inhibitor
b. It becomes covalently attached to an enzyme
c. It decreases the V_{max}
d. It interferes with substrate binding to the enzyme

Ans. (d) It interferes with substrate binding to the enzyme

273. When [S] is equal to K_m, which of the following conditions exist?

a. Half the enzyme molecules are bound to substrate
b. The velocity of the reaction is equal to V_{max}
c. The velocity of the reaction is independent of substrate concentration
d. Enzyme is completely saturated with substrate

Ans. (a) Half the enzyme molecules are bound to substrate

274. Which of the following statements about an enzyme exhibiting allosteric kinetics with cooperative interaction is false?

a. A plot of V-Vk [S] has a sigmoidal shape
b. An inhibitor may increase the apparent K_m
c. Line weaver Berk plot is useful for determining K_m and V_{max}
d. Removal of allosteric inhibitor may result in hyperbolic V-S [S] plot

Ans. (d) Removal of allosteric inhibitor may result in hyperbolic V-S [S] plot

275. Pantothenic acid acts on

a. NADP
b. NADPH
c. FAD
d. CoA

Ans. (b) NADPH

276. Vitamin deficiency that causes fatty liver includes all *except*

a. Vitamin E
b. Pyridoxine
c. Retionic acid
d. Pantothenic acid

Ans. (c) Retionic acid

277. In which of the following types of enzymes an inducer is not required?

a. Inhibited enzyme
b. Cooperative enzyme
c. Allosteric enzyme
d. Constitutive enzyme

Ans. (d) Constitutive enzyme

278. In which of the following types of enzyme water may be added to a C—C double bond without breaking the bond?

a. Hydrolase
b. Hydratase
c. Hydroxylase
d. Esterase

Ans. (b) Hydratase

279. 'Lock' and 'Key' model of enzyme action proposed by Fisher implies that?

a. The active site is flexible and adjusts to substrate
b. The active site requires removal of PO_4 group
c. The active site is complementary in shape to that of the substrate
d. Substrates change conformation prior to active site interaction

Ans. (c) The active site is complementary in shape to that of the substrate

280. In competitive inhibition of enzyme action

a. The apparent K_m is decreased
b. The apparent K_m is increased
c. V_{max} is decreased
d. Apparent concentration of enzyme molecules decreased

Ans. (b) The apparent K_m is increased

281. In competitive inhibition which of the following kinetic effect is true?

a. Decreases both K_m and V_{max}
b. Increases both K_m and V_{max}
c. Decreases K_m without affecting V_{max}
d. Increases K_m without affecting V_{max}

Ans. (d) Increases K_m without affecting V_{max}

282. Enzymes are required in traces because they

a. Have high turnover number
b. Remain unused at the end of reaction and are re used
c. Show cascade effect
d. All are correct

Ans. (d) All are correct

283. An organic substance bound to an enzyme and essential for the activity of enzyme is called

a. Holoenzyme
b. Apoenzyme
c. Coenzyme
d. Isoenzyme

Ans. (c) Coenzyme

284. Enzyme catalysed reactions occur in

a. Pico seconds
b. Micro seconds
c. Milli seconds
d. None of these

Ans. (c) Milli seconds

285. An enzyme can accelerate a reaction up to

a. 1010 times
b. 101 times
c. 10100 times
d. 10 times

Ans. (a) 1010 times

286. In plants, enzymes occur in

a. Flowers only
b. Leaves only
c. All living cells
d. Storage organs only

Ans. (c) All living cells

287. Zymogen is a

a. Vitamin
b. Enzyme precursor
c. Modulator
d. Hormone

Ans. (b) Enzyme precursor

288. Cofactor (Prosthetic group) is a part of holoenzyme, it is

a. Inorganic part loosely attached
b. Accessory non-protein substance attached firmly
c. Organic part attached loosely
d. None of these

Ans. (b) Accessory non-protein substance attached firmly

289. A protein having both structural and enzymatic traits is

a. Myosin
b. Collagen
c. Trypsin
d. Actin

Ans. (a) Myosin

290. Enzymes are different from catalysts in

a. Being proteinaceous
b. Not used up in reaction
c. Functional at high temperature
d. Having high rate of diffusion

Ans. (a) Being proteinaceous

291. Enzymes, vitamins and hormones are common in

a. Being proteinaceous
b. Being synthesized in the body of organisms
c. Enhancing oxidative metabolism
d. Regulating metabolism

Ans. (d) Regulating metabolism

292. Dry seeds endure higher temperature than germinating seeds as

a. Hydration is essential for making enzymes sensitive to temperature
b. Dry seeds have a hard covering
c. Dry seeds have more reserve food
d. Seedlings are tender

Ans. (a) Hydration is essential for making enzymes sensitive to temperature

293. Coenzymes FMN and FAD are derived from vitamin

a. C
b. B_6
c. B_1
d. B_2

Ans. (d) B_2

294. Template/lock and key theory of enzyme action is supported by

a. Enzymes speed up reaction
b. Enzymes occur in living beings and speed up certain reactions
c. Enzymes determine the direction of reaction
d. Compounds similar to substrate inhibit enzyme activity

Ans. (d) Compounds similar to substrate inhibit enzyme activity

295. Combination of apoenzyme and coenzyme produces

a. Prosthetic group
b. Holoenzyme
c. Enzyme substrate complex
d. Enzyme product complex

Ans. (b) Holoenzyme

296. Enzyme inhibition caused by a substance resembling substrate molecule is

a. Competitive inhibition
b. Non-competitive inhibition
c. Feedback inhibition
d. Allosteric inhibition

Ans. (a) Competitive inhibition

297. An enzyme brings about

a. Decrease in reaction time
b. Increase in reaction time
c. Increase in activation energy
d. Reduction in activation energy

Ans. (d) Reduction in activation energy

298. Feedback inhibition of enzyme is influenced by

a. Enzyme
b. External factors
c. End product
d. Substrate

Ans. (c) End product

299. Coenzyme is

a. Often a vitamin
b. Always an inorganic compound
c. Always a protein
d. Often a metal

Ans. (a) Often a vitamin

300. Genetic engineering requires enzyme

a. DNA ase
b. Amylase
c. Lipase
d. Restriction endonuclease

Ans. (d) Restriction endonuclease

301. Which is not true about inorganic catalysts and enzymes?

a. They are specific
b. Inorganic catalysts are not needed by enzymes
c. They are sensitive to pH
d. They speed up the rate of chemical reaction

Ans. (b) Inorganic catalysts are not needed by enzymes

302. Key and lock hypothesis of enzyme action was given by

a. Fischer
b. Koshland
c. Buchner
d. Kuhne

Ans. (a) Fischer

303. An example of feedback inhibition is

a. Allosteric inhibition of hexokinase by glucose-6-phosphate
b. Cyanide action on cytochrome
c. Sulpha drug on folic acid synthesizer bacteria
d. Reaction between succinic dehydrogenase and succinic acid

Ans. (a) Allosteric inhibition of hexokinase by glucose-6-phosphate

304. Feedback term refers to

a. Effect of substrate on rate of enzymatic reaction
b. Effect of end product on rate reaction
c. Effect of enzyme concentration on rate of reaction
d. Effect of external compound on rate of reaction

Ans. (b) Effect of end product on rate reaction

305. Allosteric inhibition

a. Makes active site unifit for substrate
b. Controls excess formation and end product
c. Both (A) and (B)
d. None of these

Ans. (c) Both (A) and (B)

306. The ratio of enzyme to substrate molecules can be as low as

a. 1 : 100,000
b. 1 : 500,000
c. 1 : 10,000
d. 1 : 1,000

Ans. (a) 1 : 100,000

307. Vitamin B_2 is component of coenzyme

a. Pyridoxal phosphate
b. TPP
c. NAD
d. FMN/FAD

Ans. (d) FMN/FAD

308. K_m value of enzyme is substrate concentration at

a. ½ V_{max}
b. 2 V_{max}
c. ½ V_{max}
d. 4 V_{max}

Ans. (d) 4 V_{max}

309. Part of enzyme which combines with non-protein part to form functional enzyme is

a. Apoenzyme
b. Coenzyme
c. Prosthetic group
d. None of these

Ans. (c) Prosthetic group

310. Who got Nobel Prize in 1978 for working on enzymes?

a. Koshland
b. Arber and Nathans
c. Nass and Nass
d. H.G. Khorana

Ans. (a) Koshland

311. Site of enzyme synthesis in a cell is

a. Ribosomes
b. RER
c. Golgi bodies
d. All of these

Ans. (b) RER

312. The fruit when kept is open, tastes bitter after 2 hours because of

a. Loss of water from juice
b. Decreased concentration of fructose in juice
c. Fermentation by yeast
d. Contamination by bacterial enzymes

Ans. (d) Contamination by bacterial enzymes

313. Hexokinase (Glucose + ATP → Glucose-6–P + ADP) belongs to the category

a. Transferases
b. Lysases
c. Oxidoreductases
d. Isomerases

Ans. (c) Oxidoreductases

314. Which enzyme is concerned with transfer of electrons?

a. Desmolase
b. Hydrolase
c. Dehydrogenase
d. Transaminase

Ans. (a) Desmolase

315. The best example of extracellular enzyme (exoenzyme) is

a. Nucleases
b. Digestive enzymes
c. Succinic dehydrogenase
d. None of these

Ans. (c) Succinic dehydrogenase

316. Which mineral element controls the activity of Nitrate reductase?

a. Fe
b. Mo
c. Zn
d. Ca

Ans. (a) Fe

317. Name the enzyme that acts both as carboxylase at one time and oxygenase at another time.

a. PEP carboxylase
b. RuBP carboxylase
c. Carbonic anyhdrase
d. None of these

Ans. (b) RuBP carboxylase

318. A metabolic pathways is a

a. Route taken by chemicals
b. Sequence of enzyme facilitated chemical reactions
c. Route taken by an enzyme from one reaction to another
d. Sequence of origin of organic molecules

Ans. (b) Sequence of enzyme facilitated chemical reactions

319. The energy required to start an enzymatic reaction is called

a. Chemical energy
b. Metabolic energy
c. Activation energy
d. Potential energy

Ans. (c) Activation energy

320. Out of the total enzymes present in a cell, a mitochondrion alone has

a. 4%
b. 70%
c. 95%
d. 50%

Ans. (b) 70%

321. Creatine phosphokinase isoenzyme is a marker for

a. Kidney disease
b. Liver disease
c. Myocardial infarction
d. None of these

Ans. (c) Myocardial infarction

322. Which inactivates an enzyme by occupying its active site?

a. Competitive inhibitor
b. Allosteric inhibitor
c. Non-competitive inhibitor
d. All of these

Ans. (a) Competitive inhibitor

323. Which one is coenzyme?

a. ATP
b. Vitamin B and C
c. CoQ and CoA
d. All of these

Ans. (d) All of these

324. The active site of an enzyme is formed by

a. R group of amino acids
b. NH_2 group of amino acids
c. CO group of amino acids
d. Sulphur bonds which are exposed

Ans. (a) R group of amino acids

325. Carbonic anhydrase enzyme has maximum turn over number (36 million). Minimum turn over number for an enzyme

a. DNA polymerase
b. Lysozyme

c. Penicillase
d. Lactase dehydrogenase

Ans. (b) Lysozyme

326. In cell, digestive enzymes are found mainly in

a. Vacuoles
b. Lysosomes
c. Ribosomes
d. Lomasomes

Ans. (b) Lysosomes

327. Substrate concentration at which an enzyme attains half its maximum velocity is

a. Threshold value
b. Michaelis-Menton constant
c. Concentration level
d. None of these

Ans. (b) Michaelis-Menton constant

328. Which enzyme hydrolyses starch?

a. Invertase
b. Maltase
c. Sucrase
d. Diastase

Ans. (b) Maltase

329. Enzymes functional in cell or mitochondria are

a. Endoenzymes
b. Exoenzymes
c. Apoenzymes
d. Holoenzymes

Ans. (c) Apoenzymes

330. The enzymes present in the membrane of mitochondria are

a. Flavoproteins and cytochromes
b. Fumarase and lipase
c. Enolase and catalase
d. Hexokinase and zymase

Ans. (a) Flavoproteins and cytochromes

331. A mitochondrial marker enzyme is

a. Aldolase
b. Amylase
c. Succinic dehydrogenase
d. Pyruvate dehydrogenase

Ans. (c) Succinic dehydrogenase

332. The enzyme used in polymerase chain reaction (PCR) is

a. Taq polymerase
b. RNA polymerase
c. Ribonuclease
d. Endonuclease

Ans. (a) Taq polymerase

333. Which of the following is a microsomal enzyme inducer?

a. Indomethacin
b. Clofibrate
c. Tolbutamide
d. Glutethamide

Ans. (d) Glutethamide

334. Identify the correct molecule which controls the biosynthesis of proteins in living organisms.

a. DNA
b. RNA
c. Purines
d. Pyrimidines

Ans. (a) DNA

335. The tear secretion contains an antibacterial enzyme known as

a. Zymase
b. Diastase
c. Lysozyme
d. Lipase

Ans. (c) Lysozyme

336. Identify one of the canbonic anhydrase inhibitor that inhibit only luminal carbonic anhydrase enzyme

a. Methazolamide
b. Acetazolamide
c. Dichlorphenamide
d. Benzolamide

Ans. (b) Acetazolamide

337. Group transferring Co-enzyme is

a. CoA
b. NAD^+
c. $NADP^+$
d. FAD^+

Ans. (a) CoA

338. The co-enzyme containing an automatic hetero-ring in the structure is

a. Biotin
b. TPP
c. Sugar phosphate
d. Co-enzyme

Ans. (c) Sugar phosphate

339. The example of hydrogen transferring co-enzyme is

a. B_6–PO_4
b. $NADP^+$
c. TPP
d. ATP

Ans. (d) ATP

340. Enzyme catalyzed hydrolysis of proteins produces amino acid of the form

a. D
b. DL
c. L
d. Racemic

Ans. (c) L

341. Transaminase activity needs the Coenzyme

a. ATP
b. B_6–PO_4
c. FADT
d. NAD^+

Ans. (b) B_6–PO_4

342. The biosynthesis of urea occurs mainly in the liver

a. Cytosol
b. Mitochondria
c. Microsomes
d. Nuclei

Ans. (b) Mitochondria

343. Bile salts make emulsification with fat for the action of

a. Amylose
b. Lipase
c. Pepsin
d. Trypsin

Ans. (b) Lipase

344. All of the following compounds are intermediates of TCA cycle *except*

a. Maleate
b. Pyruvate
c. Oxaloacetate
d. Fumarate

Ans. (b) Pyruvate

345. In conversion of lactic acid to glucose, three reactions of glycolytic pathway are circumvented, which of the following enzymes do not participate?

a. Pyruvate carboxylase
b. Phosphoenol pyruvate carboxy kinase
c. Pyruvate kinase
d. Glucose-6-phosphatase

Ans. (b) Phosphoenol pyruvate carboxy kinase

346. In the normal resting state of human most of the blood glucose burnt as fuel is consumed by

a. Liver
b. Brain
c. Adipose tissue
d. Muscles

Ans. (b) Brain

347. A regulator of the enzyme glucogen synthase is

a. Citric acid
b. Pyruvate
c. Glucose-6-PO_4
d. GTP

Ans. (c) Glucose-6-PO_4

348. A specific inhibitor for succinate dehydrogenase is

a. Arsenite
b. Malonate
c. Citrate
d. Fluoride

Ans. (b) Malonate

349. During the functioning of biosensor, which of the following sequences of event occurs?

a. Enzymatic/cellular reaction → detector → transducer
b. Enzymatic/cellular reaction → transducer → detector
c. Enzymatic/cellular reaction → pressure gauge → time
d. Enzymatic/cellular reaction → vibrator → mechanical signal

Ans. (b) Enzymatic/cellular reaction → transducer → detector

350. An immobilized enzyme being used in continuous plug flow reactor exhibits an effectiveness factor (η) of 1.2. The value of η being greater than one could be apparently due to one of the following reasons. Identify the correct reasons.

a. The enzyme follows substrate inhibited kinetics with intern pore diffusion initiation
b. The enzyme experiences external film diffusion limitation
c. The enzyme follows sigmoid kinetic
d. The immobilized enzyme is operationally unstable

Ans. (c) The enzyme follows sigmoid kinetic

351. The degree of inhibition for non-competitive inhibition of an enzyme catalyzed reaction

a. Increase with increase substrate concentration
b. Reaches a maxima with increase in substrate concentration and then decreases
c. Is independent of substrate concentration
d. Decreases with increase in substrate concentration

Ans. (b) Reaches a maxima with increase in substrate concentration and then decreases

352. An enzyme following Michaelis-Menten kinetics with V_m = 2.5 mmol $m^{-3}s^{-1}$ and km = 5.0 mM was used to carry out the reaction in a batch stirred reactor. Starting with an initial substrate concentration of 0.1 M, the time required for 50% conversion of the substrate will be about

a. 01 hr
b. 06 hr
c. 02 hr
d. 12 hr

Ans. (b) 06 hr

353. The maximum reaction velocity (V_m) for an enzyme catalyzed reaction was experimentally measured at two different temperatures of following results were obtained

Temperature,	**°C –27**	**37**
V_m mmolm^{-3}s^{-1}	**2.25**	**4.50**

The energy of activation for the reaction is

a. 12834 cal mol^{-1} b. 25668 cal mol^{-1}

c. 6417 cal mol^{-1} d. 19251 cal mol^{-1}

Ans. (a) 12834 cal mol^{-1}

354. Inversion of sucrose by immobilized invertase follows substrate inhibited kinetics. The reaction rate (V) in mol mhr^{-1} can be expressed as

$$V = 800\frac{(S)}{\{400 + 50(S) + (S)^2\}}$$

Where, (*S*) is sucrose concentration

The immobilized invertase preparation is used in a CSTR with 100 mol m^{-3} sucrose concentration in the feed stream. If the reaction velocity passes through a maxima at (*S*) = 20 mol m^{-3} the feed flow rate for a reactor volume of 1 m^3 to get the maximum productivity from reactor should be

a. 0.11 m^{-3}hr^{-1}

b. 1.10 m^{-3}hr^{-1}

c. 5.05 m^{-3}hr^{-1}

d. None of these

Ans. (a) 0.11 m^{-3}hr^{-1}

355. Enzyme papin is used with success to

a. Increase meat production

b. Leaven bread

c. Ripen papaya fruit

d. Tenderize meat

Ans. (d) Tenderize meat

356. Which one of the following reactions used for the purpose of recycling enzymes in bioprocesses?

a. Isomerization

b. Immobilization

c. Phosphorylation

d. Polymerization

Ans. (b) Immobilization

357. Match the industrial application of the following enzymes

A Penicillinase	1. Pharmaceutical
B Pectinase	2. Leather
C Trypsin	3. Wine
D Rennin	4. Dairy

Codes

	A	B	C	D
a.	4	3	1	2
b.	1	3	2	4
c.	1	2	3	4
d.	4	2	3	1

Ans. (b) 1 3 2 4

358. Which one of the following techniques is NOT ideal for immobilized cell-free enzyme?

a. Physical entrapment by encapsulation

b. Covalent surface bonding to surface carriers

c. Physical bonding by flocculation

d. Covalent chemical bonding by cross-linking the precipitate

Ans. (c) Physical bonding by flocculation

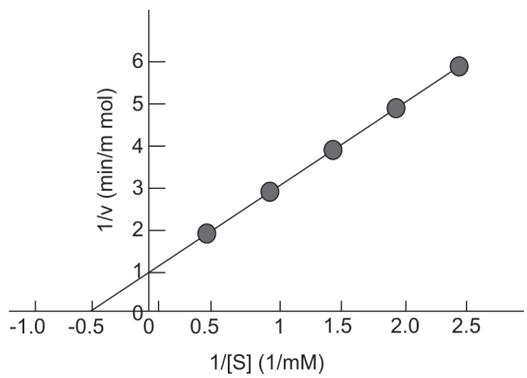
359. The enzyme where catalysis involves transfer of electrons are named as

a. Isomerase b. Transferases

c. Oxidoreductase d. Lyases

Ans. (c) Oxidoreductase

360. The graph shows a Lineweaver-Burke plot for an enzyme catalyzed reaction



Which of the following statements is correct?

a. V_{max} is 5 M mol/min and with competitive inhibition V_{max} remains unchanged

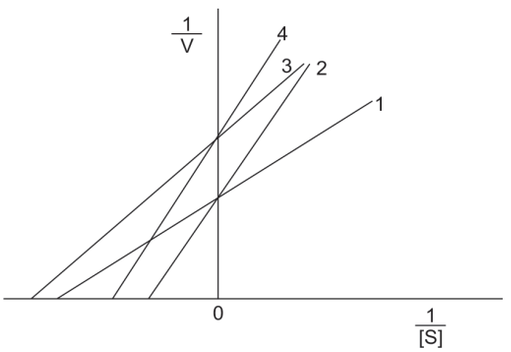
b. K_m is 2M mol/min and with competitive inhibition both K_m and V_{max} both decreases

c. K_m is 0.5 mM and with competitive inhibition V_{max} increases but K_m remain

d. K_m is 2.0 mM and with competitive inhibition K_m increases but V_{max} remains unchanged

Ans. (d) K_m is 2.0 mM and with competitive inhibition K_m increases but V_{max} remains unchanged

361. The kinetic data for an enzymatic in the presence and absence of reaction inhibitors are plotted in the following figure



Which line represents kinetics without inhibitors?

a. Line 1 b. Line 2
c. Line 3 d. Line 4

Ans. (b) Line 2

362. Which line represents kinetics of non competitive inhibition?

a. Line 1 b. Line 2
c. Line 3 d. Line 4

Ans. (d) Line 4

363. Using Hill equation for an enzyme $[s]_0 = (v_0 K_m / V_{max} - v_0)^{1/n}$ and the plot of $\log_{10} (v_0/V_{max} - v_0)$ vs $\log_{10} [s]_0$ one can find out

P – V_{max} from the intercept on the ordinate.
Q – K_m from the intercept on the ordinate.
R – 'n' from the slope.
S – K_m from the intercept on the abscissa.

a. P, Q b. Q, R
c. R, S d. P, S

Ans. (c) R, S

364. The Michaelis-Menton constant Km is a measure of

a. Rate of the reaction
b. Affinity of the enzyme for substrate
c. Concentration of enzyme-substrate [ES] intermediate
d. None of these

Ans. (b) Affinity of the enzyme for substrate

365. The Michaelis–Menton constant, K_m is

a. Numerically equal to ½ V_{max}
b. Dependent on enzyme concentration
c. Independent of pH
d. Numerically equal to the substrate concentration that gives half-maximal velocity

Ans. (d) Numerically equal to the substrate concentration that gives half-maximal velocity

366. Most industrial enzymes are obtained from

a. Plants b. Animal tissues
c. Microbes d. Insects

Ans. (c) Microbes

367. The turnover number of chymotrypsin is 100 s^{-1} and for DNA polymerase it is 15 S^1. This means that

a. Chymotrypsin binds to its substrates with higher affinity than does DNA polymerase
b. The velocity of chymotrypsin reaction is always greater than that of DNA polymerase
c. The velocities of reaction catalysed by both enzymes of saturating substrate levels could be equal if 6.7 times more DNA polymerase than chymotrypsin where used
d. The velocities of chymotrypsin reactions at particular enzyme concentration and saturating substrate levels is lower than that of DNA polymerase reaction under the same condition

Ans. (c) The velocities of reaction catalysed by both enzymes of saturating substrate levels could be equal if 6.7 times more DNA polymerase than chymotrypsin where used

368. Enzyme catalysis of chemical reaction

a. Increases the forward and reverse reaction rates
b. Decreases "G" so that the reaction can proceed spontaneously
c. Increases the energy of transition state
d. Decreases the entropy of reactions

Ans. (a) Increases the forward and reverse reaction rates

369. The factor likely to increase the rate of reaction catalyzed by a surface immobilized enzyme is/are

a. Increase agitation of the bulk liquid containing the substrate
b. Continued replacement of the bulk liquid containing the substrate
c. Increased concentration of the substrate in the bulk liquid
d. All of the above

Ans. (d) All of the above

370. Which of the following cases are likely to lead to faster rates of catalyzing by an enzyme immobilized on a negatively charged support?

a. A positively charged substrate and negatively charged product
b. A negatively charged substrate and positively charged product

c. A positively charged substrate and positively charged product
d. None of these

Ans. (a) A positively charged substrate and negatively charged product

371. On doubling the enzyme concentration, the kinetic parameters that changes are

a. K_m b. V_{max}
c. K_{cat} d. Both V_{max} and K_{cat}

Ans. (d) Both V_{max} and K_{cat}

372. An enzyme does the following in catalyzing a reaction

a. Stabilizes the substrate
b. Decreases the equilibrium constant
c. Increases the forward reaction rate
d. Hasten the approach of rate equilibrium

Ans. (b) Decreases the equilibrium constant

373. K_i indicates

a. Competitive inhibition
b. Denaturation of enzyme
c. Reaction velocity
d. All the above

Ans. (a) Competitive inhibition

374. K_m value of enzyme is substrate concentration at

a. ¼ V_{max} b. 2 V_{max}
c. ½ V_{max} d. 4 V_{max}

Ans. (c) ½ V_{max}

375. The ratio of enzyme to substrate molecules can be

a. 1 : 100,000 b. 1 : 500,000
c. 1 : 10,000 d. 1 : 1,000

Ans. (a) 1 : 100,000

376. Which one value is required for enzyme action?

a. Low k_m
b. High k_m
c. Low k_i
d. High k_i

Ans. (c) Low k_i

377. Turn-over number of an enzyme is dependent upon

a. Size of enzyme
b. Active site
c. Molecular weight of enzyme
d. Concentration of substrate

Ans. (c) Molecular weight of enzyme

378. Competitive inhibition is due to

a. Protein poison
b. Substrate analogue
c. Non-availability of activation energy
d. Short wave radiation

Ans. (b) Substrate analogue

379. End product inhibition is called

a. Substrate regulation
b. Feed back regulation
c. Irreversible inhibition
d. Non competitive inhibition

Ans. (b) Feed back regulation

380. Non competitive inhibition often results in

a. Changing in enzyme structure
b. Blocking of active site
c. Non synthesis of enzyme
d. Non availability of cofactor

Ans. (a) Changing in enzyme structure

381. Template theory of enzyme action was given by

a. Fischer
b. Koshland
c. Moned *et al*
d. Michaelis and Menton

Ans. (a) Fischer

382. Enzymes are immobilized through

a. Covalently attaching to solid support
b. Cross-linking
c. Entrapping in gel
d. All of the above

Ans. (d) All of the above

383. Enzyme used in detergents are

a. Amylases
b. Lipases
c. Proteases
d. Glucoisomerase

Ans. (c) Proteases

384. Enzyme TPA or tissue Plasminogen activator is used for

a. Dissolving blood clots
b. Maintaining plasma contents
c. Clearing turbidity of juices
d. Stimulating thromoboplastin production

Ans. (a) Dissolving blood clots

385. Enzyme immobilization is

a. Conversion of active enzyme into inactive enzyme form
b. Provide enzyme with protective covering
c. Changing soluble enzyme into insoluble state
d. None of the above

Ans. (b) Provide enzyme with protective covering

386. Which of the following is the molecular weight of mRNA?

a. 15,000 to 30,000 b. 20,000 to 35,000
c. 25,000 to 40,000 d. 30,000 to 50,000

Ans. (d) 30,000 to 50,000

387. α-helix in protein can be labeled

a. 3.6_{13} helix b. 4.4_{16} helix
c. 2.6_{12} helix d. None of these

Ans. (c) 2.6_{12} helix

388. When a protein is denaturated the freedom of rotation about bonds in both the polypeptide backbone and the side chain is?

a. Increased
b. Decreased
c. Increased in the backbone only
d. Increased in the side chain only

Ans. (a) Increased

389. The term milimol is written as

a. M.M b. V.M
c. uuM d. mM

Ans. (d) mM

390. The phenomenon by which the synthesis of a set of enzyme leading to a product from outside is known as

a. Repression b. Depression
c. Suppression d. None of these

Ans. (a) Repression

391. Autolytic function is shown by

a. Enzymes b. DNA
c. Hormones d. RNA

Ans. (a) Enzymes

392. K_m is

a. The dissociation constant for the enzyme substrate complex
b. Equal to half the substrate concentration required to achieve V_{max}
c. Identical for all isozymes of an enzyme
d. The substrate concentration that gives one-half V_{max}

Ans. (d) The substrate concentration that gives one-half V_{max}

393. Di-isopropyl fluorophosphates (DEF) reacts with serine proteases stoichiometrically and irreversibly and therefore is a

a. Competitive inhibitor
b. Non-competitive inhibitor
c. Uncompetitive inhibitor
d. Repressor

Ans. (b) Non-competitive inhibitor

394. In non-competitive inhibition

a. The concentration of active enzyme molecules is reduced
b. V_{max} is increased
c. The concentration of active enzyme molecules is unchanged
d. The apparent K_m is increased

Ans. (a) The concentration of active enzyme molecules is reduced

395. In an enzyme assay in which substrate concentration is much lower then K_m, the rate

a. Approaches V_{max}
b. Shows zero-order kinetics
c. It proportional to substrate concentration
d. Is independent of enzyme concentration

Ans. (c) It proportional to substrate concentration

396. Isoenzymes

a. Are enzymes that exist in more than one amino acid sequence in the same species
b. Cannot ne distinguished in a geiven species except immunologically
c. By definition must have the same amino aicd composition
d. Are single polypeptide chains that differ by an amino acid replacement

Ans. (a) Are enzymes that exist in more than one amino acid sequence in the same species

397. Which of the following is not a component of coenzyme A?

a. Adenylic acid
b. Pantothenic acid
c. Cysteamine
d. Acetic acid

Ans. (a) Adenylic acid

398. As a coenzyme, pyruvate decarboxylase requires

a. Coenzyme A
b. NAD^+
c. FMN
d. Thiamine pyrophosphate

Ans. (d) Thiamine pyrophosphate

399. Dehydrogenases use as coenzymes all of the following *except*

a. NAD^+
b. NADP
c. FAD
d. Ferriprotoporphyrin

Ans. (d) Ferriprotoporphyrin

400. Which of the following is an essential cofactor in carboxylation reactions?

a. Coenzyme A
b. Biotin
c. CTP
d. Lipoic acid

Ans. (b) Biotin

401. The enzyme that catalyses the reaction $2H_2O \rightarrow 2H_2O + O_2$ is a

a. Dehydrogenase
b. Peroxidase
c. Catalase
d. Hydrolase

Ans. (c) Catalase

402. Which enzyme will cleave leucyl-glycyl-proline to leucine and glycyl-proline?

a. Carboxypeptidase
b. Glycylglycyl peptidase
c. Aminopeptidase
d. Chymotrypsin

Ans. (c) Aminopeptidase

403. An enzyme of saliva that hydrolyzes starch is

a. Pepsin
b. β-Amylase
c. Lysozyme
d. α-Amylase

Ans. (d) α-Amylase

404. The isoenzymes of lactate dehydrogenase

a. Demonstrate the evolutionary development of this enzyme
b. Range from monomers to tetramers
c. Differ only in a single amino acid
d. Exist in 5 forms depending upon the content of M and H monomers

Ans. (d) Exist in 5 forms depending upon the content of M and H monomers

405. The nerve gas, DFP, has been a useful reagent in enzyme chemistry. At the active site of many hydrolytic enzymes of DFP combines with?

a. Histidine
b. Serine
c. Lysine
d. Aspartate

Ans. (b) Serine

406. The isocitrate dehydrogenase reaction is analogous to (performs the same type of chemical reaction)

a. Pyruvate dehydogenase
b. α-ketoglutarate dehydrogenase
c. β-hydroxyacyl-CoA dehydrogenase
d. 6-phosphogluconate dehydrogenase

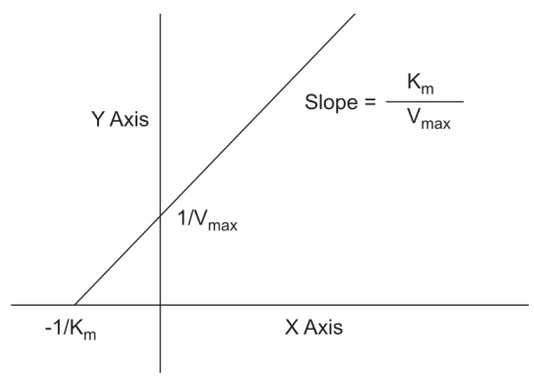
Ans. (d) 6-phosphogluconate dehydrogenase

407. Antimetabolites act by

a. Competitive inhibition when they combine irreversibly with an enzyme
b. Competitive inhibition when they combine reversibly with an enzyme
c. Non-competitive inhibition if there is no relation between degree of inhibition and substrate concentration
d. Lactate dehydrogenase

Ans. (b) Competitive inhibition when they combine reversibly with an enzyme

408. K_m and V_{max} can be determined from the Lineweaver – Burk plot of the Michaelis – Menton equation shoen below. Where V is the reaction velocity at substrate concentrations S, the X-axis experimental data are expressed as



a. 1/V
b. V
c. 1/S
d. S

Ans. (c) 1/S

409. All the following gastrointestinal enzymes are secreted as inactive zymogens (proenzymes) *except*

a. Ribonuclease
b. Pepsin
c. Trypsin
d. Chymotrypsin

Ans. (a) Ribonuclease

410. Which enzyme has the greatest specificity for peptide bonds on the carboxyl side of a cationic amino acid side chain?

a. Carboxypeptidase
b. Trypsin
c. Rennin
d. Pepsin

Ans. (b) Trypsin

411. Which of the following statements about myosin is true?

a. It is a spherically symmetric molecule
b. It is low in α-helix content
c. It is a zinc-requiring enzyme
d. It is an actin-binding protein

Ans. (d) It is an actin-binding protein

412. If an enzyme behaves according to classic Michaelis-Menton kinetics, from a double reciprocal plot of velocity versus substrate concentration, the value for the Michaelis constant (K_m) of the substrate can be determined graphically as the

a. Slope of curve
b. Point of infection of the curve
c. Absolute value of the intercept of the curve with the X-axis
d. Reciprocal of the absolute value of the intercept of the curve with the Y-axis

Ans. (d) Reciprocal of the absolute value of the intercept of the curve with the Y-axis

413. Which of the following oxidation-reduction systems has the highest redox potential?

a. Fumarate/succinate
b. $NAD^+/NADH$
c. Fe^{+++} Cytochrome a/Fe^{++}
d. Fe^{+++} Cytochrome b/Fe^{++}

Ans. (c) Fe^{+++} Cytochrome a/Fe^{++}

414. Dinitrophenol would be most likely to inhibit cell function by disrupting

a. TCA cycle
b. Glycolysis
c. Hepatic gluconeogenesis
d. Oxidative phosphorylation

Ans. (d) Oxidative phosphorylation

415. Polymyxin is unique among chemotherapeutic agents because it is bactericidal in the absence of cell growth. it exerts its effect by

a. Detergent-like disruption of membranes
b. Binding of DNA polymerase
c. Binding to DNA as an insertion its effect by
d. Binding to polysome-bound mRNA

Ans. (a) Detergent-like disruption of membranes

416. Cycloserine inhibits transpeptidation in the formation of the peptidoglycan cell wall network of gram positive organisms. This action of cycloserine is competitively inhibited by

a. L-lysine
b. D-alanine
c. D-glutamine
d. D-serine

Ans. (b) D-alanine

417. Some antibiotics act as ionophores, which means that they?

a. Increase cell membrane permeability to specific ions
b. Inhibit both translation and transcription
c. Inhibit only translation
d. Interfere directly with bacterial cell-wall synthesis

Ans. (a) Increase cell membrane permeability to specific ions

418. *De novo* synthesis of an enzyme, promoted by the substrate on which it acts, is characterized by the term

a. Induction
b. Gratuity
c. Activation
d. Derepression

Ans. (a) Induction

419. Control of metabolic pathway may be exerted by enzyme repression or induction. In vertebrates, this form of enzyme control α curs primarily in the

a. Heart
b. Brain
c. Liverd
d. Skeletal muscle

Ans. (c) Liverd

420. A hypothetical biosynthetic pathway is shown in the diagram below. A microbial organism defective in one enzyme of this path is grown in a medium containing X. Large amounts of M and L are found in the organism but none of Z, in which enzyme is the mutation expressed?

a. Enzyme A
b. Enzyme B
c. Enzyme C
d. Enzyme D

Ans. (c) Enzyme C

421. The activity of most single polypeptide enzymes can be represented by the hyperbolic curve A shown below. However, the activity of homotropic regulatory enzymes shows a sigmoid dependence on substrate concentration, curve B. this sigmoid relationship between substrate concentration and reaction velocity indicates that?

a. Homotropic enzymes are polymers
b. Homotropic enzymes catalyzes reactions more slowly than single polypeptide enzymes
c. The reaction rate is independent of substrate concentration
d. The binding of one substrate molecule enhances subsequent substrate binding and activity

Ans. (d) The binding of one substrate molecule enhances subsequent substrate binding and activity

422. Which of the following statements concerning trypsinogen and chymotrypsinogen are false?

a. They have considerable homologies in primary sequence
b. They are secreted by exocrine cells in the pancreas
c. They are exopeptidases
d. They can be converted into active enzymes by limited digestion with trypsin

Ans. (c) They are exopeptidases

423. It is true of most enzymes that they?

a. Increase the rapidity of the reaction they catalyze
b. Are specific for the substrate as well as the substrate as well as the reaction catalyzed
c. Are large polypeptides with a molecular weight greater than 5,000 daltons
d. All of the above

Ans. (d) All of the above

424. Proteins that contain a porphyrin ring include

a. Catalase
b. Cytochrome
c. Haemoglobin
d. All the above

Ans. (d) All the above

425. Which of the following proteins contain iron?

a. Haemoglobin
b. Cytochrome C
c. Peroxidase
d. All of the above

Ans. (d) All of the above

426. Which of the following statements about sickle cell anaemia are true?

a. It is widely distributed in areas of high malaria fatality
b. It results from a single amino acid change in haemoglobin
c. It is seen in homozygous individuals only
d. All of these

Ans. (d) All of these

427. Which of the following statements about isozymes of a given enzyme are true?

a. They have different substrate specificities
b. They may exhibit different K_m values for substances or cofactors
c. They are composed of distinct multimeric complexes
d. They usually exhibit identical electrophoretic mobility

Ans. (b) They may exhibit different K_m values for substances or cofactors
(c) They are composed of distinct multimeric complexes

428. Heavy chains of I_gG antibody may be separated from light chains with?

a. Ethanolamine
b. Pepsin
c. Papain
d. Mercaptoethanol

Ans. (d) Mercaptoethanol

429. Which of the following enzymes was first isolated and purified in the form of crystals?

a. Urease
b. Pepsin
c. Amylase
d. Ribonuclease

Ans. (a) Urease

430. FAD and FMN is a coenzyme, which vitamin is incorporated into its structure

a. Vitamin B_2
b. Vitamin B_1
c. Vitamin B_6
d. Vitamin C

Ans. (a) Vitamin B_2

431. Zymogens are

a. Enzymes acting upon starch
b. Group of zymase enzymes
c. Inactive enzymes precursors
d. None of the above

Ans. (c) Inactive enzymes precursors

432. Which of the following is iron porphyrin coenzymes or cofactor?

a. CoA
b. Cytochrome
c. NAD
d. FAD

Ans. (b) Cytochrome

433. The non protein part of enzyme called

a. Holoenzymes
b. Prosthetic group
c. Apoenzymes
d. None of these

Ans. (b) Prosthetic group

434. Enzymes are sensitive to

a. pH
b. Rain fall
c. Wing velocity
d. Light

Ans. (a) pH

435. The protein part of an enzymes is known as

a. Holoenzymes
b. Apoenzymes
c. Prosthetic group
d. None of the above

Ans. (b) Apoenzymes

436. NADP is

a. Enzymes activator
b. Electron acceptors
c. Ion carrier
d. All living cells of plant body

Ans. (b) Electron acceptors

437. In plants enzymes are present in

a. Only in leaves
b. Only in flowers
c. Only in storage organs
d. Hydrogen acceptor

Ans. (d) Hydrogen acceptor

438. Cytochrome oxidase contains

a. Magnesium
b. Cobalt
c. Mercury
d. Iron

Ans. (d) Iron

439. NADP is

a. An enzyme
b. A part of sRNA
c. A coenzyme (coenzyme II)
d. A part of tRNA

Ans. (c) A coenzyme (coenzyme II)

440. In seeds digestion is made possible at relatively low temperature by

a. Auxins
b. Nitrogenous substance
c. Proteins
d. Enzymes

Ans. (d) Enzymes

441. The first enzyme that reduces nitrates to nitrites and ammonia in plant is

a. Glutamine synthetase
b. Glutamate dehydrogenase
c. Nitrite reductase
d. Nitrate reductase

Ans. (d) Nitrate reductase

442. Out of total enzymes present in the cell mitochondria alone has

a. 4%
b. 95%
c. 70%
d. No enzymes

Ans. (c) 70%

443. Which of the following is the best evidence for template theory of enzymes action?

a. Compounds similar in structure to the substrate inhibit the reaction
b. Enzymes speed up the reaction by definite amount
c. Enzymes determine the direction of a reaction
d. Enzymes are found in living organism and increase the rate of certain reaction

Ans. (a) Compounds similar in structure to the substrate inhibit the reaction

444. Enzymes are basically made up of

a. Fats
b. Carbon
c. Vitamins
d. Proteins

Ans. (d) Proteins

445. Enzymes are proteins it was suggested by

a. Summer
b. Pasteur
c. Miller
d. Leeuwenhoek

Ans. (a) Summer

446. Esterase belongs to

a. Oxidation reduction enzymes
b. Carboxylase
c. Hydrolytic enzymes
d. Transferase

Ans. (c) Hydrolytic enzymes

447. Enzymes are different from inorganic, catalysts in

a. Being proteinaceous in nature
b. Not being used up in reaction
c. Working at high temperature
d. Having a high diffusion rate

Ans. (a) Being proteinaceous in nature

448. Which of the following is not an attribute of enzymes?

a. They are proteinaceous in nature
b. They speed up the rate of biochemical
c. They are specific in nature
d. They are used in reaction

Ans. (d) They are used in reaction

449. When coenzyme is combined with apoenzyme it is called?

a. Co-factor
b. Holoenzyme
c. Substrate enzyme complex
d. Vitamin A

Ans. (b) Holoenzyme

450. LDH (Lactic dehydrogenase) which catalyzed pyruvate to lactate is an example of

a. Apoenzyme
b. Antienzyme
c. Isoenzyme
d. Coenzyme

Ans. (c) Isoenzyme

451. Enzymes which convert starch into maltase is

a. Maltase
b. Diastase
c. Invertase
d. Hydrogenase

Ans. (b) Diastase

452. At temperature below the freezing point enzyme is

a. Slightly activated
b. Killed
c. Inactivated
d. Unaffected

Ans. (c) Inactivated

453. Enzymes, vitamins and hormones can be classified into a single category of biological chemicals because all of them

a. Aid in regulating metabolism
b. Are proteins
c. Are synthesized in organism
d. Enhance the oxidation metabolism

Ans. (a) Aid in regulating metabolism

454. Diastase enzymes digest or enzymes diastase helps in the digestion of

a. Proteins
b. Fats
c. Amino acid
d. Starch (polysaccharides)

Ans. (d) Starch (polysaccharides)

455. The product of an enzymes catalysed reaction can act as inhibitors of the reaction. This mechanism of control is known as?

a. Repressor
b. Competitive inhibition
c. Feedback inhibition
d. Metabolic antagonism

Ans. (c) Feedback inhibition

456. Dry seeds can endure higher temperature than the germinating deeds because

a. Dry seeds have more reserve food
b. Dry seeds are hard
c. The seedlings are tender
d. Hydration makes the enzymes more sensitive to temperature

Ans. (d) Hydration makes the enzymes more sensitive to temperature

457. At boiling temperature an enzyme is

a. Unaffected
b. Killed
c. Inactivated
d. Denaturated

Ans. (d) Denaturated

458. A huge amount of starch is stored in potatoes which are underground. This is made possible by?

a. Synthesis of sugar in the potatoes
b. Activity of enzymes which convert starch into sugar and sugar back into starch after it has to store the potato
c. Migration of starch from aerial parts
d. Migration of starch from the soil

Ans. (b) Activity of enzymes which convert starch into sugar and sugar back into starch after it has to store the potato

459. An enzyme that catalyses the rearrangement of molecular structure and forms a compound of same molecular weight is called

a. Hydrolase
b. Isomerase
c. Oxido reductase
d. Ligase

Ans. (b) Isomerase

460. Blocking of active site of an enzyme is a kind of

a. Feedback inhibition
b. Non competitive inhibition
c. Allosteric inhibition
d. Competitive inhibition

Ans. (d) Competitive inhibition

461. Enzymes which act normally within cells are called

a. Apoenzymes
b. Exoenzymes
c. Endoenzymes
d. Ferments

Ans. (c) Endoenzymes

462. Enzymes which are slightly different in molecular structure but can perform identical activities are called

a. Apoenzymes
b. Isoenzymes
c. Coenzymes
d. Homoenzymes

Ans. (b) Isoenzymes

463. The plant proteinases or endopeptidases enzyme is

a. Trypsin
b. Papain
c. Pepsin
d. Urease

Ans. (b) Papain

464. Which of the following statement is not correct?

a. All enzymes are thermostable
b. All enzymes are biocatalysts
c. All enzymes are proteins
d. All proteins are enzymes

Ans. (d) All proteins are enzymes

465. The activity of succinic dehydrogenase is inhibited by

a. Glycolate
b. Pyruvate
c. Phosphoglycerate
d. Malonate

Ans. (d) Malonate

466. In feedback inhibition a metabolic pathway is switched off by

a. Lack of a substrate
b. By a rise in temperature
c. Competitive inhibition
d. Accumulation of end product

Ans. (d) Accumulation of end product

467. An enzyme acts by

a. Increasing the pH
b. Decreasing the pH
c. Reducing the energy of activation
d. Increasing the energy of activation

Ans. (c) Reducing the energy of activation

468. T. Cech and S. Altman got noble prize in 1989 for

a. Viral infection
b. Mechanism of DNA synthesis
c. Catalytic role of RNA (ribozyme)
d. All the above

Ans. (c) Catalytic role of RNA (ribozyme)

469. The enzyme is said to be working at maximum efficiency

a. When substrate coming in contact with active site are negligible
b. When substrate concentration is increased to point of saturation
c. When substrate concentration is low
d. None of these

Ans. (b) When substrate concentration is increased to point of saturation

470. Which enzyme is required to digest the reserve food material (liquid) in castor seeds?

a. Amylase
b. Protease
c. Diastase
d. Lipase

Ans. (d) Lipase

471. Hydrolases are involved in the hydrolysis of

a. Proteins
b. Esters
c. Lipids
d. All the above

Ans. (d) All the above

472. Which of the following statement is incorrect?

a. The two terms substrate and product signify the starting and ending materials of a reaction
b. Enzymes hasten the completion of a reaction
c. Enzymes exhibit specificity for the reaction they catalyze
d. Enzymes are affected by the reactions they catalyze

Ans. (d) Enzymes are affected by the reactions they catalyze

473. Some metals known as cofactors of enzymes are

a. K^+, Co^{++}
b. Ca^{++}, Zn^{++}, Mn^{++}
c. Zn^{++}, Ca^{++}
d. All the above

Ans. (d) All the above

474. During enzyme activity the coenzyme acts as

a. Activator of oxidation reduction reactions
b. A donor or acceptor of atoms which are added to or removed from the substrates
c. Both a and b
d. None of these

Ans. (c) Both a and b

475. Amount of enzyme transforming one mole, of substrate per minute at 25°C under optimal conditions of measurement is called

a. Enzyme purity
b. Specific activity
c. Unit of enzyme activity
d. Catalytic centre activity

Ans. (c) Unit of enzyme activity

476. What will happen to an enzyme when apoenzyme is separated from it metal component?

a. Activity will be lost
b. Activity will be increased
c. Activity will be decreased
d. There will be no change in the activity

Ans. (a) Activity will be lost

477. Which of the following are coenzymes?

a. NAD, K, CoA
b. Vitamin, Fe, Cu
c. NAD, NADP, FAD, FMN
d. $NADPH_2$, Ca, Co

Ans. (c) NAD, NADP, FAD, FMN

478. Turn over number of enzyme depends upon

a. Size of enzyme molecule
b. Molecular weight of enzyme
c. Active sites of enzyme molecule
d. Concentration of substrate molecule

Ans. (c) Active sites of enzyme molecule

479. Which of the following is correct in an enzyme controlled reaction (E = enzyme, S = substrate, P = product)?

a. E + S = ES = E
b. E + S = ES = E + P
c. E + S = E + P
d. E + S = P = E + P

Ans. (b) E + S = ES = E + P

480. Non competitive inhibition can result in

a. Blocking of active site
b. Non availability of cofactor
c. Change in enzyme structure
d. Non synthesis of enzymes

Ans. (c) Change in enzyme structure

481. Induced fit theory of enzyme action was given be

a. Buchner
b. Kuhne
c. Koshland
d. Fischer

Ans. (c) Koshland

482. Enzyme taking part in converting dihydroxy acetone phosphate to glyceraldehydes phosphate belongs to the type of

a. Ligases
b. Transferases
c. Isomerases
d. Hydrolases

Ans. (c) Isomerases

483. The fastest enzyme is

a. Trypsin
b. Pepsin
c. Carbonic anhydrase
d. Urease

Ans. (c) Carbonic anhydrase

484. The enzyme used for alcohol formation by fermentation is

a. Invertase
b. Lipase
c. Amylase
d. Zymase

Ans. (d) Zymase

485. Feedback inhibition is caused by blocking of enzymes by

a. Chemicals produced by hormones
b. Hormones
c. Competitive inhibition
d. Accumulated end products

Ans. (d) Accumulated end products

486. A substance unrelated to substrate reversibly changes the activity of an enzyme. It is

a. Allosteric subunit
b. Competitive inhibitor
c. Allosteric modulator
d. Non competitive inhibitor

Ans. (b) Competitive inhibitor

487. Feedback inhibition is induced by

a. Enzyme
b. Catalyst
c. End product
d. Substrate

Ans. (c) End product

488. Enzymes as they exist inside the cell are

a. In solid form
b. In crystalline form
c. In colloidal form
d. In solution form

Ans. (c) In colloidal form

489. In genetic engineering some important enzymes are used, one of them is

a. Topoisomerase
b. Helicase
c. Restriction endonuclease
d. Translocase

Ans. (c) Restriction endonuclease

490. Enzymes are useful because they?

a. Are important structural components
b. Supply energy
c. Enhance the absorption of water
d. Catalyse biochemical reactions in the plant body

Ans. (d) Catalyse biochemical reactions in the plant body

491. Urease, the first enzyme crystallized by

a. Louis Pasteur b. J.B. Summer
c. E. Buchner d. J. Northrop

Ans. (b) J.B. Summer

492. Which enzyme is not proteinaceous?

a. Holozyme b. Trypsin
c. Ribozyme d. Isozyme

Ans. (c) Ribozyme

493. Which one of the following statements is true for the enzymes?

a. All enzymes are proteins
b. All proteins are enzyme
c. All enzymes are not proteins
d. All enzymes are vitamins

Ans. (a) All enzymes are proteins

494. The scientists associated with the study of enzyme include

a. Went b. Buchner
c. Summer d. Both b and c

Ans. (d) Both b and c

495. The nature of coenzyme is

a. Proteinaceous b. Non proteinaceous
c. Both a and b d. None of these

Ans. (d) None of these

496. Which of the following statements is incorrect?

a. The optimum pH for trypsin is 8.8
b. At optimum pH, the activity of enzyme is maximum
c. Enzymes are not affected by hydrogen ion concentration
d. The optimum pH for pepsin is 2.0

Ans. (c) Enzymes are not affected by hydrogen ion concentration

497. Which part of an active enzyme is denatured by heat?

a. Coenzyme b. Apoenzyme
c. Holoenzyme d. Activator

Ans. (b) Apoenzyme

498. How is the rate of enzyme catalysed reactions affected by every 10°C rise of temperature?

a. Halves
b. Becomes four times
c. Doubles
d. Remains unchanged

Ans. (c) Doubles

499. On boiling or treating with strong acid or alkali an enzymes loses its catalytic activity because

a. It is a lipoprotein
b. It burns
c. It is a protein
d. It is functional substance

Ans. (c) It is a protein

500. At which temperature the enzyme activity would be maximum

a. 60°C b. 55°C
c. 45°C d. 35°C

Ans. (d) 35°C

501. Which of the following is not an attribute of enzymes?

a. The speed up the rate of biochemical reaction
b. These are specific in nature
c. They are used up in reaction
d. These are proteinaceous in nature

Ans. (c) They are used up in reaction

502. Transferases are involved in the transfer of

a. Phosphate group b. Amino group
c. Methyl group d. All of the above

Ans. (d) All of the above

503. The transfer of a group from a donor molecule to an acceptor molecule is catalyzed by

a. Protease b. Isomerase
c. Transferase d. Hydrolytic enzymes

Ans. (c) Transferase

504. Activation energy is required by

a. Non catalyzed reactions
b. Catalyzed reaction
c. Both a and b
d. None of the above

Ans. (c) Both a and b

505. Which of the following is a hydrolytic enzyme?

a. Protease b. Esterase
c. Carbohydrase d. All of the above

Ans. (d) All of the above

506. Ligases are involved in the synthesis of

a. C-O bonds
b. C-N bonds
c. C-C bonds
d. All of the above

Ans. (d) All of the above

507. In competitive inhibition which of the following is true

a. ES + I = ESI
b. S + I = SI
c. E + I = EI
d. E + I = EI + S = ESI

Ans. (c) E + I = EI

508. Many vitamins are necessary to the cell

a. To increase immunity
b. To act as coenzymes
c. To provide energy
d. To help in digestion

Ans. (b) To act as coenzymes

509. Coenzyme is often a

a. Fatty acid
b. Vitamin
c. Protein
d. Carbohydrate

Ans. (b) Vitamin

510. Coenzyme functions in association with a

a. Apoenzyme
b. Protein
c. Holoenzyme
d. Vitamin

Ans. (a) Apoenzyme

511. The enzymes catalyzing breakdown without addition of water are called

a. Ligases
b. Lyases
c. Hydrolases
d. Oxidoreductases

Ans. (b) Lyases

512. Amylopectin acts upon

a. Polysaccharide in any medium
b. Polysaccharide in acidic medium
c. Polysaccharide in alkaline medium
d. Polysaccharide in neutral medium

Ans. (c) Polysaccharide in alkaline medium

513. Coenzyme is alway

a. Metal
b. Organic molecule
c. Protein
d. Non of the above

Ans. (b) None of the above

514. An enzyme can be synthesized by chemically bonding together molecules of

a. Carbohydrates
b. Amino acids
c. Lipases
d. CO_2

Ans. (b) Amino acids

515. A coenzyme is

a. Same enzyme that occurs in different tissues such as heart and muscle
b. One that shares the function of other enzyme
c. Organic or inorganic in nature and helps activate metabolic enzymes
d. Organic non protein in nature and helps to activate metabolic enzymes

Ans. (d) Organic non protein in nature and helps to activate metabolic enzymes

516. Enzymes are the polymers of

a. Hexose carbon
b. Fatty acids
c. Amino acids
d. Inorganic phosphate

Ans. (c) Amino acids

517. The enzyme which hydrolyse starch is?

a. Sucrase
b. Cellulase
c. Amylase
d. Invertase

Ans. (c) Amylase

518. Ribozyme is

a. RNA without sugar
b. RNA without phosphate
c. RNA having enzyme activity
d. RNA with extra phosphate

Ans. (c) RNA having enzyme activity

519. The release of adenyl cyclase from the cell membrane changes

a. ATP into ADP
b. ADP into ATP
c. cAMP into ATP
d. ATP into cAMP

Ans. (d) ATP into cAMP

520. Proteinaceous nature of the enzyme was established by obtaining crystalline form of urease from Jack beans in 1926 by

a. Buchner
b. Summer
c. Pouling
d. Northrop

Ans. (b) Summer

521. Which of the following enzyme is not proteinaceous in nature?

a. Coenzyme
b. Ribozyme
c. Succinic dehydrogenase
d. Catalase

Ans. (b) Ribozyme

522. Turn over number of an enzyme depends on its

a. Concentration of enzyme
b. Size of enzyme
c. Number of active sites
d. Molecular weight

Ans. (c) Number of active sites

523. Which has coenzyme activity?

a. Purine
b. Pyrimidine
c. Urease
d. Both a and b

Ans. (c) Urease

524. Which one is not a simple enzyme?

a. Amylase
b. Pepsin
c. Urease
d. Dehydrogenase

Ans. (d) Dehydrogenase

525. UbQ (ubiquinone) is

a. Activator
b. Protein cofactor
c. Non protein coenzyme
d. Protein coenzyme

Ans. (c) Non protein coenzyme

526. The enzyme used to dissolve blood clot in coronary artery is

a. Thrombokinase
b. Rennin
c. Streptokinase
d. Tyrosinase

Ans. (c) Streptokinase

527. The metallic ion acting as activator of ATPase in cell membrane

a. Fe^{++}
b. K^{+}
c. Na^{+}
d. Mg^{++}

Ans. (c) Na^{+}

528. Enzyme responsible for RNA directed DNA synthesis is

a. DNA polymerase
b. Helicase
c. Reverse transcriptase
d. Topoisomerase

Ans. (c) Reverse transcriptase

529. Which of the following enzyme is functional in maize grain during germination?

a. Maltase
b. Diastase
c. Urease
d. Zymase

Ans. (b) Diastase

530. Cytochrome oxidase is a marker enzyme for

a. Circular DNA of mitochondria
b. Outer membrane of mitochondria
c. Inner membrane of mitochondria
d. Matrix of mitochondria

Ans. (c) Inner membrane of mitochondria

531. The enzymes are highly specific in their action. This specificity of an enzyme if due to

a. RNA
b. Specific coenzymes
c. Arrangement of amino acids
d. Active site

Ans. (c) Arrangement of amino acids

532. The stoppage of an enzymatic (biological) reaction by the end product of reaction is called

a. End product inhibition
b. Feed back inhibition
c. Negative inhibition
d. All of the above

Ans. (d) All of the above

533. Coenzyme is a part of enzyme

a. Vitamin A
b. Inorganic metal activator
c. Non protein organic part attached firmly
d. Non protein organic part attached loosely

Ans. (d) Non protein organic part attached loosely

534. In competitive inhibition

a. Inhibitor block site
b. Inhibitor resembles the substrate in molecular structure
c. Inhibitor has no effect on allosteric site
d. All are correct

Ans. (d) All are correct

535. If the prosthetic group or non protein part of an conjugation enzyme (Holoenzyme) is removed then?

a. Enzyme becomes inactive
b. K_m constant increases
c. Activity of enzyme decreases
d. Enzyme starts inhibiting the reaction

Ans. (a) Enzyme becomes inactive

536. Where does reaction occur between enzyme and substrate?

a. Allosteric site
b. Prosthetic group
c. Active site
d. None of the above

Ans. (c) Active site

537. Induced fit theory of Koshland states that?

a. Active sites are inactive and do not participate
b. Active sites are static like a key
c. Active sites undergo geometrical conformational changes
d. None of these

Ans. (c) Active sites undergo geometrical conformational changes

538. Cyanide kill an animal by inhibiting cytochrome oxidase (enzyme of respiratory chain). Is does not bind with active site this is an examples of

a. Feedback inhibition
b. Noncompetitive inhibition
c. Competitive inhibition
d. Allosteric inhibition

Ans. (b) Noncompetitive inhibition

539. The spoilage of food can be prevented by keeping it in cold storage. It is due to

a. More availability of pure oxygen in cold storage
b. Reduced respiration
c. Reduced enzyme activity of bacteria
d. Reduced enzyme activity in substrate molecules

Ans. (c) Reduced enzyme activity of bacteria

540. Which inactivates an enzyme by occupying its active sites?

a. Noncompetitive inhibition
b. Competitive inhibition
c. Allosteric inhibition
d. All of the above

Ans. (b) Competitive inhibition

541. Which is not an attribute of enzymes?

a. Regulator
b. Specificity
c. Procaine
d. Used in reaction

Ans. (d) Used in reaction

542. Sometimes enzymes are named according to the source from which they are obtained such as papain from papaya. Name of the enzymes obtained from pineapple

a. Maltose
b. Bromelain
c. Sucrose
d. Pineollelase

Ans. (b) Bromelain

543. The Q_{10} for enzyme activity is

a. 3–4
b. 2–3
c. 1–2
d. 1–3

Ans. (b) 2–3

544. According to IUB system, isomerases belong to which class?

a. IV
b. V
c. III
d. I

Ans. (b) V

545. As temperature changes from 30 to 45°C the rate of enzyme activity will

a. Increase
b. Decrease
c. First decrease and then increase
d. First increase and then decrease

Ans. (d) First increase and then decrease

546. IUB has divided enzymes with how many classes?

a. 6
b. 5
c. 4
d. 8

Ans. (a) 6

547. Why is heat used to sterilized non living object in tissue culture?

a. Proteins lose their tertiary structure due to break down of bonds
b. Proteins are denatured at temperature above 55°C
c. Both correct
d. Only a is correct

Ans. (c) Both correct

548. The modern system of enzyme classification was introduced International Union of Biochemistry (IUB) in

a. 1963
b. 1962
c. 1961
d. None of these

Ans. (c) 1961

549. The essential chemical components of many co-enzymes are

a. Carbohydrate
b. Vitamins
c. Protein
d. None of these

Ans. (b) Vitamins

550. Proenzyme is the ..... precursor of an enzyme

a. Inactive
b. Active
c. Both a and b
d. None of these

Ans. (a) Inactive

551. ..... enzymes are thermolabile

a. Most of
b. All
c. Few
d. None of these

Ans. (b) All

552. A ..... is obtained when velocity is plotted against the substrate concentration

a. Rectangular parabola b. Rectangular hyperbola
c. Liner d. None of these

Ans. (b) Rectangular hyperbola

553. Abzymes were first reported by

a. James B. Sumner
b. Lerner and Tramontano
c. Northrop
d. None of these

Ans. (b) Lerner and Tramontano

554. All the enzymes have a specific ..... structure

a. One dimensional b. Two dimensional
c. Three dimensional d. None of the above

Ans. (c) Three dimensional

555. Iodoacetate is an irreversible inhibitor of the enzyme

a. Glyceraldehyde 3-phosphate dehydrogenase
b. Papain
c. Both a and b
d. None of these

Ans. (c) Both a and b

556. For the majority of enzymes, the K_m values are in the range of

a. 10^{-6} to 10^{-3} moles b. 10^{-9} to 10^{-6} moles
c. 10^{-5} to 10^{-2} moles d. None of these

Ans. (a) 10^{-6} to 10^{-3} moles

557. K_m is not dependent on the concentration of

a. Substrate b. Enzyme
c. Both a and b d. None of these

Ans. (b) Enzyme

558. Induced fit model has sufficient experimental evidence from the

a. Auto radiography b. Tracer technique
c. X-ray diffraction d. None of the above

Ans. (c) X-ray diffraction

559. When the velocity of reaction is almost proportional to the substrate concentration, the rate of reaction is said to be

a. Zero order reaction b. First order reaction
c. Second order reaction d. None of the above

Ans. (b) First order reaction

560. Which of the following enzymes is known as meat tenderizer because of its continued action even at the high temperature of cooking?

a. Mutases b. Papain
c. Oxaloacetic acid d. None of these

Ans. (b) Papain

561. Mitochondria account for ..... % of a cell volume

a. 30 b. 50
c. 70 d. None of these

Ans. (c) 70

562. Allosteric enzymes have

a. Allosteric sites b. Active sites
c. Both a and b d. None of these

Ana. (c) Both a and b

563. If an enzyme substrate system has lower value of K_m then binding of substrate to its enzyme will be

a. Inhibited b. More stronger
c. Less stronger d. None of these

Ans. (b) More stronger

564. The enzyme act by

a. Conserving the energy of activation of the reaction
b. Lowering the energy of activation of the reaction
c. Increasing the energy of activation of the reaction
d. None of the above

Ans. (b) Lowering the energy of activation of the reaction

565. Most vitamins are

a. Pressure of the coenzymes
b. Synthesized by humans
c. Covalently linked to enzymes
d. None of the above

Ans. (a) Pressure of the coenzymes

566. Pantothenic acid is a constituent of the coenzyme involved in which of the following event

a. Dehydrogenation
b. Acetylation
c. Reduction
d. Decarboxylation

Ans. (b) Acetylation

567. Which of the following coenzyme acts as an electron sink to promote catalysis?

a. Biotin b. Pyridoxal phosphate
c. Lipoamide d. CoA

Ans. (c) Lipoamide

568. Which of the following vitamin can act without phosphorylation?

a. Pyridoxine
b. Niacin
c. Lipoamide
d. Thiamine

Ans. (c) Lipoamide

569. The deficiency of niacin causes

a. Colorb lindness
b. Pellagra
c. Low vision
d. None of these

Ans. (b) Pellagra

570. Which of the following is the fat soluble vitamin?

a. Vitamin A
b. Vitamin K
c. Vitamin D
d. All of the above

Ans. (d) All of the above

571. Which of the following is the water soluble vitamin?

a. Pyridoxine
b. Thaimines
c. Cobalamin
d. All of these

Ans. (d) All of these

572. Which of the following is a cofactor and not a coenzyme?

a. Tetrahydrofolic
b. Biotin
c. Copper
d. Methylcobalamin

Ans. (c) Copper

573. K_m specifies affinity of enzyme with substrate when

a. $K_2 = K_1$
b. $K_2 >>> K_1$
c. $K_1 >>> K_2$
d. None of these

Ans. (a) $K_2 = K_1$

574. At what [S] the velocity [V_0] of an enzyme–catalyzed reaction is 25% of the Vmax?

a. ¼ K_m
b. $^1/_3$ K_m
c. 4 K_m
d. $^2/_4$ K_m

Ans. (b) $^1/_3$ K_m

575. Which of the following vitamin is necessary for coenzyme A synthesis?

a. Biotin
b. Pyridoxine
c. Pantothenic acid
d. None of these

Ans. (c) Pantothenic acid

576. An uncompetitive inhibitor of enzyme binds to

a. Site other than the active site
b. Any other site and modifies part of an enzyme
c. The active site of an enzyme
d. None of the above

Ans. (d) None of the above

577. Catalytic antibodies function as enzymes on the principle of

a. Antigen–antibody affinity
b. Enzymatic conversion of antibodies
c. Monoclonal antibodies with chemical capability
d. None of the above

Ans. (c) Monoclonal antibodies with chemical capability

578. The metabolic process in which bacteria is directly inhibited by the antibiotic penicillin

a. Synthesis of the fats
b. Cellular respiration
c. ATP hydrolysis
d. None of the above

Ans. (d) None of the above

579. Which of the following vitamin is a precursor of coenzyme that is required in enzymatic reactions involving transfer of acyl groups?

a. p-aminobenzic
b. Lipoic acid
c. Riboflavin
d. Biotin

Ans. (b) Lipoic acid

580. Lactic dehydrogenase (LDH) is essential for lactic acid formation. This is an example of

a. Chemienzyme
b. Apoenzyme
c. Abzyme
d. Isoenzyme

Ans. (d) Isoenzyme

581. Which one of the following coenzyme pair correctly with the group transferred?

a. Thiamin-pyrophosphate
b. Biotin-carbon dioxide
c. NADP-phosphoryl
d. None of the above

Ans. (b) Biotin-carbon dioxide

582. An allosteric modulator influences enzyme activity by

a. Changing the specificity of the enzyme for its substrate
b. Competing for the catalytic site with the substrate
c. Binding to a site on the enzyme molecule distinct from the catalytic site
d. None of the above

Ans. (c) Binding to a site on the enzyme molecule distinct from the catalytic site

583. An enzyme that catalyzes the conversion of an aldose sugar to a ketoses sugar would be classified as one of the

a. Oxidoreductase
b. Hydrolases
c. Transferase
d. Isomerases

Ans. (c) Transferase

584. The K_m value of an enzyme is

a. A dissociation constant
b. The substrate concentration that gives ½ maximal velocity
c. ½ of the Vmax
d. None of the above

Ans. (b) The substrate concentration that gives ½ maximal velocity

585. The product of an enzyme–catalyzed reaction can act as inhibitor of the reaction. This mechanism of control known as

a. Competitive inhibition
b. Metabolic
c. Feedback inhibition
d. None of the above

Ans. (c) Feedback inhibition

586. The active site of the enzymes is formed by some of their

a. Exposed sulfur bonds
b. Amino groups of amino acids
c. Carboxyl groups of the amino acids
d. None of the above

Ans. (b) Amino groups of amino acids

587. Most of the digestive enzymes belong to

a. Hydrolases
b. Lyases
c. Isomerases
d. Oxidoreductase

Ans. (a) Hydrolases

588. Pepsinogen (in active form of enzyme pepsin) is converted into its active form by

a. Oxidation
b. Reduction
b. Isomerism
d. Hydrolysis

Ans. (d) Hydrolysis

589. Malonic acid inhibits the activity of the enzyme

a. Hwexokinase
b. Succinic dehydrogenase
c. Threnine dehydratase
d. None of the above

Ans. (b) Succinic dehydrogenase

590. Among of the following, which enzyme has lowest turnover number?

a. Lipase
b. Catalase
c. Lysozyme
d. None of these

Ans. (c) Lysozyme

591. Among of the following, which enzyme has highest turnover number?

a. Lipase
b. Catalase
c. Lysozyme
d. None of these

Ans. (b) Catalase

592. Allosteric enzymes have

a. Active sites
b. Allosteric sites
c. Both a and b
d. None of these

Ans. (c) Both a and b

593. Most of the enzymes show optimum activity is

a. Acidic medium
b. Alkaline medium
c. Neutral medium
d. Any of the above

Ans. (d) Any of the above

594. Induced fit theory of enzyme action was proposed by

a. Went
b. Koshland
c. Fisher
d. None of these

Ans. (b) Koshland

595. Abzymes are

a. Antibodies that have catalytic activity
b. Enzymes that hydrolyze antibodies
c. Both a and b
d. None of these

Ans. (a) Antibodies that have catalytic activity

596. Which of the following statement is true regarding non-competitive inhibition?

a. K_m increases
b. V_{max} decreases
c. V_{max} increase
d. K_m decreases

Ans. (b) Vmax decreases

597. Biotin is involved in which of the following type of reaction?

a. Decarboxylations
b. Hydroxylations
c. Carboxylations
d. Dehydrations

Ans. (c) Carboxylations

598. Which one of the following vitamins does not act as a precursor for coenzymes?

a. Folic acid
b. Thiamine
c. Biotin
d. None of these

Ans. (d) None of these

599. Sulpha drugs are effective antibiotics which inhibit the formation of folic acid by acting as a

a. Competitive inhibitor
b. Uncompetitive inhibitor
c. Non-competitive inhibitor
a. None of the above

Ans. (a) Competitive inhibitor

600. The enzyme glutathione peroxidase which catalyzes destruction of H_2O_2 contains

a. Zn
b. Se
c. Fe
d. Mo

Ans. (b) Se

601. The enzymes where catalysis involves transfer of electrons are named

a. Isomerases
b. Oxidoreductase
c. Lyases
d. Transferases

Ans. (b) Oxidoreductase

602. Transformation of 1 mol of substrate per second into product is known

a. Rate of constant
b. Enzyme unit
c. The Katal (Kat)
d. None of these

Ans. (c) The Katal (Kat)

603. The amount of enzyme causing transformation of one molecule of substrate per minute at 25°C under optimal conditions of measurement is known as

a. Rate of constant
b. Enzyme unit
c. The Katal (Kat)
d. None of these

Ans. (b) Enzyme unit

604. Among the following, which one is the accepted SI unit of enzyme activity?

a. Latka
b. Talka
c. Katal
d. None of these

Ans. (c) Katal

605. Which of the following is the example of ribozyme?

a. Hepatitis dalta virus
b. Tetrahymena
c. Hammerhead
d. All of these

Ans. (d) All of these

606. The first ribozyme was discovered by

a. L. Orgel
b. F. Crick
c. C. Woese
d. R. Cech

Ans. (d) R. Cech

607. Which of the following coenzyme is the carrier of acyl group?

a. Coenzyme A
b. Coenzyme Q
c. Coenzyme II
d. None of these

Ans. (a) Coenzyme A

608. Which of the following is the carrier of sulphate group?

a. TPP
b. UDP
c. PAPS
d. None of these

Ans. (c) PAPS

609. Which of the following organic compound acts as prosthetic groups in some enzyme reactions and as cofactors in some others?

a. Heme-iron
b. Biotin
c. FMN
d. All of these

Ans. (d) All of these

610. Which of the following hydrolyzing enzyme does not hydrolyse ester bonds?

a. Phophatase
b. Lipases
c. Both A and B
d. None of these

Ans. (d) None of these

611. According to the new system of classification the enzymes are grouped into

a. Four major classes
b. Five major classes
c. Six major classes
d. None of the above

Ans. (c) Six major classes

612. A non-protein substance is required at the active center for enzymes activity which is bound ..... to the enzyme protein by ..... linkage and is known as .....

a. Tightly, coordinate cofactors
b. Tightly, covalent, prosthetic group
c. Loosely, covalent, prosthetic group
d. None of the above

Ans. (b) Tightly, covalent, prosthetic group

613. Each enzyme has been assigned a specific code number consisting of ..... digits. The first digit indicates the ..... class, the second digit indicates the ....., the third digit indicates its ..... while the fourth digit denotes the systematic specific name of the enzyme the first of which indicates the name of the ..... and the second part of the .....

a. Four, substrate, nature of reaction, sub–class sub–sub–class.
b. Four, major, sub–class sub–sub–class, substrate, nature of reaction
c. Five, major, sub–class sub–sub–class, substrate, nature of reaction
d. None of the above

Ans. (b) Four, major, sub–class sub–sub–class, substrate, nature of reaction

614. The self-splicing group I introns and RNAse P are the example of

a. Isaoenzyme b. Zymogens
c. Ribozymes d. None of these

Ans. (c) Ribozymes

615. Pepsinogen, trypsinogen, thymotrys-pinogen and procarboxypeptides are the example of

a. Isaoenzyme b. Zymogens
c. Ribozymes d. All of these

Ans. (d) All of these

620. Some enzymes are synthesized in the cells in an inactive state and are called

a. Pre-enzyme b. Proenzyme
c. Zymogens d. All of the above

Ans. (d) All of the above

621. ..... different types of peroxidase isoenzyme have been isolated from maize

a. 22 b. 20
c. 18 d. None of these

Ans. (c) 18

622. The substrate for ribozyme is

a. Fat b. RNA
c. DNA d. None

Ans. (b) RNA

623. Which of the following is not a zymogen?

a. Procarboxypeptidase b. Pepsinogen
c. Trypsinogen d. None of the above

Ans. (d) None of the above

624. How many forms of LDH have been discovered

a. Six b. Five
c. Fours d. None of the above

Ans. (b) Five

625. One of the first enzymes discovered in isozyme forms is

a. Lipase b. Phosphatase
c. Lactate dehydrogenase d. None of the above

Ans. (c) Lactate dehydrogenase

626. Multiple forms of enzymes with the same catalytic activity but different structures are known as

a. Isozymes b. Isoenzymes
c. Both d. None of the above

Ans. (c) Both

627. An excellent example of inducible enzyme in higher plant is

a. α-amylase b. Nitrate reductase
c. Both d. None of the above

Ans. (b) None of the above

628. Lactate dehydrogenase (LDH) which catalyses pyruvate to lactate is an example of

a. Apoenzyme b. Isoenzyme
c. Coenzyme d. None of the above

Ans. (b) Isoenzyme

629. The lower value of K_m means

a. Higher substrate affinity of enzyme
b. Higher enzyme activity
c. Lower affinity of enzyme with substrate
d. None of the above

Ans. (a) Higher substrate affinity of enzyme

630. An example of inductive or inducible enzyme of *E. coli* is

a. α-amylase b. Nitrate reductase
c. Both d. None of the above

Ans. (d) None of the above

631. The enzyme which are always present in the organisms in constant amount regardless of its metabolic state are called .....

a. Isoenzymes
b. Inducible enzyme
c. Constitutive enzymes
d. None of the above

Ans. (c) Constitutive enzymes

632. Majority of enzymes belongs to …….. category

a. Exoenzymes b. Endoenzymes
c. Both d. None of the above

Ans. (b) Endoenzymes

633. The non-protein part of enzyme is called

a. Holoenzyme b. Apoenzyme
c. Prosthetic group d. None of the above

Ans. (c) Prosthetic group

634. The enzymes which act normally within cells are called

a. Apoenzymes b. Endoenzymes
c. Exoenzymes d. Ferment

Ans. (b) Endoenzymes

635. Which of the following enzyme was first isolated and purified in the form of crystal?

a. Amylase b. Urease
c. Pepsin d. Ribonuclease

Ans. (b) Urease

636. Enzymes are basically made up of

a. DNA b. Fat
c. Proteins d. None of the above

Ans. (c) Proteins

637. A competitive inhibitor

a. Increases both the Vmax and the Km of an enzyme
b. Decrease the Km but increases the Vmax of an enzyme
c. Increases the Km of an enzyme
d. Decreases the Km of an enzyme

Ans. (c) Increases the Km of an enzyme

638. In a chemical reaction, transition state species have free energies

a. Higher than either the reactant or the products
b. Higher than products but lower than reactant
c. Higher than reactant, but lower than products
d. None of the above

Ans. (b) Higher than products but lower than reactant

639. Heterotrophic enzymes are

a. Stimulates and inhibited by an affecters or modulator molecule other than substrate
b. Different isoenzymes
c. Modified by their substrate concentration
d. All of the above

Ans. (d) All of the above

640. Which of the following is the common characteristic of any enzyme?

a. Most (but not all) enzymes are proteins
b. Enzymes are highly specific
c. Enzymes exhibit enormous catalytic power
d. All of the above

Ans. (d) All of the above

641. First enzyme to be isolated in pure crystalline form is

a. Urease b. Zymase
c. Diastase d. Invertase

Ans. (a) Urease

642. E.C. number of the enzyme to be isolated in pure crystalline form is

a. 1.1.1.1 b. 9.0.1.2
c. 0.1.1.1 d. None of the above

Ans. (a) 1.1.1.1

643. The turnover number for Catalase is

a. 17×10^7 b. 12×10^7
c. 9×10^7 d. 4×10^7

Ans. (d) 4×10^7

644. The world enzyme was coined by

a. F. W. Kuhne b. Gobindjee
c. Willstate d. None of the above

Ans. (a) F. W. Kuhne

645. Which of the following is considered as good source for studies of enzymes?

a. Germinating seeds b. Microorganism
c. Both d. None of the above

Ans. (c) Both

646. According to ……, an enzyme is "simple or combined proteins acting as specific catalysts"

a. Traube
b. Louis Pasture
c. Sumner and Myrback
d. None of the above

Ans. (c) Sumner and Myrback

647. In higher plant which of the following is the rich source of enzyme and are widely used in experimental work?

a. Immature flowers b. Matured flowers
c. Germinating seeds d. Matured seeds

Ans. (c) Germinating seeds

648. Which of the following coenzyme is the carrier of hexose sugar molecules?

a. UDP
b. PAPS
c. TPP
d. None of the above

Ans. (a) UDP

649. Michaelis constants (K_m) for enzyme-substrate pair of Carbonic anhydrase and HCO is

a. 9 mM
b. 8 mM
c. 7 mM
d. None of the above

Ans. (a) 9 mM

650. Michaelis constant (K_m) for enzyme-substrate pair of Chymotrypsin and N-Benzoyltyrosinamide is

a. 111 mM
b. 26 mM
c. 2.5 mM
d. None of the above

Ans. (c) 2.5 mM

651. Michaelis constants (K_m) for enzyme-substrate pair of Chymotrypsin and Glycytyrosingycine is

a. 108 mM
b. 9 mM
c. 2.5 mM
d. None of the above

Ans. (a) 108 mM

652. Michaelis constants (K_m) for enzyme-substrate pair of Hexokinase and D-Fructose is

a. 0.05 mM
b. 0.4 mM
c. 25 mM
d. None of the above

Ans. (d) None of the above

653. Michaelis constants (K_m) for enzyme-substrate pair of Hexokinase and D-Glucose is

a. 0.05 mM
b. 0.04 mM
c. 25 mM
d. None of the above

Ans. (a) 0.05 mM

654. Michaelis constants (K_m) for enzyme-substrate pair of Hexokinase and ATP is

a. 0.05 mM
b. 0.4 mM
c. 25 mM
d. None of the above

Ans. (b) 0.4 mM

655. Michaelis constants (K_m) for enzyme-substrate pair of Catalse and HO is

a. 0.05 mM
b. 0.04 mM
c. 25 mM
d. None of the above

Ans. (c) 25 mM

656. Which of the following is produced with the combination of apoenzyme and coenzyme?

a. Holoenzyme
b. Enzyme substrate complex
c. Prosthetic group
d. Enzyme product complex

Ans. (a) Holoenzyme

657. An enzyme that joins the ends of two strands of nucleic acid is

a. Polymerase
b. Ligase
c. Synthetase
d. Helicase

Ans. (b) Ligase

658. The coenzyme is

a. Often a metal
b. Always a protein
c. Often a vitamin
d. Always an inorganic compound

Ans. (a) Often a vitamin

659. Blocking of enzyme action by blocking its active site is called as

a. Allosteric inhibition
b. Feedback inhibition
c. Competitive inhibition
d. Non-competitive inhibition

Ans. (c) Competitive inhibition

CHECK YOUR GRASP

1. The scientists associated with the study of enzymes include

a. Buchner b. Went
c. Sumner d. Both a and c

2. Which enzyme is not proteinaceous

a. Isozyme b. Ribozyme
c. Holozyme d. Trypsin

3. Ribozyme is

a. RNA without sugar
b. RNA without phosphate
c. RNA having enzyme activity
d. RNA with extra phosphate

4. The non-protein part of an enzyme is called

a. Holoenzyme
b. Prosthetic group
c. Apoenzyme
d. None of the above

5. In Lineweaver-Burk plot, the y-intercept represents

a. V_{max} b. K_m
c. K_m d. $1/K_m$

6. In competitive inhibition, the inhibitor

a. Competes with the enzyme
b. Irreversibly binds with the enzyme
c. Binds with the substrate
d. Competes with the substrate

7. Competitive inhibitors

a. Decrease the Km
b. Decrease the Vmax
c. Increase the Km
d. Increase the Vmax

8. In enzyme kinetics V_{max} reflects

a. The amount of an active enzyme
b. Substrate concentration
c. Half the substrate concentration
d. Enzyme substrate complex

9. A demonstrable inducer is absent in

a. Allosteric enzyme
b. Constitutive enzyme
c. Inhibited enzyme
d. Co-operative enzyme

10. Whcih of the following is a proenzyme?

a. Carboxypeptidase b. Aminopeptidase
c. Chymotrypsin d. Pepsinogen

11. What is true about enzymes

a. All act best at pH 7.0
b. All are amino acids
c. All are proteins
d. All act best at 0°C

12. Zymogens are

a. Enzyme acting upon starch
b. Groups of zymase enzymes
c. Inactive enzyme precursors
d. None of the above

13. Which one is coenzyme?

a. ATP b. Vitamin B and C
c. CoQ and CoA d. All of these

14. The active site of an enzyme is formed by

a. R group of amino acids
b. NH_2 group of amino acids
c. CO group of amino acids
d. Sulphur bonds which are exposed

15. Coenzymes are required in which of the following reactions?

a. Oxidation-reduction b. Transamination
c. Phosphorylation d. All of these

16. Allosteric enzymes regulate the formation of products by

a. Feedback inhibition
b. Non-competitive inhibition
c. Competitive inhibition
d. Repression-derepression

In case of less than 80% score, go through brief review and glance once again from chapter

Key: 1-d 2-b 3-c 4-b 5-b 6-d 7-c 8-a 9-b 10-d 11- c 12-c 13-d 14-a 15-d 16-a

9

Plant and Animal Physiology

1. 'Plant Physiology' book was written by

a. Singh and Purohit
b. Salisburry and Ross
c. Wiebe
d. Albert

Ans. (b) Salisburry and Ross

2. Enzyme for conversion of ammonia to amino acid is

a. Nitrate reductase
b. Nitrite reductase
c. Alanine transferase
d. Glutamine synthetase

Ans. (d) Glutamine synthetase

3. Important function of leghaemoglobin in root nodules is

a. O_2 regulation
b. N_2 fixation
c. Water regulation
d. All

Ans. (a) O_2 regulation

4. The externally thin strands of cytoplasm is termed as

a. Primary cell wall
b. Secondary cell wall
c. Middle lamella
d. Plasmodesmata

Ans. (d) Plasmodesmata

5. In plants, genetic material is present in

a. Nucleus and mitochondria
b. Nucleus only
c. Mitochondria and chloroplast
d. Nucleus, chloroplast and mitochondria

Ans. (d) Nucleus, chloroplast and mitochondria

6. The main function of endoplasmic reticulum is

a. Fat synthesis
b. Protein synthesis
c. Disease resistance
d. Chlorophyll synthesis

Ans. (b) Protein synthesis

7. An enzyme associated with decarboxylation reaction in photosynthetic reaction of C_4 plants is

a. Pyruvate dikinase
b. Malic acid dehydrogenase
c. PEP carboxylase
d. Malic enzymes

Ans. (d) Malic enzymes

8. Golgi bodies was discovered in 1898 by

a. Camillio Golgi
b. Stanley
c. Farmer and Moori
d. Flemming

Ans. (a) Camillio Golgi

9. RNA synthesis in nucleus participate in protein synthesis in

a. Nucleus
b. Cytosol
c. Chloroplast
d. Spherosome

Ans. (b) Cytosol

10. Which cell organelle is the site of chemical activity in cells, perhaps over half of the cell's metabolism?

a. Chloroplast
b. Nucleus
c. Mitochondria
d. ER

Ans. (c) Mitochondria

11. Photorespiration is high in

a. Maize
b. Sugarcane
c. Pineapple
d. Rice

Ans. (d) Rice

12. Tick out which is not correctly matched?

a. Chloroplast – chlorophyll
b. Chromoplast – red pigments
c. Leucoplast – storage proteins
d. Nucleolus – fat

Ans. (d) Nucleolus – fat

13. Spherosomes are related with?

a. Chlorophyll
b. Red pigments
c. Power
d. Fat

Ans. (d) Fat

14. Theoretically possible quantum yield in photosynthesis is

a. 0.12 b. 0.9
c. 0.8 d. 0.4

Ans. (a) 0.12

15. Ribosomes are produced in

a. ER(rough) b. Nucleolus
c. Mitochondria d. Chloroplast

Ans. (b) Nucleolus

16. The pigments which produce the colour of many flowers or the red of red maple leaves are generally stored in

a. Vacuole b. Chromoplast
c. Lysosome d. Dictyosome

Ans. (a) Vacuole

17. Ultimate electron donor in mitochondrial e^- transport chain is

a. Cytochrome A b. Cytochrome B
c. Ubiquinone d. Plastoquinone

Ans. (c) Ubiquinone

18. The hydrogen atoms on the surface of the oxygen atom are distributed apart at a right angle of

a. 90° b. 105°
c. 120° d. 180°

Ans. (b) 105°

19. The strongest bond is

a. Ionic bond b. Covalent bond
c. Hydrogen bond d. Van der Waals

Ans. (a) Ionic bond

20. The weakest bond is

a. Covalent bond b. Van der waals
c. Ionic bond d. Hydrogen bond

Ans. (b) Van der waals

21. Latent heat of vaporization (water to vapour) is

a. 80 cal b. 540 cal
c. 586 cal d. 620 cal

Ans. (b) 540 cal

22. Latent heat of fusion (ice to water) is

a. 540 cal b. 620 cal
c. 80 cal d. 40 cal

Ans. (c) 80 cal

23. Important radiant generated in pentose phosphate pathway of glucose degradation is

a. NADH b. ATP
c. Ferridoxin d. NADPH

Ans. (d) NADPH

24. Glyoxysomes functions in breakdown of

a. Acetyl CoA b. Amino acids
c. Sugars d. Fatty acids

Ans. (d) Fatty acids

25. The Brownian movement was discovered in 1827 by the Scottish botanist

a. Tyndall b. Robert brown
c. Murrfy d. Stayler

Ans. (b) Robert brown

26. Calcium is an imp. Constituent of

a. Protein b. Cell wall
c. Chloroplast d. Nucleic acid

Ans. (b) Cell wall

27. Maximum free radicals production takes place in

a. Germination b. Flowering
c. Fruiting d. Senescence

Ans. (d) Senescence

28. Precursor for ethylene biosynthesis is

a. Methionine b. Alanine
c. Ornithine d. Tryptophan

Ans. (a) Methionine

29. In a rapidly transpiring plant the water column in xylem will be

a. Positive pressure
b. Negative presssure
c. High root presssure
d. No pressure

Ans. (b) Negative presssure

30. Transpiration is measured by

a. Lysimeter b. Photometer
c. Tensiometer d. Auxanometer

Ans. (b) Photometer

31. Stomata are regulated by

a. N b. P
c. K d. Ca

Ans. (c) K

32. Plant lost water in transpiration upto the extent of

a. 80% b. 90%
c. 95% d. 99%

Ans. (d) 99%

33. The world tallest tree is

a. *Sequoia sempervirens*
b. *Eucalyptus regans*
c. *Psendotsuga menziesii*
d. *Ailanthus excelsa*

Ans. (a) *Sequoia sempervirens*

34. Proteins that bind to TATA box in promoters region are

a. Coactivators b. Coregulators
c. Enhancers d. Transcriptional factors

Ans. (d) Transcriptional factors

35. The chemical nature of GA_3 is

a. Phenolic b. Terpene
c. Purine d. Indole

Ans. (b) Terpene

36. Site of oxidative electron transport in cell is

a. Mitochondria b. Chloroplast
c. Nucleus d. Cytoplasm

Ans. (a) Mitochondria

37. Guttation is not favoured under

a. Low humidity
b. High humidity
c. Low root pressure
d. High humidity and low root pressure

Ans. (c) Low root pressure

38. The basic elements of the cohesion theory for the ascent of sap are

a. Driving force b. Hydration
c. Cohesion of water d. All

Ans. (d) All

39. The xylem and phloem elements in the plant are surrounded by a layer of living cells called

a. Casparian strips b. Pericycle
c. Stele d. Endodermis

Ans. (b) Pericycle

40. Which part of root absorb water and minerals?

a. Root cap b. Root hairs
c. Epidermis d. Endodermis

Ans. (b) Root hairs

41. Fluid mosaic model of cell membrane is given by

a. Daniel and Davson
b. Robertson
c. Robercook
d. Singer and Nicholson

Ans. (d) Singer and Nicholson

42. The stage of seeds showing no germination because of internal conditions of seed is termed as

a. Dormancy b. Quinscence
c. Recalciterant d. Longetivity

Ans. (a) Dormancy

43. A plant hormone, which is primary regulator of abscission process is?

a. Ethylene b. Auxin
c. ABA d. Gibberellins

Ans. (c) ABA

44. Growing of plant in soilless nutrient solution is referred as

a. Aeroponics b. Hydroponics
c. Xeroponics d. None

Ans. (b) Hydroponics

45. Most of the wheat cultivars are

a. Day neutral
b. Short day plants
c. Qualitative long day plants
d. Quantitative long day plants

Ans. (c) Qualitative long day plants

46. The critical conc. of micronutrients needed in tissue is equal to or less than?

a. 1 ppm b. 10 ppm
c. 100 ppm d. 1000 ppm

Ans. (c) 100 ppm

47. Rice grain is deficient in

a. Lysine b. Glysine
c. Isoleucine d. Alanine

Ans. (a) Lysine

48. Storage of elements in vacuoles occurs under

a. Deficient zone
b. Critical zone
c. Luxury consumption
d. Toxic zone

Ans. (c) Luxury consumption

49. Chelates are

a. Organic in nature
b. Inorganic in nature
c. Both a and b
d. None

Ans. (a) Organic in nature

50. Siderophores produced by fungi and bacteria in soil are the source of

a. Zn
b. Fe
c. Cu
d. Mn

Ans. (b) Fe

51. The young leaves of terminal bud at first typically hooked, finally dying back at tips and margins are the deficiency symptoms of

a. K
b. Fe
c. Ca
d. Cu

Ans. (c) Ca

52. The young leaves chlorotic, principal veins remain typically green, stalks slender and short are the deficiency symptoms of

a. Fe
b. Cu
c. Mn
d. B

Ans. (a) Fe

53. Iron stored in chloroplast as an iron protein complex is called

a. Calmodulin
b. Phytoferritin
c. Chloroferritin
d. Chromoferritin

Ans. (b) Phytoferritin

54. Initiation of protein synthesis in eukaryotic mRNA requires

a. 3′ poly A tail
b. 5′ poly A tail
c. 5′ cap
d. 3′ cap

Ans. (c) 5′ cap

55. The first sign of switch over from vegetative stage to reproductive stage in wheat is?

a. Ear emergence stage
b. Double ridge stage
c. Terminal spikelet stage
d. Anthesis stage

Ans. (b) Double ridge stage

56. Abundant P in plants related with?

a. Early maturity
b. Delay maturity
c. Accumulation of anthocyanin pigments
d. Both b and c

Ans. (d) Both b and c

57. Increase in temperature at anthesis stage in wheat results in

a. Increased grain size
b. Decreased grain size
c. Increased duration of grain growth
d. No effect

Ans. (b) Decreased grain size

58. An ideal type of rice with small, thick and erect leaf was proposed by

a. Tsunoda
b. Tanaka
c. Yoshida
d. Murata

Ans. (c) Yoshida

59. Increase in wheat yield potential so far results from

a. Increase in HI
b. Increase in dry matter production
c. Increase in stem weight
d. Increase in leaf weight

Ans. (a) Increase in HI

60. Most commonly grown crop plants are included in

a. Halophytes
b. Glycophytes
c. Sciophytes
d. Xerophytes

Ans. (b) Glycophytes

61. Acytelene reduction to ethylene is measured as

a. Nitrate reduction
b. Glutamate synthase activity
c. Nitrite reduction
d. N_2 fixation

Ans. (d) N_2 fixation

62. The gray speck of oats, 'marsh spot of peas', and speckled yellows of sugar beets are the deficiency symptoms of

a. Cu
b. Mn
c. Fe
d. Zn

Ans. (b) Mn

63. The 'heart rot' of beets, 'stem crack' of celery, 'water core' of turnip and 'drought spot' of apples are the deficiency symptoms of

a. B
b. Ca
c. Zn
d. Cu

Ans. (a) B

64. Optimum temperature for maximum crop development in wheat is?

a. 10 –15°C
b. 20–25°C
c. 25–30°C
d. 30–35°C

Ans. (b) 20–25°C

65. 'little leaf' and 'rosette' of apple, 'white bud' of maize are the deficiency symptoms of

a. Fe
b. Zn
c. Cl
d. Mo

Ans. (b) Zn

66. Under an excessive light level the synthesis of which of the following is found increased?

a. Antheraxanthin
b. Violaxanthin
c. Zeaxanthin
d. All

Ans. (c) Zeaxanthin

67. In citrus plant, die back disease is the result of deficiency

a. N
b. P
c. B
d. Cu

Ans. (d) Cu

68. Which micronutrient is essential for the synthesis of 'auxin'?

a. Cu
b. Mn
c. Zn
d. Si

Ans. (c) Zn

69. 'Whiptail' disease of cauliflower is due to deficiency of

a. Cu
b. Cl
c. Ca
d. Mo

Ans. (d) Mo

70. Direct reduction of O_2 by photosystem-I leads to the formation of

a. H_2O_2
b. Superoxide anion radical
c. Singlet oxygen
d. Singlet exited state of O_2

Ans. (a) H_2O_2

71. Which of the following is not a colligative property?

a. Depression of freezing point
b. Refractive index
c. Lowering of vapour pressure
d. Elevation of boiling point

Ans. (b) Refractive index

72. The optimum pH of nutrient solution in nutrient solution culture is

a. 4
b. 6
c. 8
d. 9

Ans. (b) 6

73. Acid rains are due to following gases are

a. CO_2 and CO
b. Ozone and CO_2
c. NO_2 and SO_2
d. NH_3 and CO_2

Ans. (c) NO_2 and SO_2

74. Tumor inducing principle in Agrobacterium is in

a. T-DNA
b. Ti-plasmid
c. t-RNA
d. none

Ans. (a) T-DNA

75. Mycorrhiza (association of fungi with roots of higher plants) increased the availability of

a. Fe
b. N
c. P
d. B

Ans. (c) P

76. VAM is mostly used in

a. Perennial trees
b. Annual crops
c. Biennial crops
d. All

Ans. (a) Perennial trees

77. If the accumulation ratio in absorption of nutrients is greater than one then it is known as

a. Active absorption
b. Passive absorption
c. Adsorption
d. None

Ans. (a) Active absorption

78. Which one of the following is a most harmful pollutant by automobiles?

a. SO_2
b. CO
c. N_2O
d. SO_2

Ans. (b) CO

79. ^{14}C has a half life of

a. 14 days
b. 100 years
c. 5730 years
d. 6000 years

Ans. (c) 5730 years

80. Mass flow mechanism was proposed by

a. Darwin
b. Munch
c. Hugo de Vries
d. Banda

Ans. (b) Munch

81. hn RNA strands for

a. Homogeneous nuclear RNA
b. Heterogeneous nuclear RNA
c. Heterocyclic nuclear RNA
d. All

Ans. (b) Heterogeneous nuclear RNA

82. Isotopes differs in

a. Electrons and protons
b. Protons and neutrons
c. Neutrons only
d. Electrons and neutrons

Ans. (c) Neutrons only

83. The process in which sugars are raised to high conc. in phloem cells close to a source is known as

a. Xylem loading
b. Phloem loading
c. Phloem conc
d. Phloem deloading

Ans. (b) Phloem loading

84. The breakdown of large molecules to small molecules and this process often releases energy is called as

a. Anabolism
b. Catabolism
c. Both a and b
d. None

Ans. (b) Catabolism

85. One curie of activity is equivalent to

a. 3.7×10^4 disintegration per sec.
b. 3.7×10^1 disintegration per sec.
c. 3.7×10^{10} disintegration per sec.
d. 3.7×10^7 disintegration per sec.

Ans. (c) 3.7×10^{10} disintegration per sec.

86. Climatric rise in respiration is observed in

a. Mango
b. Citrus
c. Grapes
d. Cherries

Ans. (a) Mango

87. Callus is induced to form roots in the medium of

a. Auxin only
b. Cytokinins only
c. More Cytokinins than Auxin
d. More Auxin than Cytokinins

Ans. (d) More Auxin than Cytokinins

88. S containing amino acids is/are

a. Cysteine
b. Methionine
c. Lysine
d. Both a and b

Ans. (d) Both a and b

89. Which group of enzymes form double bonds by elimination of a chemical groups?

a. Kinases
b. Lyases
c. Polymerases
d. Ligases

Ans. (b) Lyases

90. Electrophoresis was developed to separate

a. Fats
b. carbohydrates
c. Vitamins
d. Proteins

Ans. (d) Proteins

91. Ripening is delayed by synthesis of antisense ACC synthetase RNA in which fruit

a. Tomato
b. Grapes
c. Citrus
d. Cherries

Ans. (a) Tomato

92. Blue light is always less efficient in photosynthesis than

a. White
b. Red
c. Orange
d. Violet

Ans. (b) Red

93. Recognition site of tRNA is

a. Anticodon
b. Loop I
c. Loop IV
d. 3′ OH end

Ans. (a) Anticodon

94. Chlorophyll are green because they?

a. Reflect green light
b. Absorb green light
c. Transmit green light
d. None

Ans. (b) Absorb green light

95. RNA–DNA hybridization to quantify gene expression at mRNA level is called as

a. Southern blotting
b. Slot-blot technique
c. Western blotting
d. Northern blotting

Ans. (d) Northern blotting

96. Wavelength of visible light is

a. 260–350 nm
b. 360–760 nm
c. 390–760 nm
d. 400–700 nm

Ans. (c) 390–760 nm

97. Plastocyanin protein contain

a. Fe
b. Cu
c. P
d. Mo

Ans. (b) Cu

98. Z –scheme of electron transport first proposed by

a. Hill and Bendall
b. Hatch and Boardman
c. Haliwell
d. Calwin

Ans. (a) Hill and Bendall

99. How many photons are required to produce one molecule of oxygen?

a. 4 b. 8
c. 12 d. 16

Ans. (b) 8

100. Brassino steroid is present in

a. Mustard b. Cotton
c. Wheat d. Sunflower

Ans. (a) Mustard

101. In C_3 plant, which enzyme first react with CO_2 to form PGA

a. Invertases b. Rubisco
c. Oxaloacetate d. PEP

Ans. (b) Rubisco

102. Hormone associated with 'acid growth theory' is

a. GA_3 b. Cytokinin
c. Auxin d. Ethylene

Ans. (c) Auxin

103. Protein content in pulses ranges from

a. 10 –15% b. 20 –25%
c. 25 –30% d. 40 –45%

Ans. (b) 20 –25%

104. Protein content of cereals ranges from

a. 8–12% b. 12–15%
c. 15–20% d. 20–25%

Ans. (a) 8–12%

105. Nitrate reductase is found in

a. Chloroplast b. Golgibodies
c. Mitochondria d. Cytoplasm

Ans. (d) Cytoplasm

106. Natural inhibitor of IAA oxidases is

a. Caffeic acid
b. Coumaric acid
c. ABA
d. Lactic acid

Ans. (b) Coumaric acid

107. In C_4 plants, the first stable product of photosynthesis is

a. PGA b. Malic acid
c. Oxalic acid d. Tartaric acid

Ans. (c) Oxalic acid

108. Close association of chloroplast, peroxisomes and mitochondria in a leaf cell are related with?

a. Photosynthesis b. Respiration
c. Photorespiration d. None

Ans. (c) Photorespiration

109. How many ATP are required to produce 1 mole of hexose in photosynthesis

a. 8 b. 18
c. 28 d. 38

Ans. (b) 18

110. Instrument used for measuring 'stomatal pressure' is

a. Porometer b. Callipers
c. Photometer d. Micronare

Ans. (a) Porometer

111. Who coined the term 'biological clock'?

a. Went b. Borthwick
c. Salisburry d. Bunning

Ans. (d) Bunning

112. Most dangerous gas for depletion of ozone layer is

a. Chlorine b. CFC
c. Benzene d. CO_2

Ans. (b) CFC

113. Which process is also known as glycolate pathway?

a. Photosynthesis b. Respiration
c. β-oxidation d. Photorespiration

Ans. (d) Photorespiration

114. The present level of CO_2 in atmosphere is

a. 210–250 ppm b. 295–300 ppm
c. 360–370 ppm d. 420–460 ppm

Ans. (c) 360–370 ppm

115. In C_4 plants, enzyme responsible for the synthesis of malic acid is

a. PEP carboxylase b. Rubisco
c. Isomerise d. Kinase

Ans. (a) PEP carboxylase

116. Element for most of dehydrogenase is

a. Ca b. Mo
c. Mg d. Zn

Ans. (d) Zn

117. Lysimeter is used in measurement of

a. Light
b. Transpiration
c. Lysine content
d. Water potential

Ans. (b) Transpiration

118. Agave americana is a

a. C_3 plant b. C_4 plant
c. CAM plant d. None

Ans. (c) CAM plant

119. The most striking feature of CAM plants is formation of malic acid at

a. Morning b. Afternoon
c. Evening d. Night

Ans. (d) Night

120. Select the families to which CAM plants belong?

a. Bromeliaceae b. Cactaceae
c. Orchidaceae d. All

Ans. (d) All

121. Photosynthetic inhibition by O_2 is called as

a. Hill reaction
b. Warburg's effect
c. Feed back inhibition
d. Competitive effect

Ans. (b) Warburg's effect

122. Among the following statements which one is not correct about photosynthesis

a. Light captured by PS-I and electron passed to PS-II
b. O_2 is released from photolysis of water
c. ATP from electron transport chain with PS-I, PS-II
d. Light independent reactions uses energy rich molecules to reduce CO_2

Ans. (a) Light captured by PS-I and electron passed to PS-II

123. Among following which is antioxidant?

a. Quinines
b. Tocopherols
c. Phenols
d. Sorbitols

Ans. (b) Tocopherols

124. Which ecosystem has highest net primary productivity per unit area?

a. Tropical seasonal forest
b. Tropical rain forest
c. Cultivated lands
d. Savanna

Ans. (b) Tropical rain forest

125. The irradiance at which photosynthesis is equal to respiration rate (net CO_2 exchange is zero) is called

a. Light compensation point
b. Light saturation point
c. Solar constant
d. PAR

Ans. (a) Light compensation point

126. The CO_2 conc. at which photosynthetic fixation just balances respiratory loss is known as

a. O_2 compensation point
b. O_2 saturation point
c. CO_2 compensation point
d. CO_2 saturation point

Ans. (c) CO_2 compensation point

127. The transpiration ratio is highest for

a. C_3 plants b. C_4 plants
c. CAM plants d. None

Ans. (a) C_3 plants

128. Photosynthesis inhibited by 21% O_2 in

a. C_3 plants b. C_4 plants
c. CAM plants d. None

Ans. (b) C_4 plants

129. For C_3 plants, the optimum temperature for photosynthesis is

a. 15–25°C b. 25–30°C
c. 30–47°C d. 35°C

Ans. (a) 15–25°C

130. Respiratory quotient for carbohydrates is approximately

a. 0.5 b. 1.0
c. 1.33 d. 0.7

Ans. (b) 1.0

131. Respiratory quotient for fatty acid is

a. 0.7 b. 0.5
c. 1.33 d. 2.0

Ans. (a) 0.7

132. Respiratory quotient for organic acid is

a. 0.7 b. 1.0
c. 1.33 d. >1.0

Ans. (c) 1.33

133. The end product of glycolysis is

a. Glucose b. Sucrose
c. Pyruvic acid d. NADH

Ans. (c) Pyruvic acid

134. Glycolysis takes place in

a. Mitochondria b. Chloroplast
c. Cytoplasm d. Nucleus

Ans. (c) Cytoplasm

135. Electron transport system take place in which part of mitochondria?

a. Matrix
b. Cristae
c. Outer membrane
d. Inner membrane

Ans. (b) Cristae

136. Krebs cycle produces

a. 18 ATP b. 30 ATP
c. 32 ATP d. 36 ATP

Ans. (b) 30 ATP

137. First time IAA from human urine was isolated by

a. Kogl b. Went
c. Adns d. Miller

Ans. (a) Kogl

138. The term 'skototropism' is associated with whom?

a. Jumper and Jones
b. Mayber and Mayer
c. Strong and Ray
d. Hans and Knot

Ans. (c) Strong and Ray

139. Pollen germination requires the following element

a. B b. K
c. Ca d. Si

Ans. (a) B

140. Who first isolated 'zeatin' from corn seed?

a. Wiesner b. Miller
c. Zeigler d. Letham

Ans. (d) Letham

141. Storage protein in beans is

a. Insulin b. Globulins
c. Phaseoline d. Tripsin

Ans. (c) Phaseoline

142. Main organic acid in pineapple is

a. Citric acid
b. Pyruvic acid
c. Malic acid
d. Acetic acid

Ans. (c) Malic acid

143. Sulphate reduction in leaves take place in

a. Mitochondria
b. Chloroplast
c. Glyoxisomes
d. Peroxisomes

Ans. (b) Chloroplast

144. Polymer of cellulose is

a. β-D glucose b. α-D glucose
c. Fructose d. Glucose

Ans. (a) β-D glucose

145. In which cell organelle, PEP carboxylation is taking place in C_4 plants?

a. Epidermal cells
b. Mesophyll cells
c. Xylem cells
d. Bundle sheath cells

Ans. (b) Mesophyll cells

146. Cyanide resistant respiration follow

a. Pentose phosphate pathway
b. Krebs cycle
c. Glycolysis
d. None

Ans. (a) Pentose phosphate pathway

147. Green house gas for global warming is

a. O_2 b. CH_4
c. SO_2 d. CO_2

Ans. (d) CO_2

148. Amino acid produced in photorespiration

a. Serine
b. Arginine
c. Tryptophan
d. Methionine

Ans. (a) Serine

149. In monocots and dicots accumulation of which hormone causes collapse and lysis of mature cortical cells in the root, leading to a tissue with large air spaces?

a. Auxin b. Gibberellins
c. Ethylene d. ABA

Ans. (c) Ethylene

150. Aerenchyma is related with?

a. ABA b. Ethylene
c. Cytokinin d. Auxin

Ans. (b) Ethylene

151. When starch reacts with iodine produces colour?

a. Yellow b. Blue
c. Green d. Red

Ans. (b) Blue

152. Under aerobic conditions microbes grow slower but uses more sugar and produces more CO_2 and ethanol, this phenomenon known as

a. Warburg's effect b. Pasteur effect
c. Both a and b d. None

Ans. (b) Pasteur effect

153. Enzyme used to cut double stranded RNA is

a. DNAase
b. Reverse transcriptase
c. Restriction endonuclease
d. Lipase

Ans. (c) Restriction endonuclease

154. Which one can not pass across membrane by diffusion?

a. CO_2 b. O_2
c. H_2O d. H^+

Ans. (d) H^+

155. In many species, the gradual decrease in respiration is reversed by a sharp increase, known as

a. Non climacteric b. Climacteric
c. Both d. None

Ans. (b) Climacteric

156. Conversion of organic nitrogen to NH_4 by soil microbes is called

a. Amminization
b. Ammonification
c. Nitrification
d. Mineralization

Ans. (b) Ammonification

157. Denitrification occurs in

a. Water logged soil b. Well aerated soils
c. Alkali soils d. Acidic soils

Ans. (a) Water logged soil

158. C_3 cycle of carbon fixation takes place in

a. Nucleus
b. Thylakoid of chloroplast
c. Stroma of chloroplast
d. Cytosol

Ans. (c) Stroma of chloroplast

159. The process by which N_2 is reduced to ammonium is called

a. Nitrification
b. N_2 fixation
c. Denitrification
d. Ammonia volatilization

Ans. (b) N_2 fixation

160. How many electrons are required for conversion of NO_2^- to NH_4^+?

a. 4 b. 6
c. 8 d. 10

Ans. (b) 6

161. Mature root nodule made largely of

a. Diploid cells b. Tetraploid cells
c. Hexaploid cells d. None

Ans. (b) Tetraploid cells

162. The main function of leghaemoglobin is

a. Fe supply b. Water supply
c. O_2 supply d. All

Ans. (c) O_2 supply

163. N_2 fixation is carried out by enzyme

a. Nitrate reductase b. Nitrite reductase
c. Nitrogenase d. Rubisco

Ans. (c) Nitrogenase

164. Nitrogenase consists of

a. Fe protein b. Mo protein
c. Fe–Mo protein d. none

Ans. (c) Fe–Mo protein

165. Which one of the following is P mobilize?

a. VAM b. Rhizobium
c. BGA d. Clostridium

Ans. (a) VAM

166. "Dormin" is coined by

a. Skoog b. Wareig
c. Addicot d. Wilkins

Ans. (b) Wareig

167. Kranz type of anatomy is found in

a. Sunflower b. Soybean
c. Sorghum d. Spinach

Ans. (c) Sorghum

168. How many Calvin cycles are needed to produce one molecule of glucose?

a. 1 b. 3
c. 6 d. 9

Ans. (c) 6

169. The ureides is the major nitrogen compound transported from root nodules to other parts of plant in

a. Soybean b. Wheat
c. Sugarcane d. Sugarbet

Ans. (a) Soybean

170. How many quanta are there in 1 µ Einstein?

a. 5.074×10^{23} b. 6.02×10^{17}
c. 6.02×10^{-23} d. 6.02×10^{23}

Ans. (b) 6.02×10^{17}

171. Unit of pressure in SI system

a. Atmosphere b. Dynes per square cm
c. Pascal d. mm of mercury

Ans. (c) Pascal

172. One millimole of $CaCO_3$ weight is

a. 100g b. 1g
c. 1.0g d. 0.1g

Ans. (d) 0.1g

173. In process of nitrate reduction, the oxidation no. of nitrogen changes from

a. +3 to +5 b. +5 to –3
c. +6 to –3 d. –2 to +5

Ans. (b) +5 to –3

174. Reduction of nitrite to ammonium ions is catalysed by nitrite reductase in

a. Chloroplast
b. Proplastids of roots
c. Both a and b
d. Cytoplasm

Ans. (c) Both a and b

175. Flowering stimulus is perceived by

a. Shoot apex b. Leaves
c. Buds d. Flowers

Ans. (b) Leaves

176. 1- amino-cyclopropane-1-carboxylic acid (ACC) is a close precursor of

a. ABA b. Ethylene
c. Salicylic acid d. GA

Ans. (b) Ethylene

177. The first step of assimilation of sulphate is catalyzed by

a. ATP sulfurylase b. APS sulfotransferase
c. Pyrophosphatase d. Cysteine synthetase

Ans. (a) ATP sulfurylase

178. Coconut fat is a rich source of

a. Palmitic acid b. Stearic acid
c. Lauric acid d. Ricinoleic acid

Ans. (c) Lauric acid

179. Phytoalexins includes

a. Pisatin b. Phaseolin
c. Isocoumarin d. All

Ans. (d) All

180. Antimicrobial compounds synthesized by plants when infected with microbes are?

a. Betalin b. Phytoalexins
c. Flavones d. Flavonols

Ans. (b) Phytoalexins

181. Flavonoides includes

a. Anthocyanins b. Flavonols
c. Flavones d. All

Ans. (d) All

182. Betalains have role in

a. Germination b. Pollination
c. Fruit setting d. Ripening

Ans. (b) Pollination

183. The first alkaloid to be isolated and crystallized was the

a. Nicotine
b. Cocaine
c. Morphine
d. Caffeine

Ans. (c) Morphine

184. Nicotine is produced only in

a. Roots b. Leaves
c. Stem d. Seed

Ans. (a) Roots

185. A cell lacking cell wall is also lack in

a. Biomembrane b. Chloroplast
c. ER d. Mitochondria

Ans. (b) Chloroplast

186. cDNA stands for

a. Copy DNA
b. Cyclic DNA
c. Complementary DNA
d. Both a and b

Ans. (c) Complementary DNA

187. Dry weight is commonly obtained by drying the freshly harvested plant material at

a. 60–70°C b. 70–80°C
c. 90–100°C d. 100–105°C

Ans. (b) 70–80°C

188. In bamboos, which live more than half century, flowering occurs only

a. Once b. Twice
c. Thrice d. Not countable

Ans. (a) Once

189. Fluorescence which is sensitive to the conditions of photothermal traps are said to be

a. Constant Fluorescence
b. Dead Fluorescence
c. Background Fluorescence
d. Variable Fluorescence

Ans. (d) Variable Fluorescence

190. The century plant exist for a decade or more than before flowering ..... and dying

a. Once b. Twice
c. Thrice d. Not countable

Ans. (a) Once

191. Grana stacks of thylakoid membranes are high in

a. PS-I
b. PS-II
c. Cyt b or f
d. Chloroplast a or b

Ans. (b) PS-II

192. In the great majority of plant species, seed germination begins with?

a. Radical b. Epicotyl
c. Both a and b d. None

Ans. (a) Radical

193. Phyllotaxis is related with arrangement of

a. Roots b. Branches
c. Leaves d. Flowers

Ans. (c) Leaves

194. Oxygenase function of Rubisco was first shown by

a. Andrews and Lorimer
b. Ogren and Bowes
c. Guttendge
d. Went

Ans. (b) Ogren and Bowes

195. Major form of carbon transfer in plants is by

a. Sucrose b. Glucose
c. Fructose d. Maltose

Ans. (a) Sucrose

196. The term auxin was first used in 1926 by

a. Frits Went b. Jacobs
c. Goldsmith d. Yabuta

Ans. (a) Frits Went

197. Photorespiration increases at warm temperature due to

a. Ratio of dissolved chloroplast O_2 to CO_2 is lower
b. Ratio of dissolved chloroplast O_2 to CO_2 is higher
c. Ratio of dissolved chloroplast O_2 to CO_2 is not affected
d. Ratio of dissolved chloroplast O_2 to CO_2 is equal

Ans. (b) Ratio of dissolved chloroplast O_2 to CO_2 is higher

198. IAA is chemically similar to the amino acid

a. Methionine
b. Tryptophan
c. Serine
d. Proline

Ans. (b) Tryptophan

199. Apical dominance is the result of

a. Auxins
b. Cytokinins
c. Ethylene
d. GA

Ans. (a) Auxins

200. The bakane (foolish seedling) disease of rice is caused by

a. *Gibberella fujikuroi*
b. *Claviceps fuziformis*
c. *Xanthomonas oryzae*
d. None

Ans. (a) *Gibberella fujikuroi*

201. The compound, gibberellins was isolated from fungus in 1930s by

a. Went
b. Yabuta and Hayashi
c. Anthony Trewavas
d. Crozier

Ans. (b) Yabuta and Hayashi

202. Which nutrient is related with water oxidizing enzyme complex?

a. P
b. Mn
c. Cu
d. Fe

Ans. (b) Mn

203. Activator of carbonic anhydrase

a. Mn
b. P
c. Cu
d. Zn

Ans. (d) Zn

204. Which element is related with cytochrome?

a. P
b. Zn
c. Cu
d. Fe

Ans. (d) Fe

205. The precursor of gibberellic acid is

a. Mevalonic acid
b. Kaurene
c. Violaxanthene
d. None

Ans. (b) Kaurene

206. Which plant hormone promote germination of dormant seed and growth of dormant buds?

a. Auxin
b. GA
c. Cytokinins
d. ABA

Ans. (b) GA

207. During germination, embryo normally provides which hormone to the aleurone layer for the manufacturing of hydrolytic enzymes?

a. IAA
b. ABA
c. Cytokinins
d. GA_3

Ans. (d) GA_3

208. Zeatin had first been identified by

a. Letham
b. Gottlieb Haberlandt
c. Steward
d. Skoog

Ans. (a) Letham

209. Natural occurring cytokinin is /are

a. Zeatin
b. Kinetin
c. Both a and b
d. Benzyl adenine

Ans. (c) Both a and b

210. The precursor of cytokinins is

a. Violaxanthene
b. Isopentenyl adenine
c. Campastrall
d. Kaurene

Ans. (b) Isopentenyl adenine

211. Which one of the following delay senescence and increase nutrient sink activity?

a. Auxin
b. GA
c. ABA
d. Cytokinins

Ans. (d) Cytokinins

212. Which plant hormone is a volatile hormone?

a. ABA
b. Ethylene
c. Cytokinins
d. Auxin

Ans. (b) Ethylene

213. Which gas is considered as antagonist to ethylene action?

a. O_2
b. N_2
c. CO_2
d. CH_4

Ans. (c) CO_2

214. Precursor of abscisic acid (ABA)

a. Violaxanthene
b. Xanthoxin
c. Isopentenyl adenine
d. Methionine

Ans. (a) Violaxanthene

215. The hormone ABA was first identified and characterized chemically in 1963 by

a. Frederick T. Addicott
b. Milborrow
c. Bradford
d. None

Ans. (a) Frederick T. Addicott

216. The major functions of ABA is/are

a. Inhibition of RNA synthesis
b. Inhibition of translation
c. Effect on plasma membrane
d. All

Ans. (d) All

217. Precursor of brassinosteroides is

a. Adenine b. Campastrall
c. Violaxanthine d. Kaurene

Ans. (b) Campastrall

218. Growth movement toward (positive) or away (negative) from the earth's gravitational pull is known as

a. Photoperiodism b. Phototropism
c. Gravitropism d. Plagiotropism

Ans. (c) Gravitropism

219. Aminoethoxyvinylglycine (AVG) inhibits

a. Alternate bearing in mango
b. Photosynthetic e^- transport
c. Ethylene biosynthesis
d. Cyanide resistant respiration

Ans. (c) Ethylene biosynthesis

220. Which one of the following is not correctly matched?

a. TIBA–inhibit polar transport of IAA
b. SHAM–inhibit cyanide resistant respiration
c. Atrazine–inhibit Photosynthetic e^- transport
d. None

Ans. (d) None

221. Law of inhibitory factor is given by

a. VH Blackman b. RF Blackman
c. RD Asana d. CM Donald

Ans. (b) RF Blackman

222. Which scientist worked on drought tolerance?

a. R D Asana b. C M Donald
c. HA Borthwick d. VH Blackman

Ans. (a) R D Asana

223. Select the pair which is not correctly matched?

a. LAR-leaf area per unit plant dry weight
b. SLA-leaf area per unit leaf dry weight
c. SLW-leaf dry weight per unit leaf area
d. None

Ans. (d) None

224. The main function of jasmic acid is

a. Promote leaf senescence
b. Steroid growth promoter
c. Control nastic movements
d. Decrease senescence

Ans. (a) Promote leaf senescence

225. The main function of salicylic acid is

a. Control nastic movements
b. Promote leaf senescence
c. Increase resistance to plant pathogen's infection
d. Reduces water stress

Ans. (c) Increase resistance to plant pathogen's infection

226. Select the pair which is not correctly matched?

a. Transamination – Brassin and Kriman
b. Photoperiodism – Garner and Allard
c. Ascorbic acid – Chinoy
d. None

Ans. (d) None

227. The main function of turgorins is

a. Control nastic movements
b. Promote leaf senescence
c. Increase resistance to plant pathogen's infection
d. Steroid growth promoter

Ans. (a) Control nastic movements

228. The term vernalization relates

a. To low temperature promotion of flowering
b. To low temperature promotion of early germination
c. To high temperature for early ripening
d. None

Ans. (a) To low temperature promotion of flowering

229. Which of the following is/are day neutral plants?

a. Cotton b. Buckwheat
c. Sunflower d. All

Ans. (d) All

230. Who named the florigen?

a. Skoog b. Knott
c. Chailakhayan d. Salisbury

Ans. (c) Chailakhayan

231. In vernalization the seeds are allowed to germinate for some time and then are given cold temperature treatments by keeping them at

a. 0 to 5°C b. 0 to 20°C
c. 10–20°C d. 20–25°C

Ans. (a) 0 to 5°C

232. He movement of secondary branches of roots and stem growing at right angle is known as

a. Plagiogeotropic b. Apogeotropic
c. Diageotropic d. none

Ans. (c) Diageotropic

233. Parthenocarpy means formation of fruits without seed is found in

a. Bananas b. Pineapple
c. Melons d. All

Ans. (d) All

234. The example of non-climacteric fruits is/are

a. Oranges b. Lemons
c. Pepper d. All

Ans. (d) All

235. When dormancy occurs due to unfavourable environmental conditions is known as?

a. Innate dormancy
b. Imposed dormancy
c. Induced dormancy
d. All

Ans. (b) Imposed dormancy

236. The phenomenon in which germination of seeds is affected by light, such seeds are known as

a. Photoperiodic b. Thermoperiodic
c. Photoblastic d. Vernalized

Ans. (c) Photoblastic

237. Positive photoblastic plants includes

a. *Nicotiana tabacum* b. *Nigella damascena*
c. *Silene armeria* d. *Nemophila insignis*

Ans. (a) *Nicotiana tabacum*

238. Off season flowering in plants is positive by giving treatment of

a. Photoperiodism b. Vernalization
c. Both a and b d. Thermoperiodism

Ans. (c) Both a and b

239. Maleic hydrazide is used to

a. Suppress flowering and emergence of suckers
b. Induce seed germination
c. Enhance ripening
d. All

Ans. (a) Suppress flowering and emergence of suckers

240. Pomato (a hybrid of potato and tomato) produced by

a. Cytoplasmic fusion
b. Protoplasmic fusion
c. Nuclear fusion
d. None

Ans. (b) Protoplasmic fusion

241. The principle of electrophoresis were first made in 1807 by

a. Alexander Reuss b. Michael Faraday
c. EH Du Bosi Raymond d. Lambert

Ans. (a) Alexander Reuss

242. In year 1906, who initiated the idea of chromatography

a. Michael Faraday b. AJP Martin
c. Michael Tswett d. RLM Synge

Ans. (c) Michael Tswett

243. The term protoplasm was introduced by

a. Purkinje (1840) b. Purkinje (1860)
c. Von Mohl (1846) d. Virchow (1855)

Ans. (a) Purkinje (1840)

244. Who first time reported the presence of ribosomes in cell?

a. Palade b. Haguenau
c. Robinson and Brown d. Benda

Ans. (a) Palade

245. Intracellular digestion, autophagy, aging and autolysis are the functions of

a. Mitochondria b. Lysosomes
c. Peroxisomes d. Spherosomes

Ans. (b) Lysosomes

246. Vacuoles are surrounded by

a. Plasma membrane b. Cell wall
c. Tonoplast d. Lipid bilayer

Ans. (c) Tonoplast

247. Which cell organelle concerned with glyoxylate metabolism?

a. Spherosomes b. Lysosomes
c. Ribosomes d. Glyoxysomes

Ans. (d) Glyoxysomes

248. Diffusion of liquid into gas results in the formation of

a. Foam b. Precious stones
c. Clouds d. Smoke

Ans. (c) Clouds

249. The adsorption of water by hydrophilic colloids is called

a. Diffusion b. Imbibition
c. Plasmolysis d. Mass flow

Ans. (b) Imbibition

250. The total amount of water present in soil is called as

a. Holard b. Chesard
c. Echard d. Water table

Ans. (a) Holard

251. Who gave the transpiration pull or cohesion tension theory of ascent of sap?

a. Unger b. Dixon and Jolly
c. Milburn and Johnson d. Stephan Hales

Ans. (b) Dixon and Jolly

252. Guttation is take place through

a. Stomata b. Hydathode
c. Leaf veins d. Guard cells

Ans. (b) Hydathode

253. Which instrument used to measure stomatal opening?

a. Porometer b. Photometer
c. IRGA d. Manometer

Ans. (a) Porometer

254. 'Tea yellow' disease is caused by deficiency of

a. N b. P
c. S d. B

Ans. (c) S

255. General starvation is the deficiency symptom of

a. N b. P
c. K d. Ca

Ans. (a) N

256. Blossom end rot is the deficiency symptom of

a. Ca b. Mg
c. B d. Mo

Ans. (a) Ca

257. In tobacco, "sand drown" disease is found due to deficiency of

a. Ca b. Mg
c. Fe d. Cu

Ans. (b) Mg

258. Copper deficiency in cereals, oats, beet and pulses causes

a. Exanthema or die back
b. White tip disease
c. Rosette
d. Frenching

Ans. (b) White tip disease

259. Which of the following statements is correct about diffusion?

a. It is very rapid over long distances
b. It requires an expenditure of energy by the cell
c. It is a passive process
d. It occurs when molecules move from a region of lower concentration to one of higher concentration

Ans. (c) It is a passive process

260. Osmosis is a form of diffusion in which?

a. The solute moves freely from a region of higher concentration to one of higher concentration through a semi permeable membrane
b. The solvent moves through a semi permeable membrane from region, where a solute is in higher concentration to region of lower concentration
c. The solvent moves through a semi permeable membrane from higher solvent concentration to lower solvent concentration
d. Solute as well as solvent moves freely from a region of higher concentration to one of higher concentration through a semi permeable membrane

Ans. (c) The solvent moves through a semi permeable membrane from higher solvent concentration to lower solvent concentration

261. If we place a cell in a solution. Over a period of time, I notice that the cell shrinks, as if it is losing water which of the following seems likely?

a. The solution is a strong buffer
b. The solution is an acid
c. The solution has more dissolved solutes than the cell does
d. The solution has more dissolved solutes than the cell does

Ans. (c) The solution has more dissolved solutes than the cell does

262. Water potential

a. Of a solution is always greater than for pure water
b. Is the potential energy of water in a system
c. Is a measure of the level of the active movement of water a system
d. Is never zero

Ans. (b) Is the potential energy of water in a system

263. If a plant cell is placed in deionised water the potential of that cell becomes

a. More positive because the pressure potential becomes more positive
b. More positive because the osmotic potential becomes more negative

c. More positive because the pressure potential becomes more negative
d. Less negative because the pressure potential becomes more positive

Ans. (d) Less negative because the pressure potential becomes more positive

264. The sap of a plant cell has an osmotic potential of-10 bars and there is a wall pressure of 2 bars . When this cell is placed in a solution with an osmotic potential of -3 bars the force causing water to enter the cell is

a. –8 bar
b. –7 bar
c. –5 bar
d. –3 bar

Ans. (c) –5 bar

265. A root cortex cell has a solute potential of –0.5 MPa. The water potential of the soil is –0.3 MPa. At what turgor pressure would the root cortex cell no longer take up water?

a. 0 MPa
b. –0.15 MPa
c. +0.15 MPa
d. +0.2 MPa

Ans. (d) +0.2 MPa

266. A limp lettuce leaf has an osmotic potential = –4 MPa. The lettuce leaf is placed into a beaker of pure water. When the cells of the lettuce leaf are fully turgid the water potential of the leaf cells will be?

a. +4 MPa
b. +8 MPa
c. –4 MPa
d. 0.0 MPa

Ans. (d) 0.0 MPa

267. Space between cell wall and plasma membrane in a plasmolysed cell is occupied by

a. Pure water
b. Air
c. Cell sap
d. Plasmolysing solution

Ans. (d) Plasmolysing solution

268. In a flaccid cell

a. DPD = OP
b. DPD = TP
c. DPD = OP–TP
d. None

Ans. (a) DPD = OP

269. A cell at incipient plasmolysis, with a solute potential of –2000 KPa, is placed in a solution of water potential –1200KPa. The direction of flow of water will be

a. From cell to solution
b. From solution to cell
c. Data incomplete
d. No flow of water

Ans. (b) From solution to cell

270. If both leaf water potential and leaf osmotic potential in mid afternoon on a hot summer day equals –15 bars

a. The leaf is probably wilted
b. The whole plant is at the permanent point
c. Leaf cells have highest wall pressure
d. The soil is at the plant's permanent wilted point

Ans. (a) The leaf is probably wilted

271. Which of the following plays no role in the movement of water through the xylem of plants?

a. Capillarity
b. Root pressure
c. H^+/ATPase pump at the xylem element membrane
d. Transpirational pull

Ans. (c) H^+/ATPase pump at the xylem element membrane

272. Water cohesion

a. Creates the pulling force which pulls water upward in the xylem
b. Causes water to move from the xylem into the phloem in response to differences in water concentration
c. Is an energy requiring process
d. Is responsible for making the column of water

Ans. (d) Is responsible for making the column of water

273. The class of water in the soil, that provides most of the water of plants and is thus the most important, is

a. Gravitational
b. Field capacity
c. Capillary
d. Hygroscopic

Ans. (c) Capillary

274. Halophytes such as mangroves meet high osmotic pressures in the soil. They overcome the problem of water uptake by

a. Increase in the root to shoot ratio
b. Reduction in the number of stomata to reduce transpiration
c. Accumulation of electrolytes in the vacuoles
d. Growth at relatively high humidity to reduce transpiration

Ans. (c) Accumulation of electrolytes in the vacuoles

275. Root pressure is a/an

a. Non-osmotic phenomenon
b. Osmotic phenomenon
c. Positive hydrostatic pressure
d. More than one correct

Ans. (d) More than one correct

276. Which of the following statement is correct?

a. Members of gymnosperm show high root pressure
b. Actively transpiring plants show high root pressure
c. Root pressure is mainly responsible for ascent of sap
d. None

Ans. (d) None

277. Transpiration pull depends on

a. Adhesion of water molecules to the walls of phloem cells
b. Capillarity
c. The very negative water potential of the atmosphere
d. Cohesion of water molecules to each other

Ans. (c) The very negative water potential of the atmosphere

278. The source of energy driving the transport of water through the xylem is

a. ATP produced by photosynthesis
b. ATP generated by respiration
c. The sun
d. Transpiration

Ans. (c) The sun

279. The water within xylem vessels moves toward the top of a tree (long distances) as a result of

a. Atmospheric pressure on roots
b. Active transport of ions into the vascular bundle
c. Evaporation of water through stoma
d. The force of root pressure

Ans. (c) Evaporation of water through stoma

280. Which combination of characteristic of a vessel element is most important foe water movement in the xylem?

a. Rigid cell wall, cell death at maturity, end walls absent
b. Rigid cell wall, reduction in size of plastids and mitochondria, end walls present
c. Rigid cell wall, living cell membrane, and walls absent
d. Flexible cell wall, nucleus anchored to the cell membrane, end walls present

Ans. (c) Rigid cell wall, living cell membrane, and walls absent

281. Which of the following properties of water is most directly related to its ability to rise in the capillary spaces of plants?

a. Neutral Ph
b. High density
c. Low compressibility
d. High surface tension

Ans. (d) High surface tension

282. Which of the following observations shows that ion uptake in plants is energy dependent?

a. Ion uptake shows saturation kinetics
b. Ion uptake rates are different for different ions
c. Some ions accumulate against a concentration gradient
d. Some ions enter the symplast before reaching the endodermis

Ans. (c) Some ions accumulate against a concentration gradient

283. How does a plant accumulate ions from the soil, which has a lower concentration than that in the plant?

a. Applies pressure to push ions into the cell
b. Applies tension to pull the ions into the cell
c. Expends energy to transport ions against concentration gradient
d. Roots grow around soil particles trapping the ions in a cell

Ans. (c) Expends energy to transport ions against concentration gradient

284. Which statement about the function of the casparian strip is correct?

a. It prevents excess transpiration from leaves
b. It regulates ions movement into root vascular cylinder
c. It prevent disease causing organisms from invading the plant
d. It is the pathway for nutrient transfer from xylem to phloem

Ans. (b) It regulates ions movement into root vascular cylinder

285. Mark the correct statements

a. Resistance to water flow in root cortex will be higher for symplastic pathway
b. Major pathway followed by ions from the epidermis to tracheary element of root is symplastic
c. The casparian strip prohibits H_2O from passing through the apoplast
d. Absorption of ions in plants is controlled by carriers and pumps
e. All

Ans. (e) All

286. Ion absorption by plant roots

a. Can be explained by the nutrient-carrier hypothesis
b. Is basically ions passively soaking in root cells along with soil water

c. Explains the movement of ions from a dilute soil solution into a more concertrated solution
d. More than one correct

Ans. (d) More than one correct

287. When a cell membrane moves substances from a region of lower concentration to a region og higher concentration, and expends energy in the process, this type of movement is called?

a. Osmosis
b. Diffusion
c. Active transport
d. Facilitate diffusion

Ans. (c) Active transport

288. Ion absorption by symplast occurs

a. Passively by facilitated diffusion
b. Actively by primary and secondary active transport
c. Passively by free diffusion
d. Both a and b

Ans. (d) Both a and b

289. In plant roots, the casparian strip is correctly described by which of the following?

a. It is located in the walls between endodermal cells and cortex cells
b. It provides energy for the active transport of minerals into the vascular bundle from the cortex
c. It ensures that all minerals are absorbed from the soil in equal amounts
d. It ensures that all water and dissolved substances must pass through a cell before entering the vascular bundle

Ans. (d) It ensures that all water and dissolved substances must pass through a cell before entering the vascular bundle

290. Ion transport in root occurs

a. Passively through channels
b. Actively through channels
c. Actively through carriers
d. Through both symplast and apoplast
e. All the above

Ans. (e) All the above

291. Ion channels

a. Always require ATP in order to function
b. Are always open
c. Are integral membrane proteins
d. Are responsible for the selective permeability of a membrane

Ans. (c) Are integral membrane proteins, (d) Are responsible for the selective permeability of a membrane

292. Which compound is used to prevent oxidation of phenols?

a. NAA
b. BAP
c. IAA
d. L-cysteine

Ans. (d) L-cysteine

293. Which of the following statements is correct about diffusion?

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b. It requires an expenditure of energy by the cell
c. It is a passive process
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a. The solvent moves through a semipermeable membrane from region, where a solute is in higher concentration to region of lower concentration
c. The solvent moves through a semipermeable membrane from higher solvent concentration to lower solvent concentration
d. Solute as well as solvent moves freely from a region of higher concentration to one of higher concentration through a semipermeable membrane

Ans. (c) The solvent moves through a semipermeable membrane from higher solvent concentration to lower solvent concentration

295. If we place a cell in a solution. Over a period of time, I notice that the cell shrinks, as if it is losing water which of the following seems likely?

a. The solution is a strong buffer
b. The solution is an acid
c. The solution has more dissolved solutes than the cell does
d. Both a and b

Ans. (c) The solution has more dissolved solutes than the cell does

296. Water potential

a. Of a solution is always greater than for pure water
b. Is the potential energy of water in a system
c. Is a measure of the level of the active movement of water a system
d. Is never zero

Ans. (b) Is the potential energy of water in a system

297. If a plant cell is placed in deionised water the potential of that cell becomes

a. More positive because the pressure potential becomes more positive
b. More positive because the osmotic potential becomes more negative
c. More positive because the pressure potential becomes more negative
d. Less negative because the pressure potential becomes more positive

Ans. (d) Less negative because the pressure potential becomes more positive

298. The sap of a plant cell has an osmotic potential of –10 bars and there is a wall pressure of 2 bars. When this cell is placed in a solution with an osmotic potential of –3 bars the force causing water to enter the cell is

a. –8 bar
b. –7 bar
c. –5 bar
d. –3 bar

Ans. (c) –5 bar

299. A root cortex cell has a solute potential of –0.5 MPa. The water potential of the soil is –0.3 MPa. At what turgor pressure would the root cortex cell no longer take up water?

a. 0 MPa
b. –0.15 MPa
c. +0.15 MPa
d. +0.2 MPa

Ans. (d) +0.2 MPa

300. A limp lettuce leaf has an osmotic potential = –4 MPa. The lettuce leaf is placed into a beaker of pure water. When the cells of the lettuce leaf are fully turgid the water potential of the leaf cells will be

a. +4 MPa
b. +8 MPa
c. –4 MPa
d. 0.0 MPa

Ans. (d) 0.0 MPa

301. Space between cell wall and plasma membrane in a plasmolysed cell is occupied by

a. Pure water
b. Air
c. Cell sap
d. Plasmolysing solution

Ans. (d) Plasmolysing solution

302. In a flaccid cell

a. DPD = OP
b. DPD = TP
c. DPD = OP–TP
d. None

Ans. (a) DPD = OP

303. A cell at incipient plasmolysis, with a solute potential of –2000 KPa, is placed in a solution of water potential –1200 KPa. The direction of flow of water will be

a. From cell to solution
b. From solution to cell
c. Data incomplete
d. No flow of water

Ans. (b) From solution to cell

304. If both leaf water potential and leaf osmotic potential in mid afternoon on a hot summer day equals –15 bars

a. The leaf is probably wilted
b. The whole plant is at the permanent point
c. Leaf cells have highest wall pressure
d. The soil is at the plant's permanent wilted point

Ans. (a) The leaf is probably wilted

305. Which of the following plays no role in the movement of water through the xylem of plants?

a. Capillarity
b. Root pressure
c. H^+/ATPase pump at the xylem element membrane
d. Transpirational pull

Ans. (c) H^+/ATPase pump at the xylem element membrane

306. Water cohesion

a. Creates the pulling force which pulls water upward in the xylem
b. Causes water to move from the xylem into the phloem in response to differences in water concentration
c. Is an energy requiring process
d. Is responsible for making the column of water

Ans. (d) Is responsible for making the column of water

307. The class of water in the soil, that provides most of the water of plants and is thus the most important, is

a. Gravitational
b. Field capacity
c. Capillary
d. Hygroscopic

Ans. (c) Capillary

308. Halophytes such as mangroves meet high osmotic pressures in the soil. They overcome the problem of water uptake by

a. Increase in the root to shoot ratio
b. Reduction in the number of stomata to reduce transpiration
c. Accumulation of electrolytes in the vacuoles
d. Growth at relatively high humidity to reduce transpiration

Ans. (c) Accumulation of electrolytes in the vacuoles

309. Root pressure is a /an

a. Non-osmotic phenomenon
b. Osmotic phenomenon
c. Positive hydrostatic pressure
d. More than one correct

Ans. (d) More than one correct

310. Which of the following statement is correct?

a. Members of gymnosperm show high root pressure
b. Actively transpiring plants show high root pressure
c. Root pressure is mainly responsible for ascent of sap
d. None

Ans. (d) None

311. Transpiration pull depends on

a. Adhesion of water molecules to the walls of phloem cells
b. Capillarity
c. The very negative water potential of the atmosphere
d. Cohesion of water molecules to each other

Ans. (c) The very negative water potential of the atmosphere

312. The source of energy driving the transport of water through the xylem is

a. ATP produced by photosynthesis
b. ATP generated by respiration
c. The sun
d. Transpiration

Ans. (c) The sun

313. The water within xylem vessels moves toward the top of a tree (long distances) as a result of

a. Atmospheric pressure on roots
b. Active transport of ions into the vascular bundle
c. Evaporation of water through stoma
d. The force of root pressure

Ans. (c) Evaporation of water through stoma

314. Which combination of characteristic of a vessel element is most important for water movement in the xylem?

a. Rigid cell wall, cell death at maturity, end walls absent
b. Rigid cell wall, reduction in size of plastids and mitochondria, end walls present
c. Rigid cell wall, living cell membrane, and walls absent
d. Flexible cell wall, nucleus anchored to the cell membrane, end walls present

Ans. (c) Rigid cell wall, living cell membrane, and walls absent

315. Which of the following properties of water is most directly related to its ability to rise in the capillary spaces of plants?

a. Neutral pH
b. High density
c. Low compressibility
d. High surface tension

Ans. (d) High surface tension

316. Which of the following observations shows that ion uptake in plants is energy dependent?

a. Ion uptake shows saturation kinetics
b. Ion uptake rates are different for different ions
c. Some ions accumulate against a concentration gradient
d. Some ions enter the symplast before reaching the endodermis

Ans. (c) Some ions accumulate against a concentration gradient

317. How does a plant accumulate ions from the soil, which has a lower concentration than that in the plant?

a. Applies pressure to push ions into the cell
b. Applies tension to pull the ions into the cell
c. Expends energy to transport ions against concentration gradient
d. Roots grow around soil particles trapping the ions in a cell

Ans. (c) Expends energy to transport ions against concentration gradient

318. Which statement about the function of the casparian strip is correct?

a. It prevents excess transpiration from leaves
b. It regulates ions movement into root vascular cylinder
c. It prevent disease causing organisms from invading the plant
d. It is the pathway for nutrient transfer from xylem to phloem

Ans. (b) It regulates ions movement into root vascular cylinder

319. Mark the correct statements

a. Resistance to water flow in root cortex will be higher for symplastic pathway
b. Major pathway followed by ions from the epidermis to tracheary element of root is symplastic
c. The casparian strip prohibits H_2O from passing through the apoplast
d. Absorption of ions in plants is controlled by carriers and pumps
e. All the above

Ans. (e) All the above

320. Ion absorption by plant roots

a. Can be explained by the nutrient—carrier hypothesis
b. Is basically ions passively soaking in root cells along with soil water
c. Explains the movement of ions from a dilute soil solution into a more concentrated solution
d. More than one correct

Ans. (d) More than one correct

321. When a cell membrane moves substances from a region of lower concentration to a region of higher concentration, and expends energy in the process, this type of movement is called?

a. Osmosis
b. Diffusion
c. Active transport
d. Facilitate diffusion

Ans. (c) Active transport

322. Ion absorption by symplast occurs

a. Passively by facilitated diffusion
b. Actively by primary and secondary active transport
c. Passively by free diffusion
d. Both a and b

Ans. (d) Both a and b

323. In plant roots, the casparian strip is correctly described by which of the following?

a. It is located in the walls between endodermal cells and cortex cells
b. It provides energy for the active transport of minerals into the vascular bundle from the cortex
c. It ensures that all minerals are absorbed from the soil in equal amounts
d. It ensures that all water and dissolved substances must pass through a cell before entering the vascular bundle

Ans. (d) It ensures that all water and dissolved substances must pass through a cell before entering the vascular bundle

324. Which of the following does not affect the rate of diffusion

a. Temperature
b. ATP available
c. Pressure
b. Force

Ans. (b) ATP available

325. Ion channels

a. Always require ATP in order to function
b. Are always open
c. Are integral membrane proteins
d. Are responsible for the selective permeability of a membrane
e. Both c and d

Ans. (e) Both c and d

326. The casparian strip

a. Limits the pathway available to water and solutes, forcing them to enter the symplast
b. Surrounds the root vascular tissue
c. Allows water to move down a water potential gradient
d. Is made of suberin
e. All of the above

Ans. (e) All of the above

327. Water potential of soil at field capacity is

a. –0.3 bars
b. –4 bars
c. –6 bars
d. –8 bars

Ans. (a) –0.3 bars

328. Maximum density of water is exist as

a. 0°C
b. 4°C
c. 40°C
d. 100°C

Ans. (b) 4°C

329. Water potential of chemically pure water is

a. –0.1 MPa
b. –0.5 MPa
c. –1 MPa
d. Zero

Ans. (d) Zero

330. Purple cabbage leaves do not lose their colour in cold water but do so in boiling water because

a. The plasma membrane gets killed in boiling water
b. The cell is killed in boiling water
c. The pigment is not soluble in cold water
d. The cell is killed in cold water

Ans. (a) The plasma membrane gets killed in boiling water

331. Osmosis involves

a. Cell to cell movement of water
b. Movement of water through cortical cells
c. Active absorption of water through
d. All of these

Ans. (d) All of these

332. In osmosis, solvent flows from

a. Its lower concentration to its higher concentration
b. Its higher concentration to its lower concentration
c. Its higher concentration to its higher concentration
d. None of these

Ans. (b) Its higher concentration to its lower concentration

333. Osmotic pressure is highest in

a. Hydorphyte
b. Halophytes
c. Xerophytes
d. Mesophyte

Ans. (b) Halophytes

334. The real force leading to the entry of water into a cell from other cell is

a. Diffusion pressure deficit
b. Turgor pressure
c. Wall pressure
d. Osmotic pressure

Ans. (a) Diffusion pressure deficit

335. The value of DPD of a cell is

a. OP × TP
b. OP + TP
c. OP–TP
d. None of these

Ans. (c) OP–TP

336. When al cell is fully turgid, which of the following is zero?

a. Osmotic pressure
b. Turgor pressure
c. Diffusion pressure deficit
d. None of these

Ans. (c) Diffusion pressure deficit

337. The maximum value of DPD is equal to

a. TP
b. WP
c. OP
d. All of these

Ans. (c) OP

338. In a plasmolysed cell, the DPD is

a. Equal to OP
b. Zero
c. Less than WP
d. Equall to WP

Ans. (a) Equal to OP

339. If a cell with OP = 5 and TP = 4 is surrounded by cell with OP = 3 and TP = 1, what will be the direction of water movement?

a. From cell A to other cells
b. From other cells to cell A
c. Water will move UP
d. Water will not move up

Ans. (a) From cell A to other cells

340. Which of the following is correct?

a. DPE = OP × WP
b. WP = OP–DPD
c. OP = WP–DPP
d. DPD = WP–OP

Ans. (b) WP = OP–DPD

341. Osmotic pressure depends upon

a. Concentration of solute
b. Concentration of solvent
c. Ionisation of solute
d. Temperature
e. a, c and d

Ans. (e) a, c and d

342. Water pontential can be obtained by

a. TP – OP
b. OP = WP
c. OP – TP
d. OP – DPD

Ans. (a) TP – OP

343. Osmotic pontential of a solution is always

a. Positive
b. Equal
c. Variable
d. Negative

Ans. (d) Negative

344. The pressure exerted by swollen vacuole on the cell wall is

a. OP
b. WP
c. TP
d. DPD

Ans. (c) TP

345. Highest value of ψ is

a. 1
b. 0
c. 5
d. 10

Ans. (b) 0

346. Plants die when overfertilized because the fertilizer

a. Causes dehydration of plants by exosmosis
b. Blocks absorption of nitrogenous ions
c. Damages wall of delicate root hairs
d. Upsets soil environment by poisoning soil bacteria

Ans. (a) Causes dehydration of plants by exosmosis

347. Swelling of wooden doors during rainy season is due to

a. Endosmosis
b. Exosmosis
c. Imbibitions
d. Deplasmolysis

Ans. (c) Imbibitions

348. Imbibitions process involves

a. Only diffusion
b. Only capillary action
c. Both of these
d. None of these

Ans. (c) Both of these

349. Selective permeability identifies the process of

a. Exosmosis b. Osmosis
c. Diffusion d. Plasmolysis

Ans. (b) Osmosis

350. When slices of beet roots are placed in cold water, the anthocyanin pigments do not come out. But it happens when placed in hot water. It indicates that for anthocyanin, plasma membrane?

a. Impermeable
b. Permeable
c. Semipermeable
d. Differentially permeable

Ans. (a) Impermeable

351. When a cell is placed in a hypertonic solution, its water potential?

a. Increase
b. Decrease
c. Equal
d. First increase and then decrease

Ans. (b) Decrease

352. DPD is

a. Daynight phosphate
b. Daily photosynthetic demand
c. Diffusion pressure deficit
d. Diffusion potential deficit

Ans. (c) Diffusion pressure deficit

353. When the cell is fully turgid, its

a. DPD = OP b. DPD = WP
c. WP = 0 d. DPD = 0

Ans. (d) DPD = 0

354. Turgidity in a cell is maintained by

a. Wall pressure
b. Osmotic pressure
c. Diffusion pressure
d. Turgor pressure

Ans. (d) Turgor pressure

355. Mark the incorrect statement

a. Plant absorbs excess quantity of water
b. Water and salts are taken in simultaneously
c. Plant absorbs only one thing at a time, either water or nutrient
d. Plant takes in small quantity of water

Ans. (c) Plant absorbs only one thing at a time, either water or nutrient

356. An example of rapid absorption is

a. Passive absorption b. Root absorption
c. Translocation d. Salt absorption

Ans. (a) Passive absorption

357. Which of the following takes place against concentration gradience?

a. Transpiration b. Root absorption
c. Salt absorption d. Diffusion

Ans. (c) Salt absorption

358. Several deedlings do not survive on transplantation because

a. They do not like the now soil
b. They do not get proper nutrients in the soil
c. Most root hairs are damaged
d. Leaves get demand due to transplantation

Ans. (d) Leaves get demand due to transplantation

359. Osmotic pressure of a cell is usually equal to

a. OP – TP b. OP + TP
c. DPD + TP d. DPD – OP

Ans. (c) DPD + TP

360. In a cell the pressure exerted outwards on the cell wall is termed

a. Root pressure b. Osmotic pressure
c. Turgor pressure d. Suction pressure

Ans. (c) Turgor pressure

361. The vacuole in a plant cell contains

a. Gases b. Solvent
c. Water d. Cell sap

Ans. (d) Cell sap

362. In plants the value of DPD will the higher than OP when

a. OP – TP b. OP + TP
c. TP – ve d. OP > TP

Ans. (c) TP – ve

363. Which of the following sequences correctly explains the ascending order of DPD in root hair, cortical cell and mesophyll cell?

a. Root hair < cortical cell < mesophyll cell
b. Root hair < mesophyll cell < cortical cell
c. Mesophyll cell < root hair < cortical cell
d. Cortical cell < mesophyll cell < root hair

Ans. (a) Root hair < cortical cell < mesophyll cell

364. Which of the following has highest imbibing capacity?

a. Protein
b. Carbohydrate
c. Lipid
d. Cellulose

Ans. (d) Cellulose

365. Bacteria fail to survive in a highly salted pickle because

a. They are plasmolysed and get killed
b. Pickles have low nutrient value
c. Salt inhibits their multiplication
d. They cannot carry out hotosynthesis

Ans. (a) They are plasmolysed and get killed

366. Root pressure is due to

a. Passive absorption
b. Active absorption
c. Root absorption
d. Diffusion pressure

Ans. (b) Active absorption

367. Which of the following is the correct statement in reference to active and passive transport?

a. Passive transport is non-selective
b. Active transport is non-selective
c. Active transport utilises metabolic energy whereas passive transport is due to concentration gradience
d. Passive transport is related to anions whereas active transport is related to cations

Ans. (c) Active transport utilises metabolic energy whereas passive transport is due to concentration gradience

368. DPD of a plasmolysed cell is

a. Less than OP
b. Less than TP
c. Equal to OP
d. Zero

Ans. (c) Equal to OP

369. Which of the following appears logically correct 5 for a turgid cell?

a. DPD 05 atm, OP 12 atm, TP 07 atm
b. DPD 02 atm, OP 07 atm, TP 05 atm
c. DPD 00 atm, OP 15 atm, TP 15 atm
d. DPD 10 atm, OP 05 atm, TP 06 atm

Ans. (c) DPD 00 atm, OP 15 atm, TP 15 atm

370. A piece of sliced potato kept in a solution loses its weight. The possible reason could be

a. Exit of solutes
b. Exit of solvent
c. Exosmosis
d. Death of tissue

Ans. (c) Exosmosis

371. According to well-known theory of solute transport across cell membrane, what happens when sugar molecules are passed through it

a. Na^+ do not flow at all
b. K^+ flow against the sugar molecules
c. Na^+ flow in the direction of sugar molecule
d. K^+ do not flow at all

Ans. (c) Na^+ flow in the direction of sugar molecule

372. What will happen to a cell which has been kept in alcohol for some time before placing into hypertonic solution?

a. Remain unchanged
b. Plasmolyse
c. Brust
d. Remain changed

Ans. (a) Remain unchanged

373. During the absorption of water by root hair, the water potential of cell sap is lower than that of

a. Neither pure water nor soil solution
b. Pure water and soil solution
c. Pure water but higher than soil solution
d. Impure water and soil solution

Ans. (b) Pure water and soil solution

374. A 0.1 M solution has a water potential of

a. 2.3 bars
b. –2.6 bars
c. –2.3 bars
d. +2.3 bars

Ans. (c) –2.3 bars

375. In soil, water available to the root is

a. Capillary water
b. Gravitational water
c. Chemically bound water
d. Hygroscopic water

Ans. (a) Capillary water

376. Water enters into root hairs from soil on account of

a. Root pressure
b. Osmotic pressure
c. Suction pressure
d. Capillary pressure

Ans. (c) Suction pressure

377. A soil is physiologically dry when

a. Soil temperature is <4°C
b. Concentration of soil solution is higher than cell
c. It has no hygroscopic water
d. It has no capillary water

Ans. (b) Concentration of soil solution is higher than cell

378. Water logged soil is

a. Physiologically dry
b. Both physically and physiologically dry
c. Physically dry
d. None of these

Ans. (a) Physiologically dry

379. Field capacity includes

a. Capillary water
b. Hygroscopic water
c. Gravitational water
d. Both a and b

Ans. (d) Both a and b

380. In trees, without duramen

a. Root will die first
b. Root and shoot both die
c. Neither root not shoot would die
d. None of these

Ans. (c) Neither root nor shoot would die

381. The force of tension-cohesion exceeds root pressure on a

a. Rainy day
b. Sunny day
c. Full moon light
d. Foggy morning

Ans. (b) Sunny day

382. Which of the following plant would die rapidly?

a. Ringed
b. Pruned
c. Deciduous
d. Hollow-hearted

Ans. (a) Ringed

383. The mechanism of movement of water through vessels and tracheids is a kind of

a. Bulk flow
b. Transpiration
c. Osmosis
d. Gravitational flow

Ans. (a) Bulk flow

384. In a plant without heart-wood

a. Root will die first
b. Neither one would die
c. Shoot will die first
d. None of these

Ans. (b) Neither one would die

385. In a 10-year old tree

a. Passive absorption dominates
b. Active absorption dominates
c. Both of these
d. None of these

Ans. (a) Passive absorption dominates

386. Most amount of soil water enters into root hairs on account of

a. Osmotic pressure
b. Root pressure
c. Suction pressure
d. Turgor pressure

Ans. (c) Suction pressure

387. Girdling experiment cannot be successful in maize because

a. The stem is covered with wax
b. The stem is thick
c. Its vascular bundles are not present in a ring
d. The stem is thin

Ans. (c) Its vascular bundles are not present in a ring

388. Which of the following contributes most to transport of water from the ground to the leaves of a tree?

a. Shoot pressure
b. Root pressure
c. Transpiration pull
d. Capillary water

Ans. (c) Transpiration pull

389. Which water is available to plant for absorption

a. Gravitational water
b. Capillary water
c. Hygroscopic water
d. None of these

Ans. (b) Capillary water

390. The cohesive force of water is due to

a. H-bond
b. O-bond
c. OH-bond
d. C-bond

Ans. (a) H-bond

391. Root pressure is maximum when

a. T/A ratio is higher
b. T/A ratio is lower
c. T/A ratio is equal
d. None of these

Ans. (b) T/A ratio is lower

392. Which one following is not required by plants for their normal healthy growth?

a. Cobalt
b. Calcium
c. Lead
d. Iron

Ans. (c) Lead

393. Presence of phosphorus in a plant

a. Retards protein formation
b. Promotes fruit ripening
c. Brings about healthy root growth
d. None of these

Ans. (a) Retards protein formation

394. Die back disease of citrus is caused by

a. Fungus b. Bacteria
c. Virus d. Cu-deficiency

Ans. (d) Cu-deficiency

395. Rapid deterioration of root and shoot tips occurs due to the deficiency of

a. Phosphorus b. Nitrogen
c. Cobalt d. Calcium

Ans. (d) Calcium

396. On the basis of symptoms of chlorosis in leaves a student inferred that this was due to deficiency of nitrogen. This inference could be correct only if yellowing appeared first in?

a. Old leaves followed by young leaves
b. Young leaves
c. Old leaves
d. None of these

Ans. (b) Young leaves

397. Cytochrome oxidase contains

a. Co b. Na
c. Mg d. Fe

Ans. (d) Fe

398. Plastocyanin is a protein containing

a. Ca b. Cu
c. Mg d. Fe

Ans. (b) Cu

399. Absence of Mg^{2+} ions from plant tissue result in

a. Chlorosis b. Plasmolysis
c. Necrosis d. Hydrolysis

Ans. (a) Chlorosis

400. Sickle leaf disease occurs due to deficiency of

a. P b. K
c. Fe d. Mg

Ans. (a) P

401. Sulphur is the constituent of

a. Valine b. Lucine
c. Proline d. Methionine

Ans. (c) Proline

402. Khaira disease of rice is the consequence of

a. Boron deficiency b. Mo deficiency
c. Zn deficiency d. Calcium deficiency

Ans. (c) Zn deficiency

403. Which element is essential for IAA synthesis?

a. Zinc b. Calcium
c. Boron d. Iron

Ans. (a) Zinc

404. Why do freshly exposed surfaces of may fruits and vegetables become dark?

a. Dust from atmosphere settles on them
b. The fruits are blacks in colour
c. Dirty knife leaves some traces of iron of them
d. Oxidation of tannic acid in the presence of the trace of iron from the knife makes them dark

Ans. (d) Oxidation of tannic acid in the presence of the trace of iron from the knife makes them dark

405. The importance of microelement was recognised rather belatedly because

a. They were toxic to plants
b. They were being absorbed as contaminants
c. They were lost by plants through roots
d. Plant physiologists did not find them in plants

Ans. (b) They were being absorbed as contaminants

406. Which element is common to nucleic acids, phospholipids, ATP, ADP, NADPH?

a. Bo b. Na
c. Co d. P

Ans. (d) P

407. Which of the following is required for synthesis of ascorbic acid?

a. Cu
b. Cd
c. Fe
d. Zn

Ans. (a) Cu

408. Which of the following are required for chlorophyll synthesis?

a. Cu and Ca
b. Mg and Ca
c. Fe and Mg
d. B and Co

Ans. (c) Fe and Mg

409. An element concerned with the photolysis of water during light reaction of photosynthesis is

a. B b. Co
c. Mn d. Fe

Ans. (c) Mn

410. Active transport of elements across the cell membrane required

a. ATP
b. Acetyl coA
c. Acetyl choline
d. Cyclic AMP

Ans. (c) Acetyl choline

411. Deficiency symptoms of nitrogen first appears in

a. Young leaves
b. Old leaves
c. Both young and old leaves
d. None of these

Ans. (b) Old leaves

412. In plants, Ca is present in the form of

a. Calcium oxalate
b. Calcium chloride
c. Calcium pectate
d. Calcium carbonate

Ans. (c) Calcium pectate

413. Molybdenum is a component of

a. Nitrate reductase system
b. Phosphorylase
c. Photolysis of water system
d. Phosphate reductase system

Ans. (a) Nitrate reductase system

414. Which of the following statement is correct in reference to microessential elements?

a. These are required in very small quantities
b. These are required in very large quantities
c. These are more important and toxic
d. None of these

Ans. (a) These are required in very small quantities

415. Plants obtains nitrogen from the soil in the form of

a. Nitrates
b. Free nitrogen
c. Nitrogen oxide
d. All of the obove

Ans. (a) Nitrates

416. Element which maintains the solubility of calcium in the cells is

a. B
b. Fe
c. Cu
d. Mg

Ans. (a) B

417. Which element has to be taken exclusively from external atmosphere by the terrestrial plant?

a. N
b. P
c. Mg
d. C

Ans. (d) C

418. Which of the following is not a part of enzyme, but it activates the enzyme?

a. Mg
b. Co
c. Mn
d. K

Ans. (d) K

419. Absence of magnesium ions from the soil usually results in

a. Necrosis
b. Etiolation
c. Chlorosis
d. Plasmolysis

Ans. (c) Chlorosis

420. In plants, chlorosis in caused due to deficiency of

a. Fe
b. B
c. Mg
d. Ca

Ans. (a) Fe

421. Four elements found in abundance in plants and making up to 99% of all elements are

a. C, H, O, N
b. C, H, O, S
c. S, H, O, B
d. C, H, O, P

Ans. (a) C, H, O, N

422. Which one of the following elements is the constituent of chlorophyll?

a. Fe
b. B
c. Mg
d. Ca

Ans. (c) Mg

423. Which element participates in translocation of carbohydrates in the plants?

a. Ca
b. B
c. Zn
d. Cu

Ans. (b) B

424. Which of the following are called storage elements?

a. Ca, C, N, S
b. N, P, K, B
c. Ca, B, N, O
d. C, N, S, P

Ans. (d) C, N, S, P

425. The following are common symptoms developed due to deficiency of Ca, Mg, K and Mo

a. Formation of anthocyanins
b. Appearance of necrotic spots
c. Vein banding
d. Chlorosis

Ans. (b) Appearance of necrotic spots

426. What features of an element is not required to prove essential?

a. It is found in all tissues of plants
b. It directly participates in metabolism
c. It cannot be substituted by another element
d. None of these

Ans. (a) It is found in all tissues of plants

427. Advantages of hydroponic cultures are that

a. Plants can be grown with controlled nutrients
b. Natural calamities such as floods and drought can be avoided
c. Pet problems can be kept controlled
d. All of these

Ans. (d) All of these

428. Deficiency symptoms of Mg, Zn, K and N occur first in old leaves which indicates that?

a. These are readily mobile
b. These are less mobile
c. These require ATP for their mobility
d. These elements are non-mobile

Ans. (a) These are readily mobile

429. Symptoms like-terminal buds die, young leaves become hooked die back at margins or tips appear due to deficiency of

a. C b. N
c. Ca d. B

Ans. (c) Ca

430. Necrosis occurs due to deficiency of

a. K and Mg
b. Ca and Zn
c. B and Co
d. Both a and b

Ans. (d) Both a and b

431. Symptoms of phosphorus deficiency are

a. Symptoms appear in young leaves
b. Lower leaves are usually red or yellow
c. Terminal bud die and chlorosis
d. None of these

Ans. (b) Lower leaves are usually red or yellow

432. Whiptail of brassica is caused due to deficiency of

a. Mo b. Fe
c. Cu d. Zn

Ans. (a) Mo

433. San drown disease is found due to deficiency of

a. Magnesium b. Copper
c. Iron d. Boron

Ans. (a) Magnesium

434. Top sickness of tobacco is caused due to deficiency of

a. Mo b. Mn
c. Zn d. B

Ans. (d) B

435. The physiological disease caused by the deficiency of boron is

a. Top sickness of tobacco b. Hard fruit of citrus
c. Heart rot of sugar beet d. All of these

Ans. (d) All of these

436. Sodium is essential for

a. Bacteria b. All fungi
c. Blue green algae d. All hetrotrophic plant

Ans. (c) Blue green algae

437. Exanthema of fruits is found due to deficiency of

a. Zn b. B
c. Mo d. Cu

Ans. (d) Cu

438. Physiological disease called pahla blight of sugarcane is caused due to deficiency of

a. Mn b. Zn
c. Mo d. Ca

Ans. (a) Mn

439. Which one of the following is not a physiological disease?

a. Canker of citrus b. Kharia of paddy
c. Reclamation disease d. None of these

Ans. (a) Canker of citrus

440. Tip hooking disease is caused due to

a. Fungi
b. Bacteria
c. Virus
d. Mineral deficiency

Ans. (d) Mineral deficiency

441. Sulphur is a constituent of

a. Essential oil b. All amino acid
c. Chlorophyll d. Fatty acid

Ans. (a) Essential oil

442. Zn is an activator of

a. Amino acid oxidase
b. Tryptophan synthetase
c. PEPCO
d. Succinyl co A

Ans. (b) Tryptophan synthetase

443. Deficiency of iron first appears in

a. Young leaves
b. General starvation
c. Old leaves
d. None of these

Ans. (a) Young leaves

444. Lesions in the pith of stem and death of head occur due to deficiency of

a. Fe
b. Zn
c. B
d. Mo

Ans. (b) Zn

445. Which element is found highest in maize plant?

a. N
b. C
c. O
d. H

Ans. (c) O

446. The best form of iron supply of the plant is

a. $FeSO_4$
b. Fe-EDTA
c. $FeNO_4$
d. $FeCl_3$

Ans. (b) Fe-EDTA

447. An element involved in the selective permeability of the cell membranes is

a. K
b. Fe
c. Ca
d. P

Ans. (c) Ca

448. An element essential for the synthesis of auxin is

a. Zn
b. Co
c. Mg
d. Ca

Ans. (a) Zn

449. The 'Brown heart disease' is caused due to deficiency of

a. Cu
b. Co
c. Mg
d. B

Ans. (d) B

450. Which element is the constituent of thiamine, biotin, CoA and ferredoxin?

a. C
b. H
c. O
d. S

Ans. (d) S

451. Which element is the constituent of middle lamella of the cell wall?

a. Co
b. Mg
c. Ca
d. Fe

Ans. (c) Ca

452. An element that plays important role in increasing hardness and helping in maintenance of turgidity of cell is

a. P
b. B
c. K
d. Ca

Ans. (c) K

453. An element requied for pollen germination is

a. Ca
b. Co
c. B
d. K

Ans. (c) B

454. Which one of the following is essential for the evolution of oxygen in photosynthesis?

a. Ca
b. Mg
c. Cl
d. Fe

Ans. (c) Cl

455. Which element is the constituent of cytochrome and ferredoxin, activates catalase and required for the synthesis of chlorophyll?

a. Fe
b. Ca
c. Mg
d. Co

Ans. (a) Fe

456. Indian soil has mainly a deficiency of

a. Zn
b. Mg
c. Ca
d. N

Ans. (d) N

457. Leghemoglobin protects the activity of

a. Amylase
b. Nitogenase
c. Catalase
d. Nitrate reductase

Ans. (d) Nitrate reductase

458. A nitrogen fixing cyanobacteria found in coralloid root of cycas is

a. Spirulina
b. Anabaena
c. Aulosira
d. None of these

Ans. (b) Anabaena

459. Nostoc is found developing symbiotic relationship with

a. Virus
b. Bacteria
c. Fungi
d. Anthoceros

Ans. (d) Anthoceros

460. Nitosomonas converts

a. NO_3 into NO_2
b. HNO_3 into NO_3
c. NH_3 into NO_2
d. None of these

Ans. (c) NH_3 into NO_2

461. Ammonia is converted into nitrite in the soil by

a. Nitrosococcus
b. Nitosomonas
c. Nitrococcus
d. None of these

Ans. (a) Nitrosococcus

462. Which bacteria oxidise nitrite in the soil by?

a. Nitosomonas
b. Nitrosococcus
c. Nitrococcus
d. Nitrobacter

Ans. (d) Nitrobacter

463. Nitrosification process carried out by certain bacteria refers to the conversion of

a. NO_2 into NO
b. NH_3 into NO_2
c. N_2 into NH_3
d. None of these

Ans. (b) NH_3 into NO_2

464. Which is the main source of electrons for nitrite reductase?

a. Plastoquinone
b. Acetyl CoA
c. Ferredoxin
d. Cytochrome

Ans. (c) Ferredoxin

465. Nitrite reductase does not require

a. Co
b. Mo
c. Mg
d. Ca

Ans. (b) Mo

466. The mineral element essential for N_2-fixation and N_2 metabolism is

a. Ca
b. Zn
c. Mo
d. B

Ans. (c) Mo

467. The production of nitrates from ammonia through nitrosomonas is called

a. Ammonification
b. Nitrification
c. Denitrification
d. Nitrogen fixation

Ans. (b) Nitrification

468. A crop plant that can grow well in N_2 deficient soils without addition of manure is

a. Cowpea
b. *Cajanus cajan*
c. *Allium sativum*
d. *Allium cepa*

Ans. (b) *Cajanus cajan*

469. Which pigment is essential for nitrogen fixation by leguminous plants?

a. Anthocyanin
b. Plastoquinone
c. Leghemoglobin
d. Phycocyanin

Ans. (c) Leghemoglobin

470. In nitrogen cycle, nitrite is converted into nitrate by

a. Nitobactor
b. Nitrosomonas
c. Nitrosococcus
d. Azotobacter

Ans. (a) Nitobactor

471. Symbiotic nitrogen fixing bacteria occur in the genus

a. Rhizobium
b. Azotobacter
c. Nitrococcus
d. None of these

Ans. (b) Azotobacter

472. Conversion of nitrates into NH_3 is carried out by

a. Nitrosomonas
b. Bacillus mycoides
c. Xanthomonas
d. Rhizobium

Ans. (b) Bacillus mycoides

473. An example of photosynthetic, anaerobic, non-symbiotic N_2 fixing bacteria is

a. Rhodospirillum
b. Nitosomonas
c. Rhizobium
d. Bacillus

Ans. (a) Rhodospirillum

474. In green plants, the reduction of nitrite into ammonia requires

a. Cytochrome
b. Ferredoxin
c. Plastoquinone
d. Plastocynin

Ans. (b) Ferredoxin

475. Ferredoxin is commonly found in

a. Mitochondria
b. Ribosome
c. Golgi complex
d. Chloroplasts

Ans. (d) Chloroplasts

476. The reduction of nitrite into ammonia takes place in

a. Stem
b. Root
c. Tip
d. Leaf

Ans. (d) Leaf

477. Nitrate reductase is a

a. Flavoprotein b. Vitamin
c. Hormone d. Phytochrome

Ans. (a) Flavoprotein

478. Molybdenum is a constituent of

a. Nitrate reductase b. Nitrite reductase
c. Nitrite oxidase d. Nitrate oxidase

Ans. (a) Nitrate reductase

479. Nitogenase converts

a. Free N_2 into NO_3 b. Free N_2 into HNO_3
c. Free N_2 into NO_2 d. Free N_2 into NH_3

Ans. (d) Free N_2 into NH_3

480. Flowering plants obtain nitrogen from the soil in the form of

a. NO_2 b. NH_3
c. NO_3 d. N_2

Ans. (c) NO_3

481. Nitrobacter converts NO_2 into NO_3 by the oxidation process and for this it obtains energy from

a. Oxidation of organic b. Host plant
c. Radiant energy d. None of these

Ans. (a) Oxidation of organic

482. Movement of minerals against concentration gradience requires

a. IBA b. ATP
c. NADPH2 d. IAA

Ans. (b) ATP

483. Which fertiliser is supplied to the fields poor in phosphorus?

a. Urea b. Gypsum
c. Bone meal d. Lime soda

Ans. (c) Bone meal

484. NPK fertilisers comprise

a. Nitrophosphate and potash
b. Nitrophosphate and urea
c. Nitrophosphate and bone meal
d. None of these

Ans. (a) Nitrophosphate and potash

485. Some fertiliser bags are found labelled with numbers like 17-18-9. These numbers refers to

a. Days of supply to soil
b. Percentage of fertilisers
c. Batch number of production
d. None of these

Ans. (b) Percentage of fertilisers

486. Repeated cultivation of crop fields leads to depletion of

a. N, P, K b. N, S, P
c. N, Mg, K d. None of these

Ans. (a) N, P, K

487. An element not essential for plant growth is

a. I_2 b. K
c. P d. C

Ans. (a) I_2

488. An element responsible of an anaerobic nitrogen fixing bacteria is

a. P b. K
c. N d. Ca

Ans. (b) K

489. An example of an anaerobic nitrogen fixing bacteria is

a. *Rhizobium* b. *Xanthobium*
c. *Clostridium* d. None of these

Ans. (c) *Clostridium*

490. The bacteria which convert nitrate into molecular nitrogen are called

a. Nitrifying bacteria b. *Nitrosococcus*
c. Denitrifying bacteria d. Methanobacteria

Ans. (c) Denitrifying bacteria

491. Nif gene occur in

a. *Rhizobium* b. *Streptococcus*
c. *Penicillium* d. *Xanthomonas*

Ans. (a) Rhizobium

492. Total root parasite is

a. Orobanche b. Loranthus
c. Viscum d. None of these

Ans. (a) Orobanche

493. An example of a parasitic epiphytic plant is

a. Loranthus b. Viscum
c. Rafflesia d. Cuscuta

Ans. (b) Viscum

494. Balanophora is a

a. Partial stem parasite b. Total root parasite
c. Partial root parasite d. Total stem parasite

Ans. (b) Total root parasite

495. Which of the following is obtained by insectivorus plants from animal bodies?

a. N_2 b. O_2
c. S d. B

Ans. (a) N_2

496. In nepenthes, pitcher is the modification of

a. Leaf apex b. Stem base
c. Leaf blade d. Stem tip

Ans. (c) Leaf blade

497. Dionaea muscipula is commonly known as

a. Bladderwort b. Venus fly trap
c. Water fly trap d. None of these

Ans. (b) Venus fly trap

498. In sundew, the part of plant which attracts the insects is

a. Leaf base b. Leaf petiole
c. Leaf blade d. None of these

Ans. (c) Leaf blade

499. Striga is a parasite found on the roots of

a. Avena sativa b. Dalbergia sisoo
c. Opium poppy d. Saccharum officinarum

Ans. (d) Saccharum officinarum

500. Which of the following is /are saprophyte?

a. Monotropa b. Puccinia
c. Splachnum d. All of the above

Ans. (d) All of the above

501. Which one of the following is an aquatic insectivorous plant?

a. Drosera b. Sarracenia
c. Aldrovanda d. None of these

Ans. (c) Aldrovanda

502. An example of root parasite producing biggest flower is

a. *Dendrophthae* b. *Rafflesia*
c. Sunflower d. None of these

Ans. (b) Rafflesia

503. Refflesia flowers, the biggest in plant kingdom, are pollinated by

a. Carion flies b. Elephant
c. Birds d. Sun birds

Ans. (a) Carion flies

504. Which one of the following is an endemic insectivorous plant of Australia?

a. Dionaea b. Utricularia
c. Drosera d. Cephalotus

Ans. (d) Cephalotus

505. An insectivorous plant native to USA is

a. Dionaea b. Nepenthes
c. Aldrovanda d. Drosera

Ans. (a) Dionaea

506. Which one of the following is not a pitcher palnt?

a. Cephalotus b. Darlingtonia
c. Aldrovanda d. Sarracenia

Ans. (c) Aldrovanda

507. Darwin called the most wonderful plant to

a. Nepenthes b. Drosera
c. Dionaea d. Sarracenia

Ans. (c) Dionaea

508. Government of Meghalaya has declared an insectivorous plant as a protected species found in its state. It is

a. *Nepenthes* b. *Drosera*
c. *Aldrovanda* d. *Sarracenia*

Ans. (a) Nepenthes

509. The most widely distributed insectivorous plant of our country is

a. *Nepenthes* b. *Drosera*
c. *Aldrovanda* d. None of these

Ans. (b) Drosera

510. Mistletoe is a

a. True stem parasite
b. True root parasite
c. Partial stem parasite
d. None of these

Ans. (c) Partial stem parasite

511. Which one of the following is a partial stem parasite?

a. Dendrophthae b. Arceuthodum
c. Santalum d. Pinguicula

Ans. (a) Dendrophthae

512. Which one is found as a root parasite on sorghum?

a. Santalum b. Striga
c. Cistanche d. Orobanche

Ans. (b) Striga

513. Which one of the following plants is not found in India?

a. Drosera
b. Aldrowanda
c. Rafflesia
d. All of these

Ans. (c) Rafflesia

514. Examples of partial root parasite are

a. Viscum, loranthus, dendrophthae, cassytha
b. Santalum, thesium, rhinanthus
c. Santalum, thesium, rhinanthus
d. All of these

Ans. (c) Santalum, thesium, rhinanthus

515. The mango and madhuca crops of North India are badly damaged due to

a. Dendrophthae
b. Cuscuta
c. Viscum
d. None of these

Ans. (a) Dendrophthae

516. An example of mycelia and smallest dicot is

a. Cuscuta
b. Sesam
c. Wolffia
d. Arceuthobium

Ans. (d) Arceuthobium

517. Adhesive traps for catching insects are fond in

a. Drosophyllum
b. drosera
c. Pinguicula
d. All of these

Ans. (d) All of these

518. In which of the following insectivorous plant lobster-pot trap mechanism is found?

a. Genlisea
b. Pingulcula
c. Cephalotus
d. Sarracenia

Ans. (a) Genlisea

519. Sun pitcher is the name of

a. Pinguicula
b. Darlingtonia
c. Heliamphora
d. Nepenthes

Ans. (c) Heliamphora

520. A root less insectivorous plant is

a. Utricularia
b. Nepenthes
c. Pingulcula
d. All of the above

Ans. (a) Utricularia

521. Osmosis involves

a. Diffusion of suspended particles from higher to lower concentration
b. Diffusion of suspended particles from lower to higher concentration
c. Diffusion of water from more to less concentrated side
d. Diffusion of water from less to more concentrated side

Ans. (d) Diffusion of water from less to more concentrated side

522. ''Osmosis is the diffusion of a solution of weaker concentration into a solution of a higher concentration, when both are separated by a semipermeable membrane''. What is the error in this statement?

a. There is no mention of DPD
b. The movement of water molecules is not specified
c. The behaviour of the semipermeable membrane is not specified
d. The exact concentrations are not indicated

Ans. (b) The movement of water molecules is not specified

523. A cells is placed in 4 M solution of salt and no change in the volume of the cell is observed. The concentration of cell sap is

a. 0.4 M
b. 4 M
c. 40 M
d. 0.01 M

Ans. (a) 0.4 M

524. A cell placed in strong salt solution will shrink because

a. Cytoplasm will decompose
b. Mineral salt will break the cell wall
c. Salt water enter the cell
d. Water comes out by exosmosis

Ans. (d) Water comes out by exosmosis

525. A cell increases in volume if the external medium is

a. Hypotonic
b. Hypertonic
c. Isotonic
d. None

Ans. (a) Hypotonic

526. Osmosis is defined as

a. Flow of solvent (water) through a semipermeable membrane from less to more concentrated side
b. Flow of solute from a semipermeable membrane
c. Flow of water without a membrane
d. None of the above

Ans. (a) Flow of solvent (water) through a semipermeable membrane from less to more concentrated side

527. Osmosis involves

a. Diffusion of suspended particles from higher to lower concentration

b. Diffusion of water from more to less concentrated side
c. Diffusion of suspended particles from lower to higher concentration
d. Diffusion of water from less to more concentrated side

Ans. (c) Diffusion of suspended particles from lower to higher concentration

528. DPD stands for

a. Diffusion pressure deficit
b. Diffusion pressure demand
c. Daily photosynthetic depression
d. Daily phosphorus demand

Ans. (a) Diffusion pressure deficit

529. DPD—

a. OP × TP
b. OP + TP
c. OP—TP
d. TP—OP

Ans. (c) OP—TP

530. A piece of potato tuber is placed in concentrated salt solution

a. It would become limp (Shrink) due to loss of water from its cells
b. It would become turgid by absorbing water from salt solution
c. Nothing would happen
d. It would die

Ans. (a) It would become limp (Shrink) due to loss of water from its cells

531. Seeds when placed in water swell because of

a. Osmosis
b. Root pressure
c. Imbibition
d. Diffusion

Ans. (c) Imbibition

532. If cell A with OP = 6 and TP = 5 is surrounded by the cells with OP = 3 and TP = 2 what will be the direction of water movement

a. From cell A to other cells
b. From other cells to cell A
c. Water will not move
d. Water will move up

Ans. (c) Water will not move

533. In process of osmosis

a. Both cell wall and protoplasm act as a membrane
b. Entire protoplasm act as a membrane
c. Only the outermost layer of protoplast act as a membrane
d. Only cell wall acts as a membrane

Ans. (c) Only the outermost layer of protoplast act as a membrane

534. Purple cabbage leaves do not lose their colour in cold water but do so in boiling water because

a. Plasma membrane gets killed in boiling water
b. Hot water can enter the cell readily
c. The pigment is not soluble in cold water
d. The cell wall is killed in boiling water

Ans. (a) Plasma membrane gets killed in boiling water

535. When a cell is kept in 0.5 M solution of sucrose its volumes does not alter. If the same cell is placed in 0.5 M solution of sodium chloride, the volume of the cell will

a. Increase
b. Decrease
c. Cell will be plasmolysed
d. Not show any change

Ans. (d) Not show any change

536. In diagram given below when the turgor pressure of the cell B increases to 18 what would be changes with regard to water movement?

a. Cell A, C, D, E absorb water from B
b. Water diffuses into B from other cells
c. B actively absorbs water from the neighbour cells
d. No movement of water takes place

Ans. (a) Cell A, C, D, E absorb water from B

537. Which of the following statement is not correct?

a. Plant absorbs excess quantity of water
b. Plant take in small quatity of mineral salts through soil water
c. Water and inorganic salts are taken in simultaneously by root hairs
d. Plants absorb only one thing at a time water or inorganic salt

Ans. (c) Water and inorganic salts are taken in simultaneously by root hairs

538. The most widely accepted theory for ascent of sap in trees is

a. Capillarity
b. Role of atmospheric pressure
c. Pulsating action of living cells
d. Transpiration pull and cohesion theory of Dison

Ans. (d) Transpiration pull and cohesion theory of Dison

539. A soil is physiologically dry when

a. It has no hygroscopic water
b. Concentration of soil solution is higher than cell
c. Soil temperature is 4°C
d. There is excess of CO_2 in soil

Ans. (b) Concentration of soil solution is higher than cell

540. Stomata is opened and closed due to

a. Change of Turgor pressure in guard cells
b. Pressure of gases inside the leaves
c. Their genetic constitution
d. Effect of hormones

Ans. (a) Change of Turgor pressure in guard cells

541. Which of the following is rapid type of absorption?

a. Passive absorption
b. Active absorption
c. Salt absorption
d. Root absorption

Ans. (a) Passive absorption

542. That the wall is permeable membrane can be best deduced from the passage of water and mineral salts from?

a. Soil into root hairs
b. Root hairs into cortical cells
c. Pericycle cells into tracheal elements
d. Cortical cells into the pericycle

Ans. (a) Soil into root hairs

543. Plasma membrane controls?

a. Passage of water only
b. Passage of water and some solutes in and out of cell
c. Passage of water and solutes into the cell
d. Movements of the cell contents out of the cell

Ans. (b) Passage of water and some solutes in and out of cell

544. If a plant cell is immersed in the water continues to entre the cell until the

a. Concentration of the salt is the same inside the cell as outside
b. Cell bursts
c. Diffusion pressure is the same inside cell as outside
d. Concentration of water is the same inside the cell as outside

Ans. (c) Diffusion pressure is the same inside cell as outside

545. When beet roots cylinders are washed and then placed in cold water, anthocyanin does not come out. This indicates most likely that plasma membrane is?

a. Permeable to anthocyanin
b. Impermeable to anthocyanin
c. Differentially permeable to anthocyanin
d. Dead structure

Ans. (b) Impermeable to anthocyanin

546. Why plants die when over fertilized?

a. Due to dehydration of plants
b. Due to damage of walls of delicate root hairs
c. Due to block absorption of nitrogenous ions
d. Due to upsets soil environment by poisoning soil bacteria

Ans. (a) Due to dehydration of plants

547. Ultimate cause of water movement against gravity is

a. Photosynthesis
b. Osmosis
c. Transpiration
d. Imbibition

Ans. (c) Transpiration

548. All following involves osmosis except

a. Water passing from a root hair to adjacent cells
b. Water passing up a xylem vessel element to xylem vessel element above it
c. Water entering a mesophyll cell from the xylon vessel element
d. Water from soil entering a root hair

Ans. (b) Water passing up a xylem vessel element to xylem vessel element above it

549. If grapes placed in hypertonic solution. They will become

a. Flacid
b. Turgid
c. Longer
d. More full of starch

Ans. (a) Flacid

550. When the leaves of Tradescanscia put into a strong solution. The content of leaves cell will be contract away from the wall. This is known as?

a. Hydrolysis
b. Contraction
c. Dehydration
d. Plasmolysis

Ans. (d) Plasmolysis

551. When a cell is fully turgid which of the following will be zero?

a. Turgor pressure
b. Wall pressure
c. Suction pressure (D.P.D.)
d. Osmotic pressure

Ans. (c) Suction pressure (D.P.D.)

552. What is the action spectra of transpiration?

a. Green and ultraviolet
b. Orange and red
c. Blue and far red
d. Blue and red

Ans. (d) Blue and red

553. Guard cells differ from epidermal cells in having

a. Mitochondria
b. Vacuoles
c. Cell wall
d. Chloroplasts

Ans. (d) Chloroplasts

554. Water absorbed by root hairs of a plant can rise to the higest point by means of

a. Root pressure
b. Imbibition force
c. Force of capillary
d. Transpiration pull

Ans. (d) Transpiration pull

555. Active absorption of water from the soil by the roots is mainly affected by

a. Typical tissue organisation
b. Sucking power of the root hairs
c. Osmotic concentration of cell sap
d. Tension due to transpiration

Ans. (b) Sucking power of the root hairs

556. Which of the following is responsible for guttation?

a. Osmosis
b. Root pressure
c. Transpiration
d. Photosynthesis

Ans. (b) Root pressure

557. In succulent plants the stomata open in night and close by day time. Which among the following would be best hypothesis to explain the mechanism of stomatal action in night only?

a. CO_2 accumulates, reduces pH, stimulates enzymes resulting in accumulation of sugars
b. Increase in CO_2 conc. conversion of organic acids into starch resulting in the increased conversion into sugar resulting in K^+ transport
c. Low CO_2 conc. accumulates organic acids resulting in the increased conc. of cell sap
d. CO_2 used up, increase pH results in accumulation of sugars

Ans. (b) Increase in CO_2 conc. conversion of organic acids into starch resulting in the increased conversion into sugar resulting in K^+ transport

558. Percentage of water left in the soil when a plant wilt is known as

a. Turgidity
b. Wilting coefficient
c. Field capacity
d. Water retaining power of soil

Ans. (b) Wilting coefficient

559. The following percentage of water absorbed by herbaceous plants is lost in transpiration

a. 80
b. 60
c. 90
d. 40

Ans. (c) 90

560. Root cap has no role in water absorption because

a. It has no connection with vascular system
b. It has loosely arranged cells
c. It has no cells containing chloroplasts
d. It has no root hairs

Ans. (b) It has loosely arranged cells

561. In which of the following plants would metabolism be hindered if the leaves are coated with wax on their upper surface?

a. Hydrilla
b. Lotus
c. *Pistia*
d. *Vallisneria*

Ans. (b) Lotus

562. In submerged hydrophytes gaseous exchange takes place through

a. Lenticels
b. Stomata
c. Hydathodes
d. By general surface of the cells by

Ans. (d) By general surface of the cells by

563. In terms of permeability the cell and plasmalemma are

a. Permeable and differentially permeable
b. Both semipermeable
c. Semipermeable and differentially permeable
d. Both differentially permeable

Ans. (a) Permeable and differentially permeable

564. Which of the following method of water absorption is affected by opening and closing of stomata?

a. Active
b. Passive
c. Both of these
d. None of these

Ans. (b) Passive

565. According to searth the opening and closing of stomata is governed by

a. pH
b. Enzymes
c. Phosphorylation
d. $NADPH_2$ formation

Ans. (a) pH

566. Of the process which occur in the leaves the one which may lower their temperature (cooling effect) is

a. Respiration b. Photosynthesis
c. Transpiration d. Hydrolysis

Ans. (c) Transpiration

567. Maximum amount of water vapour held in the atmosphere is

a. Saturation point b. Absolute humidity
c. Relative humidity d. None of these

Ans. (b) Absolute humidity

568. Due to low atmospheric pressure, the rate of transpiration will

a. Remain unaffected b. Increased
c. Decrease slowly d. Decrease rapidly

Ans. (b) Increased

569. Which of the following is most likely cause for the wider opening of the stomata?

a. Secretion of salt molecules by adjacent cells is taking place
b. Water molecules enter the guard cells
c. Night temperature is going to fall
d. The atmosphere outside becoming less humid

Ans. (d) The atmosphere outside becoming less humid

570. When a plant wilts, what will be the sequence of events?

a. Exosmosis, deplasmolysis, plasmolysis temporary and permanent wilting
b. Exosmosis, plasmolysis, deplasmolysis, temporary and permanent wilting
c. Exosmosis, plasmolysis, temporary and permanent wilting
d. Endosmosis, plasmolysis, temporary and permanent wilting

Ans. (c) Exosmosis, plasmolysis, temporary and permanent wilting

571. Cohesion occurs in between

a. Xylem cell and water b. Water molecules
c. Water atoms d. Water and leaf

Ans. (a) Xylem cell and water

572. Water will be absorbed by root hairs when

a. Concentration of salts in the soil is high
b. Concentration of solutes in the cell sap is high
c. Plant is rapidly respiring
d. They are seperated from soil by a permeable memberane

Ans. (b) Concentration of solutes in the cell sap is high

573. Water will be absorbed by root hairs when the external medium is

a. Hypotonic b. Hypertonic
c. Isotonic d. Viscous

Ans. (a) Hypotonic

574. According to Levitt stomata open during day time because the guard cells

a. Photosynthesize and produce osmotically active sugar
b. Are thin walled
c. Are bean shaped
d. None of these

Ans. (a) Photosynthesize and produce osmotically active sugar

575. The cell sap is

a. Living content of the vacuole
b. Living content of the cell
c. Non-living content of the cell
d. Non-living content of the vacuole

Ans. (d) Non-living content of the vacuole

576. Wilting of plants occurs when

a. Phloem is blocked
b. Xylem is blocked
c. Both xylem and phloem blocked
d. A few roots are removed

Ans. (b) Xylem is blocked

577. Root pressure is absent in

a. Dicots b. Monocots
c. Mango d. Gymnosperms

Ans. (d) Gymnosperms

578. Root pressure was introduced by

a. Stephen Hales b. C.M. Stephen
c. Sachs d. J.C. Bose

Ans. (a) Stephen Hales

579. Dixon and Jolly suported

a. Physical force theory b. Vitral force theory
c. Pulsation theory d. All of these

Ans. (a) Physical force theory

580. The real force causing water entry into a cell from other cell

a. Turgor pressure
b. Diffusion pressure deficit
c. Wall pressure
d. Osmotic pressure

Ans. (b) Diffusion pressure deficit

581. Swelling of wooden doors during rainy season is due to

a. Imbibition
b. Endosmosis
c. Deplasmolysis
d. Capillarity

Ans. (a) Imbibition

582. Many transplanted seedlings may not survive because

a. They do not like the new soil
b. They do not get required mineral salt
c. Most of the root hairs are lost during transplantation
d. The leaves get damaged

Ans. (c) Most of the root hairs are lost during transplantation

583. Root hairs occur in the zone of

a. Cell division
b. Cell elongation
c. Cell maturation
d. None of above

Ans. (c) Cell maturation

584. The membrane that allows some of solute molecules to pass through it and prevent others is called

a. Permeable membrane
b. Semipermeable membrane
c. Selectively or differentially permeable membrane
d. Impermeable membrane

Ans. (c) Selectively or differentially permeable membrane

585. The external solution having more concentration than the cell sap is called

a. Hypertonic solution
b. Isotonic solution
c. Hypotonic solution
d. None of the above

Ans. (a) Hypertonic solution

586. The external solution having same concentration as that of cell sap is called

a. Hypertonic solution
b. Isotonic solution
c. Hypotonic solution
d. Ultratonic solution

Ans. (b) Isotonic solution

587. The external solution having less concentration than the cell sap is called

a. Hypertonic solution
b. Isotonic solution
c. Hypotonic solution
d. Ultratonic solution

Ans. (c) Hypotonic solution

588. The pressure exerted by the swelling protoplast on the walls of the cell is

a. Wall pressure
b. Osmotic pressure
c. Suction pressure
d. Turgor pressure

Ans. (d) Turgor pressure

589. The pressure exerted by wall of the cell on the protoplast is

a. W.P.
b. T.P.
c. D.P.
d. O.P.

Ans. (a) W.P.

590. The membrane which allows the solvent molecules to pass through it and not the solute molecules is called?

a. Impermeable membrane
b. Semipermeable membrane
c. Permeable membrane
d. None of the above

Ans. (b) Semipermeable membrane

591. Net movement of water is from

a. Low DPD to high DPD
b. High DPD to low DPD
c. DPD gradient plays no role
d. None of the above

Ans. (a) Low DPD to high DPD

592. Cell turgidity is caused by

a. Endosmosis
b. Exosmosis
c. Plasmolysis
d. Diffusion

Ans. (a) Endosmosis

593. Fresh grapes shall shrink when they are placed in

a. Hot water
b. Cold water
c. Starch water
d. Concentrated salt solution

Ans. (d) Concentrated salt solution

594. O.P. of a cell can be measured by

a. Manometer
b. Photometer
c. Calorimeter
d. Plasmolysis

Ans. (d) Plasmolysis

595. O.P. of a solution can be measured by

a. Photometer
b. Osmometer
c. Calorimeter
d. Plasmolysis

Ans. (b) Osmometer

596. The common material used in demonstrating plasmolysis in the laboratory is

a. Garden Nasturtium
b. Balsam
c. Banyan
d. *Tradescantia*

Ans. (d) *Tradescantia*

597. A cell with fully clastic wall is placed in hypertonic solution. What will not happen?

a. Change in cell size and shape
b. The whole cell will shrink
c. Cytoplasm shrinks from the cell wall and undergoes plasmolysis
d. Decrease in cell size

Ans. (c) Cytoplasm shrinks from the cell wall and undergoes plasmolysis

598. Gum swells up in the water due to

a. Imbibition b. Diffusion
c. Endosmosis d. Turgidity

Ans. (a) Imbibition

599. When a cell is placed in 0.25 M concentrated sugar solution, there is no change in it. So the external solution is called?

a. Hypertonic b. Isotonic
c. Hypotonic d. None of the above

Ans. (b) Isotonic

600. When a cell is placed in 0.25 M concentrated sugar solution, there is no change in it. The concentration of cell sap would be

a. 0–025 M b. 0–25M
c. 25 M d. None of the above

Ans. (b) 0–25M

601. When a cell is placed in 0.5 M concentrated solution of sugar, there is no change in its volume. But if the same cell is placed in 0.5 M concentrated solution of sodium chloride there will be

a. Decrease in volume b. Increase in volume
c. No change in volume d. None of the above

Ans. (a) Decrease in volume

602. When chemical fertilisers are given to plants, the soil is to be throughly watered otherwise the plants get killed because of?

a. Toxic effects of chemical (fertilisers) compounds
b. Plasmolysis due to high concentration of fertilisers
c. Failure of physiological process like photosynthesis and respiration
d. None of the above

Ans. (b) Plasmolysis due to high concentration of fertilisers

603. The pressure that prevails in cell due to number of substances dissolved in cell sap is

a. Wall pressure b. Turgor pressure
c. Osmotic pressure d. Diffusion pressure

Ans. (c) Osmotic pressure

604. The selectively permeable membrane of the cell is

a. Plasmalemma b. Cytoplasm
c. Cell wall d. None of the above

Ans. (a) Plasmalemma

605. The plasmolysed cells regain turgidity and assume original volume under influence of hypotonic solution. The process is called

a. Plasmolysis b. De-plasmolysis
c. Endosmosis d. Exosmosis

Ans. (b) De-plasmolysis

606. Diffusion pressure deficit is the amount by which two solutions differ in their?

a. T.P. b. O.P.
c. D.P. d. W.P.

Ans. (c) D.P.

607. In biological system, the terms osmosis involves the diffusion of

a. Water b. Solutes
c. Energy d. Both a and b

Ans. (a) Water

608. A wooden peg inserted in a rock causes its breaking during the rainy season. It is due to development of

a. Turgor pressure b. Osmotic pressure
c. Imbibition pressure d. Plasmolysis

Ans. (c) Imbibition pressure

609. Endosmosis takes place when a plant cell is immersed in

a. Isotonic solution b. Hypotonic solution
c. Hypertonic solution d. HCl solution

Ans. (b) Hypotonic solution

610. Imbibition occurs when

a. Grapes are dipped in saturated solution
b. Wood is placed in ether
c. Rubber is dipped in ether
d. Rubber is dipped in water

Ans. (c) Rubber is dipped in ether

611. A solution of 1.0 M glucose develops a pressure of –27 bars in an osmometer. What is not correct?

a. Pressure potential is –27 bars
b. Osmotic pressure is 27 bars
c. Osmotic potential is –27 bars
d. Solute potential is –27 bars

Ans. (a) Pressure potential is –27 bars

612. Force causing the entry of water into root hairs is

a. Osmotic pressure
b. Atmospheric pressure
c. Turgor pressure
d. Suction pressure

Ans. (d) Suction pressure

613. 1 gm molar solution is

a. 1 gm mole of solute dissolved in 1000 ml of solvent
b. 1 gm mole of solute dissolved in 1000 ml of solution
c. 1 gm of solute dissoved in 1000 ml of solvent
d. 1 gm of solute dissolved in 1000 ml of solution

Ans. (b) 1 gm mole of solute dissolved in 1000 ml of solution

614. An animal cell placed in pure water will

a. Swell up and burst
b. Shrink and die
c. Shrink and undergo plasmolysis
d. Swell up and develop turgidity

Ans. (a) Swell up and burst

615. Osmotic potential of pure water is

a. One
b. Zero
c. Less than zero
d. Between zero and one

Ans. (b) Zero

616. A plant cell placed in water will

a. Swell up and become turgid
b. Swell up and burst
c. Lose water and become flaccid
d. Shrink and die

Ans. (a) Swell up and become turgid

617. Water potential is the sum of opposing forces of

a. Osmotic pressure and diffusion pressure deficit
b. Solute potential and osmotic potential
c. Solute potential and pressure potential
d. Diffusion pressure deficit and turgor pressure

Ans. (c) Solute potential and pressure potential

618. Passage of water across a selectively permeable membrane is

a. Active transport
b. Pinocytosis
c. Facilitated diffusion
d. Osmosis

Ans. (d) Osmosis

619. Land plants grow in soils which possess an osmotic concentration

a. Hypotonic in relation to cells
b. Hypertonic in relation to cells
c. Isotonic in relation to cells
d. Ultrotonic in relation to cells

Ans. (a) Hypotonic in relation to cells

620. What will happen when pollen grain is placed in water?

a. It will germinate and produce a pollen tube
b. The pollen grain does not germinate
c. The pollen grain swells up but bursts at places without forming a pollen tube
d. The pollen grain forms a number of pollen tubes

Ans. (c) The pollen grain swells up but bursts at places without forming a pollen tube

621. In thistle funnel experiment, entry of water into thistle funnel stops after some time automatically due to

a. Diffusion of sugar out of thistle funnel
b. External and internal solutions become isotonic
c. Development of hydrostatic pressure in the thistle funnel
d. Development of hydrostatic pressure in the beaker

Ans. (c) Development of hydrostatic pressure in the thistle funnel

622. Seeds soaked in water imbibe the same because of

a. Adsorption
b. Higher O.P.
c. Lower O.P.
d. Pressure of vacuoles

Ans. (a) Adsorption

623. Potometers are made on the principle that

a. The amount of water transpired is approximately equal to amount of water absorbed
b. The amount of water transpired is more than the amount of water absorbed
c. The amount of water transpired is less than the amount of water absorbed
d. Humidity causes reduction in transpiration

Ans. (a) The amount of water transpired is approximately equal to amount of water absorbed

624. The process in which loss of water occurs in the form of water vapour is

a. Respiration
b. Guttation
c. Transpiration
b. Exosmosis

Ans. (c) Transpiration

625. Stomatal aperture is surrounded by guard cells and widens (opens) when guard cells are

a. Flaccid
b. Turgid
c. Bean shaped
d. Dumb-bell shaped

Ans. (b) Turgid

626. The maximum loss of water in transpiration is from

a. Lenticels
b. Cuticle
c. Stomata
b. Hydothodes

Ans. (c) Stomata

627. The stomata are called sunken when?

a. Guard cells are in the line with epidermal cells
b. Guard cells are situated below epidermal cells
c. Guard cells are situated above epidermal cells
d. Guard cells occur in lower epidermis

Ans. (b) Guard cells are situated below epidermal cells

628. Transpiration is high under

a. Dry environment
b. Low atmospheric pressure
c. High temperature
d. All the above

Ans. (b) Low atmospheric pressure

629. Sunken stomata

a. Increase transpiration
b. Decrease transpiration
c. Hinder transpiration
d. Stop transpiration

Ans. (b) Decrease transpiration

630. Stomatal frequency indicates

a. Number of stomata per unit area
b. Rate of water loss
c. Rate of gaseous exchange
d. Width of stomatal aperture

Ans. (a) Number of stomata per unit area

631. In dorsiventral leaf, the number of stomata per unit area are generally

a. Same on both the surfaces
b. More on lower surface (epidermis)
c. More on upper surface (epidermis)
d. Absent on upper surface (epidermis)

Ans. (b) More on lower surface (epidermis)

632. In isobilateral leaf, the number of stomata per unit area are

a. More on upper surface
b. More on lower surface
c. Approximately same on both the surfaces
d. Absent on both the surfaces

Ans. (c) Approximately same on both the surfaces

633. In xerophytic leaf the stomata are situated

a. On both surfaces
b. On upper surface
c. On lower surface
d. Absent from both surfaces

Ans. (c) On lower surface

634. The loss of water in the form of water drops is called

a. Transpiration
b. Respiration
c. Guttation
d. Exosmosis

Ans. (c) Guttation

635. Guttation is from

a. Uninjured edges of leaves near vein endings
b. Epidermal layers of leaf surfaces
c. Injured edges of leaves
d. None of the above

Ans. (a) Uninjured edges of leaves near vein endings

636. Transpiration is unavoidable evil because of

a. Structure of leaf and harmful effect
b. Beneficial and harmful effect
c. Maintenance of turgidity for growth
d. Gaseous exchange for photosynthesis and respiration

Ans. (a) Structure of leaf and harmful effect

637. Drooping of leaves due to loss of turgor at noon but recovery in the evening is referred to as

a. Temporary wilting
b. Incipient wilting
c. Permanent wilting
d. Midday desiccation

Ans. (a) Temporary wilting

638. Loss of water by cells without external sign of leaf drooping is called

a. Temporary wilting
b. Nascent wilting
c. Incipient wilting
d. Permanent wilting

Ans. (c) Incipient wilting

639. Which does not cause stomatal opening?

a. Circadian rhythm
b. Influx of K^+ ions
c. Light
d. High CO_2 concentration

Ans. (d) High CO_2 concentration

640. Transpiration does not help in

a. Translocation of minerals
b. Excretion of sap
c. Ascent of sap
d. Cooling

Ans. (b) Excretion of sap

641. Plants which scotoactive stomata perform?

a. C_4 photosynthesis
b. CAM photosynthesis
c. C_3 photosynthesis
d. Anoxygenic photosynthesis

Ans. (b) CAM photosynthesis

642. Day time loss of water in the vapour form from stomata is a trade off for intake of

a. Minerals
b. Oxygen
c. Carbon dioxide
d. Energy

Ans. (c) Carbon dioxide

643. For keeping stomata open, besides K ions the guard cells require a constant supply of

a. ABA
b. ATP
c. Organic acids
d. Protons

Ans. (b) ATP

644. Presence of stomata on the under surface of dorsiventral leaf is a mechanism of

a. Reduction in transpiration
b. Protection from dust
c. Proper regulation of transpiration
d. Increase in transpiration

Ans. (a) Reduction in transpiration

645. An antitranspirant is

a. Phenyl mercuric acid
b. Abscisic acid
c. Salicylic acid
d. All the above

Ans. (d) All the above

646. Transpiration is a process related to

a. Osmosis
b. Diffusion
c. Activated transport
d. Facilitated diffusion

Ans. (b) Diffusion

647. Presence of hair on the leaf surface

a. Reduces transpiration
b. Increases transpiration
c. Helps in rapid exchange of gases
d. Prevents guttation

Ans. (a) Reduces transpiration

648. Some plants possess modifications like phylloclades, cladodes, phyllodes, scale leaves, etc. for

a. Differentiation and evolution
b. Decreasing transpiration
c. Increasing transpiration
d. Storage of absorbed water

Ans. (b) Decreasing transpiration

649. Rate of transpiration is inversely related to

a. Humidity
b. Light
c. Temperature
d. Water

Ans. (a) Humidity

650. Which of the following shows guttation?

a. *Pisum sativum*
b. *Ficus bengalensis*
c. *Acacia nilotica*
d. *Tropaeolum*

Ans. (d) Tropaeolum

651. Plants exhibit subepidermal evaporation of water during

a. Photosynthesis
b. Guttation
c. Transpiration
d. Respiration

Ans. (c) Transpiration

652. Of the following four dorsiventral leaves which will show the maximum loss of weight

a. Smeared with vaseline on both surfaces
b. Smeared with vaseline on the upper surface
c. Smeared with vaseline on the lower surface
d. Unsmeared

Ans. (d) Unsmeared

653. Starch degradation activity of enzyme phosphorylase increases under

a. High pH
b. Low pH
c. Neutral medium
d. Not connected with pH

Ans. (a) High pH

654. Scotoactive movement of stomata is that?

a. Stomata open at night
b. Stomata open during day
c. Stomata close at night
d. Stomata open both during day and night

Ans. (a) Stomata open at night

655. Presently which view is considered best for turgor changes in guard cells

a. Photosynthesis of chloroplasts in guard cells
b. Starch is converted into sugar in guard cells
c. Starch is converted into glucose in guard cells
d. Potassium is actively transported into guard cells

Ans. (d) Potassium is actively transported into guard cells

656. Guttational drop comprises

a. Simple water
b. Water and various salts dissolved in it
c. Water and inorganic salts
d. Water and organic salts

Ans. (b) Water and various salts dissolved in it

657. Cobalt chloride method for demonstration of transpiration was first used by

a. Freeman b. Stahl
c. Darwin d. Ganong

Ans. (b) Stahl

658. Porometer was developed by

a. Darwin b. Freeman
c. Livingston d. Ganong

Ans. (a) Darwin

659. A leafy shoot is enclosed air tightly in a flask. The flask becomes moist on the inner surface due to

a. Guttation b. Evaporation
c. Transpiration d. Cooling effect

Ans. (c) Transpiration

660. The most effective light for stomatal opening is

a. Yellow b. Green
c. Red d. Blue

Ans. (d) Blue

661. According to Lloyd, the opening and closing of stomata is governed by

a. K^+ ion influx and efflux
b. Change in pH
c. Starch sugar interconversion
d. Piiotosynthetic activity of guard cell chloroplasts

Ans. (c) Starch sugar interconversion

662. Who proposed that opening and closing of stomata is connected with the change in pH of guard cells?

a. Lloyd b. Von Mohl
c. Sayre/Scarth d. Levitt

Ans. (c) Sayre/Scarth

663. Stomata remain open when relative humidity is

a. Above 70% b. 50–70%
c. 30–50% d. Below 30%

Ans. (a) Above 70%

664. Stomata close at relative humidity of

a. 60–70% b. 50–60%
c. 50–70% d. Less than 50%

Ans. (d) Less than 50%

665. Transpiration efficiency/transpiration ratio is

a. Water absorbed to water transpired
b. Unit weight of dry matter synthesised in relation to units of water transpired by the plant
c. Unit weight of dry matter in relation to water consumed
d. Unit weight of water transpired to unit weight of dry matter synthesised

Ans. (d) Unit weight of water transpired to unit weight of dry matter synthesised

666. A mesophytic plant growing in well watered soil shows decreased transpiration in the afternoon due to

a. Closure of many stomata
b. Contraction of cuticle
c. Less water availability from soil
d. High rate of photosynthesis

Ans. (a) Closure of many stomata

667. During high wind velocity, the stomata

a. Open more widely
b. Close down
c. Remain unaffected
d. Remain unaffected but lose more water due to mass action

Ans. (b) Close down

668. Which of the following hypostomatous leaves would dry up last?

a. Both surfaces greased b. Both surfaces ungreased
c. Lower surfaces greased d. Upper surfaces greased

Ans. (a) Both surfaces greased

669. In majority of plants, the guard cells are

a. Dumb-bell shaped b. Reniform
c. Rounded d. Polygonal

Ans. (b) Reniform

670. Dumb-bell shaped guard cells are found in

a. Gymnosperms b. Most dicots
c. Cereals d. Xerophytes

Ans. (c) Cereals

671. Cobalt chloride is blue in dry state. In contact with moisture, it turns?

a. Yellow b. Pink
c. Red d. Green

Ans. (c) Red

672. Spraying plant surfaces with phenyl mercuric acetate and silicon emulsion will result in

a. Increased photosynthesis
b. Increased transpiration
c. Decreased transpiration
d. Exosmosis

Ans. (c) Decreased transpiration

673. The maximum absorption of water by roots occurs in the (region) zone of

a. Root cap
b. Cell division
c. Cell elongation
d. Root hairs

Ans. (d) Root hairs

674. The phenomenon of absorption of water that depends on water loss from aerial parts of plants (Transpiration) is

a. Active absorption
b. Passive absorption
c. Both passive and active absorption
d. None of the above

Ans. (b) Passive absorption

675. The metabolic activities of root cells are the main cause of water absorption in

a. Passive absorption
b. Active absorption
c. Both passive and active absorption
d. None of the above

Ans. (b) Active absorption

676. The movement of water is along

a. Turgor gradient
b. DPI gradient
c. Diffusion gardient
d. Osmotic gradient

Ans. (b) DPI gradient

677. The energy is required in absorption of water in

a. Active absorption
b. Passive absorption
c. Both passive and active absorption
d. None of the above

Ans. (a) Active absorption

678. The most dominant role in the absorption of water is that of

a. Active absorption
b. Passive absorption
c. Both active and passive absorption
d. None of the above

Ans. (b) Passive absorption

679. No energy is required and roots play only the role of absorbing organs in

a. Passive absorption
b. Active absorption
c. Both passive and active absorption
d. None of the above

Ans. (a) Passive absorption

680. The absorption of water is not affected when?

a. Soil is water logged (poorly aerated)
b. Soil temperature increases
c. Soil solution is highly concentrated
d. Soil water is available in maximum

Ans. (d) Soil water is available in maximum

681. The term active water absorption and passive water absorption were given by

a. Renner
b. Atkins
c. Priestley
d. Kramer

Ans. (a) Renner

682. For absorption of water, the root hairs act as

a. Sucking organs
b. Osmotic system
c. Monometer
d. Anemometer

Ans. (b) Osmotic system

683. Optimum temperature for water absorption is

a. 0°–5°C
b. 5°–20°C
c. 20°–25°C
d. 40°–50°C

Ans. (c) 20°–25°C

684. At 0°C soil temperature the rate of water absorption

a. Increases
b. Not affected
c. Decreases
d. Appreciable

Ans. (c) Decreases

685. As absorbed water passes towards vascular cylinder, it must enter the cytoplasm of

a. Pericycle cells
b. Endodermal cells
c. Cortical cells
d. Xylem parenchyma

Ans. (b) Endodermal cells

686. A living continuum of cells connected by plasmodesmata is

a. Dermal tissue
b. Ground complex
c. Donnan free space
d. Symplast

Ans. (b) Ground complex

687. A nonliving continuum of cells walls and intercellular spaces is

a. Ground complex
b. Alburnum
c. Apoplast
d. Desmotubule

Ans. (c) Apoplast

688. A water-logged soil is physiologically dry because of

a. Anaerobic conditions
b. Nonmovement of water capillaries
c. Increased viscosity of water
d. Abundance of salts

Ans. (a) Anaerobic conditions

689. Water tightly held to soil particles is

a. Bound water
b. Capillary water
c. Hygroscopic water
d. Runaway water

Ans. (c) Hygroscopic water

690. At field capacity the soil contains

a. Capillary and gravitational water
b. Capillary and runaway water
c. Capillary and hygroscopic water
d. Capillary, hygroscopic and bound water

Ans. (d) Capillary, hygroscopic and bound water

691. The phenomenon which forces water upwards into tracheary elements of xylem in the root region is

a. Transpiration
b. Root pressure
c. Turgor pressure
d. Imbibition pressure

Ans. (b) Root pressure

692. Root pressure may be caused by

a. Osmotic flow of water into xylem of absorbing part of root
b. Loss of water from xylem of the plant due to transpiration
c. Low water potential of leaves
d. High water potential of leaves

Ans. (a) Osmotic flow of water into xylem of absorbing part of root

693. The osmotic theory of active water absorption was first given by

a. Karmer (1941)
b. Eaton (1943)
c. Atkins (1916)
d. Priestley (1923)

Ans. (c) Atkins (1916)

694. The lowest water potential is found in the xylem channels of

a. Stem
b. Root
c. Root in the root hair zone
d. Leaves

Ans. (d) Leaves

695. Contribution of passive water absorption to total water absorption is

a. 50%
b. 70%
c. 80–90%
d. 96–100%

Ans. (d) 96–100%

696. Force for passive water absorption develops in

a. Xylem
b. Aerial parts
c. Root
d. Root hairs

Ans. (b) Aerial parts

697. Force for active water absorption is present in

a. Xylem
b. Aerial parts
c. Root
d. Root hairs

Ans. (c) Root

698. Rate of water absorption generally follows closely the rate of

a. Transpiration
b. Photosynthesis
c. Respiration
d. Growth

Ans. (a) Transpiration

699. The phenomenon related to active water absorption is

a. Transpiration
b. Root pressure
c. Osmotic pressure
d. Translocation

Ans. (b) Root pressure

700. Root pressure can be demonstrated by means of

a. Wilting
b. Guttation
c. Transpiration
d. Exudation/bleeding

Ans. (d) Exudation/bleeding

701. A soil is physiologically dry if it contains

a. No hygroscopic water
b. No bound water
c. No gravitational water
d. High concentration of soil solution

Ans. (d) High concentration of soil solution

702. The upward movement of water, against the downward pull of gravity in plants depends on the process of

a. Osmosis
b. Photosynthesis
c. Respiration
d. Transpiration

Ans. (d) Transpiration

703. Strasburger rejected the vital force theory on the ground that

a. Living cells are incapable of translocation
b. Water rises in dead cells
c. Respiration occurs in living cells
d. Living cells are capable of growth

Ans. (b) Water rises in dead cells

704. The pressure that develops in roots due to the metabolic activities of living cells is

a. Turgor pressure
b. Osmotic pressure
c. Root pressure
d. Diffusion pressure

Ans. (c) Root pressure

705. Which of the following statement is wrong in root-pressure concept of ascent of sap?

a. Water can be raised to a height of 6′–7′
b. Water moves upward in the absence of shoot
c. Water movement by this force is slow
d. Root pressure operates in all the plants

Ans. (d) Root pressure operates in all the plants

706. Imbibitional theory was given by

a. Sachs
b. Boehm
c. Scholander
d. Curtis

Ans. (a) Sachs

707. Cohesive force of water molecules is of the magnitude of (Dixon and Joly)

a. 1–10 atm
b. 10–15 atm
c. 45–200 atm
d. 15–45 atm

Ans. (c) 45–200 atm

708. The following evidences rejected the atmospheric pressure theory. Which of them is incorrect?

a. It can raise water to height of 33 feet only if complete vacuum is created
b. Free surface of water is required for proper operation of atmospheric pressure which is readily available in plants
c. Pressure falls below that of atomspheric pressure because of transpiration
d. Water rises rapidly to compensate the water loss because of atmospheric pressure

Ans. (b) Free surface of water is required for proper operation of atmospheric pressure which is readily available in plants

709. Which of the following is not the least convincing in the imbibitional theory of ascent of sap?

a. The imbibitional force is very high from 100–1000 atm
b. The imbibitional force can raise the water to a height of 200′ – 400′, i.e. the tallest tree
c. The movement of water is along the walls of the xylem vessels and not through the lumen (cavity) of the vessels
d. The movement of water, no doubt is slow, but to some extent can keep pace with transpiration

Ans. (c) The movement of water is along the walls of the xylem vessels and not through the lumen (cavity) of the vessels

710. The girdling or ringing experiment is that

a. The metallic ring is tightly tied to a stem
b. The ring of tissue external to xylem is removed in a stem
c. The area is simply marked in the form of ring in a stem
d. None of the above

Ans. (b) The ring of tissue external to xylem is removed in a stem

711. The girdling or ringing experiment to prove that the water moves through the xylem vessels was performed by

a. Stocking
b. Malpighi
c. Molisch
d. Askcnasy

Ans. (b) Malpighi

712. Capillarity theory was proposed by

a. Unger
b. Sachs
c. Bohm
d. Mac Dougal

Ans. (c) Bohm

713. The main function of xylem vessel is

a. To provide mechanical support to the plant
b. To conduct organic food from one part of the plant to another
c. To conduct water and minerals from one part of the plant to another
d. None of the above

Ans. (c) To conduct water and minerals from one part of the plant to another

714. A girdled plant will eventually die because of

a. Absence of downward movement of water
b. Absence of upward movement of water
c. Absence of upward supply of organic nutrients
d. Absence of downward movement of organic nutrients

Ans. (d) Absence of downward movement of organic nutrients

715. The cut end of a shoot is dipped in eosine solution. What will happen?

a. Ascent of sap does not occur
b. Ascent of sap does not occur but the leaves remain fresh
c. Leaves wilt but ascent of sap continues
d. Ascent of sap occurs and the tracheary elements get stained

Ans. (d) Ascent of sap occurs and the tracheary elements get stained

716. Root pressure theory of ascent of sap is unacceptable because

a. Water can ascend without root or root pressure
b. Root pressure cannot explain ascent of sap beyond 10 metres
c. Root pressure is more during early morning than afternoon
d. Root pressure does not occur in spring

Ans. (a) Water can ascend without root or root pressure

717. Transpiration cohesion theory explains that the upwards pull of water is transmitted from top to bottom by cohesion of molecules caused by

a. Hydrophilic cell walls
b. Hydrogen bonds
c. Oxygen bonds
d. Surface tension

Ans. (b) Hydrogen bonds

718. Rising column of water does not break its connection with xylem walls despite negative pressure or tension due to

a. Cohesion amongst water molecules
b. Strong trarnpiration pull
c. Adhesion
d. Surface tension

Ans. (c) Adhesion

719. Ascent of sap is

a. Upward movement of water in the plant
b. Downward movement of organic nutrients
c. Upward and downward movement of water in the plant
d. Redistribution of inorganic substances in the plant

Ans. (a) Upward movement of water in the plant

720. Instrument that can be used to demonstrate pull due to vaporisation of water is

a. Potometer
b. Atmometer
c. Auxanometer
d. Anemometer

Ans. (b) Atmometer

721. The transport of sap from root to top of the plant is

a. Ascent of sap
b. Conduction
c. Transport
d. Translocation

Ans. (a) Ascent of sap

722. In xylem, the ascent of sap takes place in

a. Tracheids with associated xylem parenchyma
b. Walls of tracheary elements
c. Xylem parenchyma
d. Lumen of tracheary elements

Ans. (d) Lumen of tracheary elements

723. The force with which water molecules are held together in xylem is?

a. Imbibition pressure
b. Osmotic pressure
c. Adhesion force
d. Cohesion force

Ans. (d) Cohesion force

724. Root pressure is unable to explain the ascent of sap because it is not found in

a. Bryophytes
b. All plants in all seasons
c. Trees
d. Spring

Ans. (b) All plants in all seasons

725. The force which determines the flow of water from one cell to another is

a. T.P.
b. D.P.D.
c. O.P.
d. W.P.

Ans. (b) D.P.D.

726. DPD is abbreviated form of

a. Daily photosynthetic deficit
b. Daily phosphorus deficit
c. Daily pressure deficit
d. Diffusion pressure deficit

Ans. (d) Diffusion pressure deficit

727. Swelling of wooden frames during rains is caused by

a. Endosmosis
b. Imbibition
c. Capillarity
d. Osmosis

Ans. (b) Imbibition

728. Osmosis involves

a. Diffusion of suspended particles from higher to lower concentration
b. Diffusion of suspended particles from lower to higher concentration

c. Diffusion of water from more to less concentrated side
d. Diffusion of water from less to more concentrated side

Ans. (d) Diffusion of water from less to more concentrated side

729. Dry seeds when placed in water swell up due to

a. Imbibition
b. Absorption
c. Diffusion
d. Adsorption

Ans. (a) Imbibition

730. A cell is plasmolysed after being kept in hypertonic solution. What will be present between cell wall and plasmalemma?

a. Isotonic solution
b. Hypertonic solution
c. Air
d. Hypotonic solution

Ans. (b) Hypertonic solution

731. Raisins placed in water swell up due to

a. Plasmolysis
b. Adsorption
c. Diffusion
d. Endosmosis

Ans. (d) Endosmosis

732. Which one is semipermeable?

a. Plasmalemma
b. Cell wall
c. Endoplasmic reticulum
d. Golgi body

Ans. (a) Plasmalemma

733. Root hairs absorb water from soil when?

a. Osmotic concentration is same in the two
b. Solute concentration is higher in soil solution
c. Solute concentration is higher in root hairs
d. Absorption is active

Ans. (c) Solute concentration is higher in root hairs

734. Plasma membrane controls

a. Passage of water only
b. Passage of water and some solutes in and out of the cell
c. Passage of water and solutes into the cell
d. Movements of cell contents out of the cell

Ans. (b) Passage of water and some solutes in and out of the cell

735. Osmosis is the diffusion of a solution of a weaker concentration, when both are separated by semipermeable membrane. What is the error in the statement?

a. The movement of water molecules is not specified
b. There is no mention of DPD
c. Behaviour of semipermeable membrane is not specified
d. The exact concentrations are not indicated

Ans. (a) The movement of water molecules is not specified

736. A cell placed in strong salt solution will shrink because

a. Cytoplasm will decompose
b. Mineral salts will break the cell wall
c. Salt water enters the cell
d. Water comes out by exosmosis

Ans. (d) Water comes out by exosmosis

737. Osmosis is defined as

a. Flow of solvent (water) through a semipermeable membrane from less concentrated solution to more concentrated solution
b. Flow of solute from a semipermeable membrane
c. Flow of water without a membrane
d. None of the above

Ans. (a) Flow of solvent (water) through a semipermeable membrane from less concentrated solution to more concentrated solution

738. In osmosis solvent flows from

a. Lower concentration to higher concentration of solvent
b. Higher concentration of solvent to lower concentration of solvent
c. One cell to another
d. None of the above

Ans. (b) Higher concentration of solvent to lower concentration of solvent

739. If cell *(a)* with OP = 5 and TP = 4 is surrounded by cells with OP = 3 and TP = 1. What will be direction of water movement?

a. From cell *(a)* to other cells
b. From other cells to cell *(a)*
c. Water will not move
d. Water will move up

Ans. (a) From cell *(a)* to other cells

740. A cell increases in volume if the external medium is

a. Hypotonic
b. Hypertonic
c. Isotonic
d. None of the above

Ans. (a) Hypotonic

741. DPD is equal to

a. OP × TP
b. OP + TP
c. OP – TP
d. TP × OP

Ans. (c) OP – TP

742. If a cell gets reduced in size when placed in solution, the solution is

a. Hypertonic b. Hypotonic
c. Weak d. Saturated

Ans. (a) Hypertonic

743. The actual pressure with which water enters into the cell is called

a. DPD b. OP
c. WP d. Diffusion

Ans. (a) DPD

744. In hypertonic solution a cell's water potential

a. Decreases
b. Increases
c. First increases then decreases
d. No change

Ans. (a) Decreases

745. When a cell is fully turgid, which of the following will be zero?

a. Turgor pressure/pressure potential
b. Wall pressure
c. Suction pressure/DPD/water potential
d. Osmotic pressure (solute pressure)

Ans. (c) Suction pressure/DPD/water potential

746. An example of selectively permeable membrane is

a. Plasmalemma
b. Cell wall
c. Mitochondrial membrane
d. Chloroplast membrane

Ans. (a) Plasmalemma

747. When beet root cylinders are washed and then placed in cold water, anthocyanin does not come out. This indicates that most likely the plasma membrane is?

a. Permeable to anthocyanin
b. Impermeable to anthocyanin
c. Differentially permeable to anthocyanin
d. Dead structure

Ans. (b) Impermeable to anthocyanin

748. If the plant cell is immersed in water, the water continues to enter the cell until the

a. Concentration of the salt is the same inside the cell as outside
b. Cell bursts
c. Diffusion pressure deficit is the same inside the cell as outside
d. Concentration of water is the same inside the cell as outside

Ans. (c) Diffusion pressure deficit is the same inside the cell as outside

749. Turgidity of cell is maintained by

a. Osmotic pressure b. Wall pressure
c. Turgor pressure d. Diffusion pressure

Ans. (c) Turgor pressure

750. That the cell wall is permeable membrane can be best deduced from the passage of water and mineral salts from?

a. Soil into root hairs
b. Root hairs into cortical cells
c. Pericycle into tracheal elements
d. Cortical cells into the pericycle

Ans. (c) Pericycle into tracheal elements

751. A slice of sugar beet placed in concentrated salt solution would

a. Become swollen
b. Lose water and become flaccid
c. Absorb small quantity of water
d. Show no change

Ans. (b) Lose water and become flaccid

752. A cell placed in hypertonic solution shows shrinkage of its protoplasm due to

a. Plasmolysis
b. Endosmosis
c. Osmosis
d. Imbibition

Ans. (a) Plasmolysis

753. Osmosis is

a. Passage of solvent only through a semipermeable membrane
b. Passage of solutes only through a membrane
c. Passage of both solvent and solute through a membrane
d. Passage of solution through a protoplasm

Ans. (a) Passage of solvent only through a semipermeable membrane

754. Osmosis involves movement of

a. Solute particles from higher concentration to lower concentration
b. Solvent particles from lower water potential to higher water potential
c. Solute particles from lower concentration to higher concentration

d. Solvent particles from higher water potential to lower water potential

Ans. (d) Solvent particles from higher water potential to lower water potential

755. A cleaned goat bladder is filled with a syrup, tied and immersed in water. The volume of syrup or liquid within the bladder will

a. Increase
b. Decrease
c. Remain the same
d. Undergo plasmolysis

Ans. (a) Increase

756. A cell increases in size when placed in an external solution, which is

a. Hypotonic
b. Hypertonic
c. Isotonic
d. All the above

Ans. (a) Hypotonic

757. Seed germination is accompanied by

a. Absorption of heat
b. Starch synthesis
c. Evolution of heat
d. Fat synthesis

Ans. (c) Evolution of heat

758. Purple cabbage leaves do not pass out colour in cold water but do so in hot water because

a. Hot water enters the cells faster
b. Pigment is not soluble in cold water
c. Hot water destroys cell walls
d. Hot water kills plasmalemma and makes it permeable

Ans. (d) Hot water kills plasmalemma and makes it permeable

759. Osmotic pressure is maximum in

a. Hydrophytes
b. Halophytes
c. Xerophytes
d. Mesophytes

Ans. (b) Halophytes

760. Water passes into a cell due to

a. O.P.
b. D.P.D.
c. W.P.
d. Diffusion

Ans. (b) D.P.D.

761. Which is true of a fully turgid cell?

a. O.P. = D.P.D.
b. O.P. = Zero
c. D.P.D. = Zero
d. T.P. = Zero

Ans. (c) D.P.D. = Zero

762. The process of selective passage across a semi-permeable membrane is

a. Diffusion
b. Osmosis
c. Capillarity
d. Imbibition

Ans. (b) Osmosis

763. Which is possible for a fully turgid cell?

a. D.P.D = 10 atm, O.P. = 15 atm, T.P. = 5 atm
b. D.P.D. = 0.2 atm, O.P. = 0.7 atm, T.P. = 0.5 atm
c. D.P.D. = 00 atm, O.P. = 15 atm, T.P. = 15 atm
d. D.P.D. = 5 atm, O.P. = 12 atm, T.P. = 7 atm

Ans. (c) D.P.D. = 00 atm, O.P. = 15 atm, T.P. = 15 atm

764. Water potential is equal to

a. ψ_s + O.P.
b. ψ_s = T.P.
c. $\psi_p + \psi_w$
d. $\psi_s + \psi_p$

Ans. (d) $\psi_s + \psi_p$

765. Osmotic pressure in a vacuolated plant cell is

a. Equal to W.P.
b. Equal to T.P.
c. More than D.P.D.
d. Less than D.P.D

Ans. (d) Less than D.P.D

766. In a plant cell, O.P. is equal to

a. T.P. – D.P.D.
b. D.P.D. – T.P.
c. T.P. – D.P.
d. D.P.D. + T.P.

Ans. (b) D.P.D. – T.P.

767. Which one does not involve osmosis?

a. Water passing from one xylem element to the other above it
b. Water passing from soil to root hair
c. Water passing into mesophyll cell from xylem
d. Water passing from root hair cell to cortical cell

Ans. (a) Water passing from one xylem element to the other above it

768. Imbibition involves

a. Diffusion of water
b. Movement of water into imbibant through capillarity
c. Movement of water into imbibant through diffusion as well as capillary action
d. Adsorption of water

Ans. (c) Movement of water into imbibant through diffusion as well as capillary action

769. A bottle filled with previously moistened Mustard seeds and water was screw capped tightly and kept in a corner. It blew up suddenly after about half an hour. The phenomenon involved is

a. Diffusion
b. Imbibition
c. Osmosis
d. D.P.D.

Ans. (b) Imbibition

770. A semipermeable membrane allows the diffusion of

a. Solutes
b. Solvent
c. Both solvent and solutes
d. None of above

Ans. (b) Solvent

771. Water movement between cells is due to

a. T.P.
b. W.P.
c. D.P.D.
d. Incipient plasmolysis

Ans. (c) D.P.D.

772. Under which condition does the D.P.D. become more than O.P.?

a. O.P. < T.P.
b. O.P. = T.P.
c. T.P. is negative
d. OP > T.P.

Ans. (c) T.P. is negative

773. When concentration of solutes is low in the soil, absorption of water is?

a. Stopped
b. Increased
c. Retarded
d. Normal

Ans. (b) Increased

774. Excessive supply of chemical fertilizers often causes death of crop plants due to

a. Exosmosis
b. Endosmosis
c. Imbibition
d. Turgidity

Ans. (a) Exosmosis

775. D.P.D. is equal to

a. O.P. – W.P.
b. O.P. + W.P.
c. T.P.
d. O.P.

Ans. (a) O.P. – W.P.

776. Cell 'A' with O.P. = 10 atm and T.P. = 5 atm. is in contact with cell 'B' having O.P. = 15 atm and T.P. = 12 atm. The flow of water will be

a. From a to b
b. Equal flow
c. From b to a
d. No flow

Ans. (c) From b to a

777. Compared to 1 M sucrose solution, the ψ_w of 1M sodium chloride solution is

a. High
b. Same
c. Lower
d. None of the above

Ans. (c) Lower

778. Transpiration occurs from

a. Leaves
b. Stem
c. All aerial parts
d. Roots

Ans. (c) All aerial parts

779. Guard cells differ from epidermal cells in having

a. Mitochondria
b. Vacuoles
c. Cell wall
d. Chloroplasts

Ans. (d) Chloroplasts

780. Stomata open at night and close during day time in

a. Xerophytes
b. Mesophytes
c. Succulents
d. Hydrophytes

Ans. (c) Succulents

781. Active K^+ exchange mechanism for opening and closing of stomata was given by

a. Darwin
b. Levitt
c. Scarth
d. Khorana

Ans. (b) Levitt

782. Wilting in plants occurs when?

a. Phloem is blocked
b. Xylem is removed/blocked
c. Pith is removed
d. A few leaves are removed

Ans. (b) Xylem is removed/blocked

783. Guttation is the process of elimination of water from plants through

a. Stomata
b. Hydathodes
c. Lenticels
d. Wounds

Ans. (b) Hydathodes

784. Which of the following is used to determine the rate of transpiration in plants?

a. Porometer/hygrometer
b. Potometers
c. Auxanometer
d. Tensiometer/Barometer

Ans. (b) Potometers

785. What is the action spectrum of transpiration?

a. Green and ultraviolet
b. Orange and red
c. Blue and far red
d. Blue and red

Ans. (d) Blue and red

786. Stomata open during day time because the guard cells

a. Produce osmotically active sugars or organic acids
b. Are thin walled
c. Are bean shaped
d. Have to help in gaseous exchange

Ans. (a) Produce osmotically active sugars or organic acids

787. Transpiration occurs when the outer atmosphere

a. Is wet
b. Has more moisture content than the substomatal cavities
c. Has less moisture than substomatal cavities
d. Possesses the same moisture content as in substomatal cavities

Ans. (c) Has less moisture than substomatal cavities

788. Water drops present on leaf margins of Tropaeolum, Balsam and grasses in early morning are due to

a. Guttation
b. Dew
c. Osmosis
d. Transpiration

Ans. (a) Guttation

789. Stomatal opening is under the control of

a. Epidermal cells
b. Palisade cells
c. Spongy parenchyma cells
d. Guard cells

Ans. (d) Guard cells

790. Transpiration rate of a dorsiventral leaf is

a. Higher on the lower surface
b. Higher on the upper surface
c. Equal on both the surfaces
d. Dependent upon species

Ans. (a) Higher on the lower surface

791. Maximum transpiration takes place from

a. Stem
b. Leaves
c. Roots
d. Flowers and fruits

Ans. (b) Leaves

792. In which type, the stomata are present exclusively on the upper surface of the leaves?

a. Potato type
b. Potamogeton type
c. Barely type
d. Water Lily type *(A.M.U. 1991)*

Ans. (d) Water Lily type. *(A.M.U. 1991)*

793. Number of stomata present per cm of a common leaf is about

a. Less than 100
b. More than 100,000
c. 1 million
d. 10000

Ans. (d) 10000

794. Which is produced during water stress that brings stomatal closure?

a. Ethylene
b. Abscisic acid
c. Ferulic acid
d. Coumarin

Ans. (d) Coumarin

795. In succulent plants the stomata open in night and close by day. Which among following would be best hypothesis to explain the machanism of stomatal action in night only?

a. CO_2 accumulates, reduces pH, stimulates enzymes, resulting in accumulation of sugars
b. Increase in CO_2 concentration, conversion of organic acids into starch, resulting in the increased conversion into sugars, resulting in K^+ transport
c. Low CO_2 concentration due to utilisation, accumulation of organic acids resulting in the increased cone, of cell sap
d. CO_2 used up, increases pH, results in accumulation of sugars

Ans. (c) Low CO_2 concentration due to utilisation, accumulation of organic acids resulting in the increased cone, of cell sap

796. The conditions under which transpiration would be most rapid

a. High humidity
b. Excess of water in soil
c. Low humidity, high temperature, guard cell are turgid (open), moist soil
d. Low velocity of wind

Ans. (c) Low humidity, high temperature, guard cell are turgid (open), moist soil

797. In which of the following plants would metabolism be hindered if the leaves are coated with wax on their upper surface?

a. Hydrilla
b. Lotus
c. Pistia
d. Vallisneria

Ans. (b) Lotus

798. The following percentage of water absorbed by herbaceous plants is lost in transpiration

a. 80
b. 60
c. 99
d. 40

Ans. (c) 99

799. Of the processes which occur in leaves, the one which may lower their temperature (cooling effect) is?

a. Respiration b. Photosynthesis
c. Transpiration d. Hydrolysis

Ans. (c) Transpiration

800. Transpiration from the two leaf surfaces are compared by dry paper strips previously soaked in solution of

a. Sodium chloride b. Calcium chloride
c. Cobalt nitrate d. Cabalt chloride

801. Stomata open when guard cells are

a. Turgid b. Flaccid
c. Large d. Small

Ans. (a) Turgid

802. Guttation is loss of water

a. From root b. Through stomata
c. In liquid form d. In vapour form

Ans. (c) In liquid form

803. Classical theory or starch hydrolysis theory of stomatal opening was given forth by

a. Sayre b. Emerson
c. Levitt d. Fujino

Ans. (a) Sayre

804. Transpiration is least in

a. Good soil moisture
b. High wind velocity
c. Dry environment
d. High atmospheric humidity

Ans. (d) High atmospheric humidity

805. Transpiration is high in

a. Rainy season/high humidity
b. Winter
c. High temperature
d. Low wind velocity

Ans. (c) High temperature

806. Potometer is an instrument that measures

a. Respiration b. Transpiration
c. Growth d. Photosynthesis

Ans. (b) Transpiration

807. Wilting appears due to excessive

a. Respiration b. Photosynthesis
c. Absorption d. Transpiration

Ans. (d) Transpiration

808. Transpiration is regulated by movements of

a. Gurad cells b. Subsidiary cells
c. Epidermal cells d. Mesophyll cells

Ans. (a) Gurad cells

809. Stomata open when guard cells show

a. Increase in both osmotic and turgor pressures
b. Decrease in both osmotic pressure and turgor pressure
c. Increase in osmotic pressure but decrease in turgor pressure
d. Decrease in osmotic pressure but increase in turgor pressure

Ans. (a) Increase in both osmotic and turgor pressures

810. An important factor in stomatal opening is

a. Hormone content of cells
b. Protein content of cells
c. Chorophyll content of cells
d. Shape of guard cells

Ans. (d) Shape of guard cells

811. Transpiration rate is dependent upon

a. Stomatal frequency b. Position of stomata
c. State of stomata d. All the above

Ans. (b) Position of stomata

812. Transpiration differs from evaporation in

a. Rate of water loss
b. Transpiration is a physiological process while evaporation is a physical process
c. Transpiration is a physical process while evaporation is a physiological process
d. Frequency of water loss

Ans. (b) Transpiration is a physiological process while evaporation is a physical process

813. Frequency and position of stomata can be determined by

a. Cobalt chloride paper
b. Potometer
c. Porometer
d. Measuring water loss

Ans. (c) Porometer

814. Transpiration increases in

a. Hot, damp and windy conditions
b. Cool, damp and windy conditions
c. Cool, dry and still conditions
d. Hot, dry and windy conditions

Ans. (d) Hot, dry and windy conditions

815. Rate of transpiration is reduced with?

a. Rise in temperature
b. Decrease in light intensity
c. Increase in wind velocity
d. Increase in water uptake

Ans. (b) Decrease in light intensity

816. Hot weather wilting is caused by

a. Reduced water absorption
b. Excessive transpiration
c. Excessive transpiration and reduced absorption
d. Excessive water absorption

Ans. (c) Excessive transpiration and reduced absorption

817. Guttation is mainly due to

a. Root pressure
b. Osmosis
c. Transpiration
d. Imbibition

Ans. (a) Root pressure

818. In guttation, plants can

a. Excrete salts
b. Compensate for loss of water
c. Manufacture organic substances
d. Get rid of excess water

Ans. (d) Get rid of excess water

819. Actual water vapour content of atmosphere is

a. Relative humidity
b. Differential humidity
c. Absolute humidity
d. Positive humidity

Ans. (c) Absolute humidity

820. Which one keeps its stomata open during night and closed during day?

a. Cactus
b. Water Lily
c. Ivy
d. Hibiscus

Ans. (a) Cactus

821. Which wall of the guard cells is thick?

a. Lateral
b. Inner
c. Outer
d. All the above

Ans. (b) Inner

822. Higher CO_2 concentration around the leaves results in

a. Reduced photosynthesis
b. Complete stomatal closure
c. Wider opening of stomata
d. Partial closure of stomata

Ans. (d) Partial closure of stomata

823. Which one gives the most valid explanation for guard cell movements?

a. Guard cell photosynthesis
b. Starch hydrolysis theory
c. Potassium influx and efflux
d. Transpiration

Ans. (c) Potassium influx and efflux

824. A specialised multicellular structure in leaves which excretes water droplets is?

a. Lenticel
b. Stomata
c. Hydathode
d. Bordered pit

Ans. (c) Hydathode

825. The stomatal type of cereals which open only for a few hours during the day is

a. Barley type
b. Potato type
c. Alfalfa type
d. Bean type

Ans. (a) Barley type

826. In thin-leaved mesophytes, stomata open during the day and close during the night. They belong to

a. Barley type
b. Potato type
c. Alfalfa type
d. Bean type

Ans. (c) Alfalfa type

827. Phenyl mercuric acetate (PMA) results in

a. Reduced photosynthesis
b. Reduced transpiration
c. Reduced respiration
d. Killing of plants

Ans. (b) Reduced transpiration

828. Rate of transpiration is dependent upon

a. Negative turgor pressure
b. Temperature
c. D.P.D.
d. Vapour pressure deficit

Ans. (d) Vapour pressure deficit

829. Stomata open and close due to

a. Circadian rhythm
b. Genetic clock
c. Pressure of gases inside the leaves
d. Turgor pressure of guard cells

Ans. (d) Turgor pressure of guard cells

830. In terrestrial habitats, temperature and rainfall conditions are influenced by

a. Water transformations
b. Transpiration
c. Thermoperiodism
d. Translocation

Ans. (b) Transpiration

831. Low atmospheric pressure changes the rate of transpiration to

a. Decrease slowly
b. Increase
c. Remain unchanged
d. Decrease rapidly

Ans. (b) Increase

832. During wilting the sequence of events shall be

a. Endosmosis → Plasmolysis → Temporary Wilting → Permanent Wilting
b. Exosmosis → Plasmolysis → Temporary Wilting → Permanent Wilting
c. Exosmosis » Deplasmolysis → Plasmolysis → Temporary Wilting → Permanent Wilting
d. Exomosis → Plasmolysis Deplasmolysis → Temporary Wilting → Permanent Wilting

Ans. (b) Exosmosis → Plasmolysis → Temporary Wilting → Permanent Wilting

833. In hot summer day, plant cooling occurs due to

a. Transport of water from root to all parts of the plant
b. Loss of liquid water
c. Water loss from entire plant
d. Loss of water vapours from foliar surface

Ans. (d) Loss of water vapours from foliar surface

834. Conversion of starch to organic acids is required for

a. Stomatal opening
b. Stomatal closing
c. Stomatal formation
d. Stomatal activity

Ans. (a) Stomatal opening

835. Element involved in stomatal regulation is

a. Zinc
b. Magnesium
c. Potassium
d. Iron

Ans. (c) Potassium

836. At constant temperature, the rate of transpiration will be higher at

a. Sea level
b. 1 km below sea level
c. 1 km above sea level
d. 1.5 km above sea level

Ans. (d) 1.5 km above sea level

837. In guard cells when sugar is converted into starch, the stomatal pore

a. Closes completely
b. Opens partially
c. Opens fully
d. Remains unchanged

Ans. (a) Closes completely

838. Guttation occurs only if the plant is kept in

a. Humid soil
b. Water
c. Moist atmosphere
d. Dry environment

Ans. (c) Moist atmosphere

839. Guttation occurs in well watered herbaceous plants of well drained soils during

a. Evening
b. Morning
c. Day
d. Noon

Ans. (b) Morning

840. Water will be absorbed by root hairs when the external medium is

a. Hypotonic
b. Hypertonic
c. Isotonic
d. Viscous

Ans. (a) Hypotonic

841. Absorption of water by root is increased with the?

a. Increase in transpiration
b. Increase in rate of photosynthesis
c. Decrease in transpiration
d. Decrease in salt uptake

Ans. (a) Increase in transpiration

842. Root hairs occur in the zone of

a. Cell division
b. Cell elongation
c. Cell maturation
d. Mature cells

Ans. (c) Cell maturation

843. Root cap has no role in water absorption because

a. It has no direct connection with the vascular system
b. It has loosely arranged cells
c. It has no cells containing chloroplasts
d. It has no root hairs

Ans. (d) It has no root hairs

844. Transpiration cohesion tension theory operates in

a. Active absorption
b. Passive absorption
c. Both active and passive absorption
d. None of the above

Ans. (b) Passive absorption

845. The phenomenon of uptake of water at the expense of energy by the cell usually against the osmotic gradient is known as

a. Osmosis
b. Active absorption
c. Passive absorption
d. Imbibition

Ans. (b) Active absorption

846. Which of the following statement is not correct?

a. Plants absorb excess quantity of water
b. Plants take in small quantity of mineral salts through the soil water
c. Water and inorganic salts are taken in simultaneously by root hairs
d. Plants absorb only one thing at a time, water or inorganic salts

Ans. (c) Water and inorganic salts are taken in simultaneously by root hairs

847. Root pressure can be measured by means of

a. Porometer
b. Potometer
c. Auxanometer
d. Manometer

Ans. (d) Manometer

848. Rapid water absorption takes place by

a. Passive absorption
b. Active absorption
c. Expenditure of energy
d. Osmosis

Ans. (a) Passive absorption

849. Root hairs absorb water when?

a. They respire rapidly
b. Soil solution is isotonic
c. Salt concentration of cell sap is high
d. Salt concentration of soil is high

Ans. (c) Salt concentration of cell sap is high

850. Which is influenced by opening and closing of stomata?

a. Active water absorption
b. Passive water absorption
c. Both types of water absorption
d. Rate of growth

Ans. (b) Passive water absorption

851. Root pressure is maximum at the time of

a. Water absorption as well as transpiration are low
b. Both water absorption and transpiration are high
c. Absorption is low and transpiration is high
d. Absorption is high and transpiration is low

Ans. (d) Absorption is high and transpiration is low

852. Transplanted seedlings often get killed because of

a. Damage to root hairs
b. Damage to leaves
c. Change in soil microorganisms
d. Nonavailability of required minerals

Ans. (a) Damage to root hairs

853. Soil water is able to reach xylem elements of root because of

a. Imbibition
b. Gradient of DPD
c. Gradient of turgor pressure
d. Ion concentration of water

Ans. (b) Gradient of DPD

854. Water potential found in root hair cells is generally

a. 1–2 atm
b. –1 to 20 atm
c. –1 to 4.0 atm
d. –1 to – 4 atm

Ans. (d) –1 to – 4 atm

855. Path of water movement from soil to xylem is

a. Metaxylem → Protoxylem → Cortex → Soil → Root hair
b. Cortex → Root hair → Endodermis → Pericycle → Protoxylem → Metaxylem
c. Soil → Root hair → Cortex → Endodermis → Pericycle → Protoxylem → Metaxylem
d. Pericycle → Soil → Root hair → Cortex → Endodermis → Protoxylem → Metaxylem

Ans. (c) Soil → Root hair → Cortex → Endodermis → Pericycle → Protoxylem → Metaxylem

856. In soil, the water available for root absorption is

a. Gravitational water
b. Capillary water
c. Hygroscopic water
d. Combined water

Ans. (b) Capillary water

857. Rate of water absorption can be increased through

a. Decreased transpiration
b. Decreased ion absorption
c. Increased photosynthesis
d. Increased transpiration

Ans. (d) Increased transpiration

858. The relay pump theory, in vital theories of ascent of sap, was given by

a. Strasburger
b. Dixon
c. Godlewski
d. Unger

Ans. (c) Godlewski

859. In a girdled plant which dies first

a. Shoot
b. Root
c. Both die simultaneously
d. None, as the plant survives

Ans. (b) Root

860. A tree girdled up to xylem may survive for some time but ultimately dies because

a. Water does not move upwards
b. Sugar does not move upwards
c. Sugar does not move downwards
d. Water does not move downwards

Ans. (c) Sugar does not move downwards

861. Water in plants is transported by or ascent of sap takes place through

a. Cambium
b. Phloem
c. Xylem
d. Epidermis

Ans. (c) Xylem

862. The most widely accepted theory for ascent of sap in trees is

a. Capillarity
b. Role of atmospheric pressure
c. Pulsating action of living cell
d. Transpiration pull and cohesion theory of Dixon and Joly

Ans. (d) Transpiration pull and cohesion theory of Dixon and Joly

863. Water rises in the stem due to

a. Cohesion and transpiration pull
b. Turgor pressure
c. Osmotic pressure
d. None of the above

Ans. (a) Cohesion and transpiration pull

864. Dixon and Joly are associated with?

a. Light reaction and photosynthesis
b. Anaerobic respiration
c. Cohesion theory of ascent of sap
d. Apical dominance

Ans. (c) Cohesion theory of ascent of sap

865. According to the vital force theory, ascent of sap is due to active pulsation of innermost layer of cortex. This theory was given by

a. J.C. Bose
b. Dixon
c. Strasburger
d. Sachs

Ans. (a) J.C. Bose

866. Root pressure is maximum when?

a. Transpiration is high and absorption low
b. Transpiration is very low and absorption high
c. Transpiration is very high and absorption high
d. Transpiration and absorption both are slow

Ans. (b) Transpiration is very low and absorption high

867. Xylem conducts sap from

a. Leaves to roots
b. Roots to leaves
c. Roots to stems
d. Stems to roots

Ans. (b) Roots to leaves

868. Cohesion-transpiration pull theory operates only in

a. Passive water absorption
b. Active water absorption
c. Conditions favouring transpiration
d. Conditions restricting transpiration

Ans. (a) Passive water absorption

869. Upward movement of water through xylem is best explained by

a. Cohesion theory
b. Pulsation theory
c. Capillarity theory
d. Root pressure theory

Ans. (a) Cohesion theory

870. The most accepted theory for the ascent of sap was given by

a. Sachs
b. Bose
c. Dixon and Joly
d. Strasburger

Ans. (c) Dixon and Joly

871. Which contributes most to the transport of water from soil to the leaves of a tree?

a. Root pressure
b. Cohesion of water and transpiration pull
c. Capillary rise of water inside xylem
d. Hydrolysis of ATP

Ans. (b) Cohesion of water and transpiration pull

872. The principal pathway of water translocation in angiosperms is

a. Sieve cells
b. Sieve tube elements
c. Xylem vessel system
d. Xylem and phloem

Ans. (c) Xylem vessel system

873. Cohesive force of water is due to

a. O-bonds
b. OH-bonds
c. S-bonds
d. H-bonds

Ans. (d) H-bonds

874. Ringing/girdling experiment was first performed by

a. Hartig
b. Strasburger
c. Godlewski
d. Bose

Ans. (a) Hartig

875. First theory for ascent of sap was proposed by

a. Westermayer
b. Godlewski
c. Bose
d. Stephen Hales

Ans. (b) Godlewski

During osmosis, water passes through a semi-permeable membrane

	From	*To*
a.	Low ψ_w	High ψ_w
b.	High solute concentration	Low solute concentration
c.	High ψ_s	Low ψ_s
d.	Hypotonic solution	Hypertonic solution

Ans. (d) Hypotonic solution — Hypertonic solution

876. Diffusion of water through selectively permeable membrane is

a. Diffusion
b. Imbibition
c. Osmosis
d. Translocation

Ans. (c) Osmosis

877. A higher plant cell covered with cutin and suberin is placed in water. After 15 minutes, the cell

a. Will be killed
b. Size will increase
c. Size will remain unchanged
d. Size will decrease

Ans. (c) Size will remain unchanged

878. Water is absorbed from outside solution only when it is

a. Isotonic
b. Hypotonic
c. Hypertonic
d. None of these

Ans. (b) Hypotonic

879. Supply of excess fertilizer and watering of a grass lawn causes browning of grass leaves due to

a. Decreased photosynthesis
b. Water-logging of soil
c. Leaching of fertilizer to lower soil strata
d. Osmosis and death of root

Ans. (d) Osmosis and death of root

880. During absorption of water by roots, the water potential of cell sap is lower than that of

a. Pure water and soil solution
b. Neither pure water nor soil solution
c. Pure water but higher than that of soil solution
d. Soil solution but higher than that of pure water

Ans. (a) Pure water and soil solution

881. Plant cells kept in hypertonic solution will get

a. Lysed
b. Turgid
c. Deplasmolysed
d. Plasmolysed

Ans. (d) Plasmolysed

882. .01 M solution of solute (nonelectrolyte) will have a water potential of

a. –2.3 bars
b. Zero
c. 2.3 bars
d. 22.4 bars

Ans. (a) –2.3 bars

883. The movement of free atoms from higher concentration to lower concentration is called

a. Osmosis
b. Diffusion
c. Endosmosis
d. Exosmosis

Ans. (b) Diffusion

884. In seed germination the first to occur is

a. Diffusion
b. Osmosis
c. Imbibition
d. All the above

Ans. (c) Imbibition

885. Plasmolysis is due to

a. Exosmosis
b. Endosmosis
c. Osmosis
d. Adsorption

Ans. (a) Exosmosis

886. Mango dipped in concentrated NaCl solution will

a. Burst
b. Contract
c. Swell
d. No effect

Ans. (b) Contract

887. Cotton fibres dipped in water absorb water through

a. Endosmosis
b. Exosmosis
c. Capillarity
d. Imbibition

Ans. (c) Capillarity

888. A cell placed in a solution get deplasmolysed. The solution is

a. Hypotonic
b. Hypertonic
c. Isotonic
d. Ditonic

Ans. (a) Hypotonic

889. In osmosis, the volume of solvent (in solution) will

a. Decrease
b. Increase
c. Remain constant
d. Volume has no relation to osmosis

Ans. (b) Increase

890. The term water potential was coined by

a. Sayre
b. Von Mohl
c. Lloyd
d. Slatyer and Taylor

Ans. (d) Slatyer and Taylor

891. Water potential of a solution is depicted by

a. ψ_p
b. ψ_s
c. ψ_x
d. $\Delta\psi$

Ans. (b) ψ_s

892. Endosmosis of water occurs when water potential of the cell sap is

a. Higher
b. Equal
c. Lower
d. None of the above

Ans. (c) Lower

893. With rise in turgidity, wall pressure will?

a. Decrease
b. Increase
c. Fluctuate
d. Remain unchanged

Ans. (b) Increase

894. Cut flowers are dipped basally in dilute sodium chloride solution to

a. Reduce bacterial growth
b. Reduce transpiration
c. Induce endosmosis
d. Increase solute inside flowers

Ans. (b) Reduce transpiration

895. "Osmosis is flow of solution from higher concentration to solution of lower concentration through semipermeable membrane." Which is incorrect in the statement?

a. Exact concentration of solution is not given
b. Character of semipermeable membrane is not given
c. Flow of solution is not possible through semipermeable membrane
d. All the above

Ans. (c) Flow of solution is not possible through semipermeable membrane

896. Stomata generally open during the day because the guard cells have

a. Outer thin wall
b. Chlorophyll
c. Kidney-shape
d. Larger nuclei

Ans. (b) Chlorophyll

897. An adaptation for better gaseous exchange in plant leaves is

a. Hair on lower surface
b. Multiple epidermis
c. Waxy cuticle
d. Stomata on lower surface away from direct sunrays

Ans. (d) Stomata on lower surface away from direct sunrays

898. Transpiration is helpful to plants in

a. Cooling
b. Loss of excess nutrients
c. Upward conduction/ascent of sap
d. Loss of excess water

Ans. (c) Upward conduction/ascent of sap

899. Temporary wilting is due to

a. Photosynthesis
b. Transpiration
c. Respiration
d. Absorption of water

Ans. (b) Transpiration

900. Stomata open when the guard cells possess

a. Less K^+
b. More ABA
c. More K^+
d. All the above

Ans. (c) More K^+

901. An antitranspirant is

a. Cobalt chloride
b. Mercury
c. Potassium
d. Phenyl mercuric acetate

Ans. (d) Phenyl mercuric acetate

902. Which of the following factors is most important in regulation of transpiration?

a. Humidity
b. Temperature
c. Light
d. Wind

Ans. (a) Humidity

903. Transpiration is dependent upon

a. Difference of vapour pressure
b. Degree of stomatal opening
c. Both a and b
d. Availability of green light

Ans. (d) Availability of green light

904. Plant cooling occurs due to

a. Assimilation
b. Guttation
c. Photorespiration
d. Transpiration

Ans. (d) Transpiration

905. High CO_2 concentration in leaf interior will cause

a. Stomatal opening
b. Stomatal closure
c. No effect on stomata
d. Stomata are destroyed

Ans. (b) Stomatal closure

906. Water exudation through hydathodes is

a. Guttation
b. Transpiration
c. Hydrolysis
d. Excretion

Ans. (a) Guttation

907. Hydathodes occur on

a. Stem
b. Leaves
c. Roots
d. All the above

Ans. (b) Leaves

908. Water potential in leaf tissue is 'positive' (near zero) during

a. Low transpiration
b. Excessive absorption
c. Excessive transpiration
d. Guttation

Ans. (d) Guttation

909. A leafy twig of mesophytic plant dipped in water would demonstrate

a. Photosynthesis
b. Transpiration
c. Respiration
d. Guttation

Ans. (b) Transpiration

910. Which is not related to transpiration?

a. Absorption and distribution of minerals
b. Circulation of water
c. Temperature
d. Bleeding

Ans. (d) Bleeding

911. The loss of water through cuticle reaches up to

a. 5%
b. 10%
c. 20%
d. 40%

Ans. (d) 40%

912. Phytohormone connected with closing of stomata is

a. ABA
b. Kinetin
c. GA
d. IBA

Ans. (a) ABA

913. A twig kept in water having some salt remains fresh for longer period due to

a. Decrease in bacterial degradation
b. Exosmosis
c. Decrease in transpiration rate
d. Absorption of more water

Ans. (c) Decrease in transpiration rate

914. Root pressure is due to

a. Active absorption
b. Passive absorption
c. Increased transpiration
d. Increased photosynthesis

Ans. (a) Active absorption

915. The movement of water from one cell of cortex to the next in the root is due to

a. Water potential gradient
b. Chemical potential gradient
c. Accumulation of inorganic salts in the cells
d. Accumulation of organic salts in the cells

Ans. (a) Water potential gradient

916. Exudation of xylem sap on cutting of a shoot is due to

a. Guttation
b. Root pressure
c. Transpiration
d. None of the above

Ans. (a) Guttation

917. Water entering root due to diffusion is part of

a. Endocytosis
b. Osmosis
c. Passive absorption
d. Active absorption

Ans. (c) Passive absorption

918. Water absorbed by root in order to meet the requirement of transpiration is due to

a. Transpiration pull
b. Osmosis
c. Imbibition
d. Plasmolysis

Ans. (b) Osmosis

919. Root hair absorbs water from soil through

a. Turgor pressure
b. Ion exchange
c. Osmosis
d. DPD

Ans. (c) Osmosis

920. Prolonged water-logging kills plants due to

a. Stoppage of root respiration
b. Dilution of soil nutrients
c. Dilution of plant cell sap
d. Leaching of nutrients

Ans. (a) Stoppage of root respiration

921. Rate of water absorption is slow near freezing point because

a. Water absorption is a metabolic process
b. Cell growth stops
c. Transpiration is reduced
d. Cell membranes become more viscous

Ans. (d) Cell membranes become more viscous

922. Water ascends in plants through

a. Xylem b. Phloem
c. Stele d. Pith.

Ans. (a) Xylem

923. Cohesion theory of ascent of sap was proposed by

a. Munch b. Stephen Hales
c. Dixon and Joly d. Bose

Ans. (c) Dixon and Joly

924. The force responsible for raising water in 100 ft tall plant is

a. Transpiration pull b. Root pressure
c. Air pressure d. Capillary action

Ans. (a) Transpiration pull

925. Which one explains ascent of sap?

a. Cohesion-tension theory of Dixon and Joly
b. Starch-sugar interconversion
c. Photosynthesis
d. None of the above

Ans. (a) Cohesion-tension theory of Dixon and Joly

926. Water supply in the plant is due to

a. Osmosis b. Guttation
c. Cohesion force d. Imbibition

Ans. (c) Cohesion force

927. The principle by which blotting paper absorbs water is

a. Capillary action b. Transpiration pull
c. Root pressure d. Absorptive capacity

Ans. (a) Capillary action

928. If cohesion-tension transpiration pull theory is correct, a break in water column should

a. Increase water content of leaves
b. Increase rate of photosynthesis
c. Cause wilting of leaves
d. Have no effect at all

Ans. (c) Cause wilting of leaves

929. Plant cells dipped in distilled water will become

a. Turgid b. Plasmolysed
c. Flaccid d. Impermeable

Ans. (a) Turgid

930. To initiate cell plasmolysis, salt solution should be

a. Isotonic b. Hypotonic
c. Hypertonic d. None of the above

Ans. (c) Hypertonic

931. Water potential and osmotic potential of pure water are

a. Zero and zero b. 100 and zero
c. 100 and 100 d. Zero and 100

Ans. (a) Zero and zero

932. If a cell with OP 10 bars and TP 4 bars is connected to cells B, C and D having OP and TP repectively 4 and 4, 10 and 5 and 7 and 3 bars, the flow of water will be

a. C to A, B and D b. B to A, C and D
c. A to D, B and C d. A to B, C and D

Ans. (b) B to A, C and D

933. Use of excessive fertilisers causes wilting due to

a. Endosmosis b. Exosmosis
c. Imbibition d. None of the above

Ans. (b) Exosmosis

934. Osmotic potential is depicted as

a. (–) b. (+)
c. × d. (÷)

Ans. (a) (–)

935. Potato slices were placed in sucrose solution. After half an hour, density of sucrose solution increased. Water potential of Potato tuber is

a. Equal to solute potential of sucrose solution
b. Greater than solute potential of sucrose solution
c. Less than solute potential of sucrose solution
d. Half the concentration of sucrose solution

Ans. (c) Less than solute potential of sucrose solution

936. A cell will become fully turgid if it is placed in

a. Hypotonic solution b. Isotonic solution
c. Hypertonic solution d. All the above

Ans. (a) Hypotonic solution

937. Dry wooden stakes driven in cracks of a rock and soaked will develop pressure that will split the rock. The phenomenon is

a. Osmotic pressure b. Imbibition
c. Turgor pressure d. Deplasmolysis

Ans. (b) Imbibition

938. Cells absorb water through

a. Osmosis only
b. Imbibition only
c. Both osmosis and imbibition
d. None of the above

Ans. (c) Both osmosis and imbibition

939. On plasmolysis, a plant cell

a. Swells up
b. Bursts
c. Becomes flaccid
d. Becomes turgid

Ans. (c) Becomes flaccid

940. A cell placed in hypotonic solution will

a. Shrink
b. Show exosmosis
c. Show endosmosis
d. No change in shape or size

Ans. (c) Show endosmosis

941. A cell shrinks on being kept in a solution. The solution is

a. Isotonic
b. Hypotonic
c. Hypertonic
d. None of the above

Ans. (c) Hypertonic

942. Shrinking of protoplasm from cell wall under influence of hypertonic solution is

a. Plasmolysis
b. Apoptosis
c. Deplasmolysis
d. Flaccidity

Ans. (a) Plasmolysis

943. Wooden doors swell up and get stuck during rainy season due to

a. Endosmosis
b. Imbibition
c. Capillarity
d. Exosmosis

Ans. (b) Imbibition

944. In plants water moves from

a. Less negative to more negative gradient
b. More negative to less negative gradient
c. Similar gradient
d. Zero gradient

Ans. (a) Less negative to more negative gradient

945. Movement of water through semipermeable membrane produces

a. Wall pressure
b. Suction pressure
c. Osmotic pressure
d. Turgor pressure

Ans. (d) Turgor pressure

946. Adding solute to pure water will cause development of

a. Positive water potential
b. More positive water potential
c. More negative water potential
d. Negative water potential

Ans. (d) Negative water potential

947. Loss of water from tips of leaves is

a. Transpiration
b. Guttation
c. Bleeding
d. Respiration

Ans. (b) Guttation

948. Maximum transpiration occurs in

a. Algal cells
b. Xerophytic plants
c. Hydrophytic plants
d. Mesophytic plants

Ans. (d) Mesophytic plants

949. Nonfunctional stomata can be seen in

a. Mango leaf
b. Pea leaves
c. Hydrilla
d. Lotus

Ans. (c) Hydrilla

950. Latest explanation for closure of stomata is

a. Starch glucose theory
b. Active K^+ ions theory
c. ABA theory
d. None of the above

Ans. (c) ABA theory

951. When half the leaves are removed randomly, transpiration will show?

a. Higher magnitude but lower flux or rate per unit
b. Lower magnitude but higher flux
c. Both magnitude and flux increase
d. Both magnitude and flux decrease

Ans. (b) Lower magnitude but higher flux

952. Who said that "transpiration is a necessary evil"?

a. Bose
b. Steward
c. Anderson
d. Curtis

Ans. (d) Curtis

953. Rate of transpiration is related to

a. Light and temperature
b. Light, temperature, atmospheric humidity and wind
c. Light, temperature and wind
d. Soil and temperature

Ans. (b) Light, temperature, atmospheric humidity and wind

954. Enzyme connected with opening and closing of stomata is

a. α-amylase
b. Pyruvic kinase
c. PEP carboxylase
d. RuDP carboxylase

Ans. (c) PEP carboxylase

955. Rate of transpiration is highest when?

a. Soil is wet and air is dry
b. Soil is wet and air is humid
c. Soil is dry and air is humid
d. Both soil and air are dry

Ans. (a) Soil is wet and air is dry

956. An internal factor in transpiration is

a. CO_2 b. O_2
c. N_2 d. Stomata

Ans. (d) Stomata

957. Rate of transpiration is measured by

a. Ganong's potometer b. Porometer
c. Auxanometer d. Respirometer

Ans. (a) Ganong's potometer

958. Root pressure helps in ascent of sap by

a. Pumping food in phloem
b. Pumping sap into xylem in roots
c. Pumping sap in stem for sending it to roots
d. All the above

Ans. (b) Pumping sap into xylem in roots

959. Which helps in opening of stomata?

a. K^+ b. Ca^{2+}
c. H^+ d. Cl'

Ans. (a) K^+

960. Match the columns

a. Column I	*Column II*
a. Girdling	p Ascent of sap experiment
b. Cobalt chloride	q Tiasnpiration paper method
c. Atmometer	r Unequal transpiration on two surfaces
d. Bell jar experiment	s Translocation in phloem

a. a–s, b–p, c–q, d–r b. a–s, b–r, c–p, d–q
c. a–q, b–p, c–s, d–r d. a–r, b–p, c–s, d–q

Ans. (b) a–s, b–r, c–p, d–q

961. A sudden increase in carbon dioxide concentration around a leaf will cause

a. Wider opening of stomata
b. Increase in transpiration
c. Closure of stomata
d. Decrease in transpiration due to closure of stomata

Ans. (d) Decrease in transpiration due to closure of stomata

962. Changes in turgidity of guard cells are controlled by

a. Potassium b. Chloride
c. Malic acid d. All the above

Ans. (d) All the above

963. Rate of transpiration is high in

a. C_3 plants
b. C_4 plants
c. CAM plants
d. Both C_3 and C_4 plants

Ans. (a) C_3 plants

964. Plants exchange water with environment through structures by two cells

a. Lenticels b. Hydathodes
c. Stomata d. All the above

Ans. (c) Stomata

965. Arrange root hair cell, inner cortical cell and mesophyll cell in ascending order of DPD

a. Mesophyll cell, root hair cell and cortical cell
b. Cortical cell, mesophyll cell and root hair cell
c. Root hair cell, cortical cell and mesophyll cell
d. Root hair cell, mesophyll cell and cortical cell

Ans. (c) Root hair cell, cortical cell and mesophyll cell

966. In root hair, water enters due to

a. Diffusion b. W.P.
c. T.P. d. O.P.

Ans. (d) O.P.

967. The direction of water in *Cycas* leaflets is

a. Upward b. Downward
c. Lateral d. Both a and b

Ans. (c) Lateral

968. Sir J.C. Bose proposed a theory of ascent of sap known as

a. Pulsation theory
b. Transpiration pull theory
c. Relay pump theory
d. Capillary force theory

Ans. (a) Pulsation theory

969. Cohesion-tension theory is related to

a. Respiration
b. Ascent of sap
c. Transpiration
d. Photosynthesis

Ans. (b) Ascent of sap

970. A cell kept in a solution increases in volume. The solution is

a. Hypotonic b. Isotonic
c. Hypertonic d. Either A or B

Ans. (a) Hypotonic

971. Guttation is due to

a. Negative root pressure b. Positive root pressure
c. Transpiration d. None of the above

Ans. (b) Positive root pressure

972. Stomata open or close due to the ion

a. Ca^{2+} b. Na^{+}
c. K^{+} d. Cu^{+}

Ans. (c) K^{+}

973. Epidermal cells containing chloroplasts are

a. Hydathodes b. Accessory cells
c. Stomata d. Guard cells

Ans. (d) Guard cells

974. Each stoma is surrounded by

a. Passage cells b. Guard cells
c. Parenchyma cells d. Lenticels

Ans. (b) Guard cells

975. Which one is correct ?

a. $\psi_m = \psi_p + \psi_s + \psi_w$ b. $\psi_w = \psi_p + \psi_s + \psi_m$
c. $\psi_p = \psi_w + \psi_m + \psi_s$ d. $\psi_w = \psi_w + \psi_p + \psi_p + \psi_s$

Ans. (b) $\psi_w = \psi_p + \psi_s + \psi_m$

976. Match the columns and find the correct combination

Column I	*Column II*
a. Ganong's Potometer	i. Rate or growth
b. Cobalt chloride paper	ii. Rate of transpiration
c. Pfeffer's auxanometer	iii. Differential transpiration
d. Porometer	iv. Opening and closing of stomata

a. (a) – (ii), (b) – (iii), (c) – (i), (d) – (iv)
b. (a) – (i), (b) – (ii), (c) – (iii), (d) – (iv)
c. (a) – (iii), (b) – (iv), (c) – (ii), (d) – (i)
d. (a) – (iv), (b) – (iii), (c) – (ii), (d) – (i)

Ans. (a) (a) – (ii), (b) – (iii), (c) – (i), (d) – (iv)

977. Find the correct order for instrument used for measuring (*i*) Transpiration (*ii*) Size of stomata (*iii*) Atmospheric pressure (*iv*) Osmosis.

a. Potometer, manometer, porometer, osmometer
b. Manometer, potometer, porometer, osmometer
c. Porometer, manometer, potometer, osmometer
d. Potometer, porometer manometer, osmometer

Ans. (d) Potometer, porometer manometer, osmometer

978. Chlorophyllous cells fewer in number, unique in shape with inner walls thicker are

a. Guard cells b. Passage cells
c. Subsidiary cells d. Bulliform cells

Ans. (a) Guard cells

979. Watei lost through transpiration is

a. Pure water b. Rich in organic solutes
c. Rich in dissolved salts d. All the above

Ans. (a) Pure water

980. Common between guard cells and mesophyll cells is

a. Dumbell shaped
b. Differentially thick walls
c. Presence of chloroplasts
d. Uniformly thin cell wall

Ans. (c) Presence of chloroplasts

981. A leaf with more stomata on lower surface belongs to

a. Potato type b. Oat type
c. Apple-mulberry type d. Nymphaea type

Ans. (b) Oat type

982. Main function of lenticel is

a. Transpiration b. Guttation
c. Bleeding d. Gaseous exchange

Ans. (d) Gaseous exchange

983. Which is the most important factor in regulation of transpiration?

a. Light b. Temperature
c. Humidity d. Wind

Ans. (d) Wind

984. Epithem is associated with?

a. Respiration b. Guttation
c. Transpiration d. Photosynthesis

Ans. (b) Guttation

985. Stomata open during day due to

a. Accumulation of K^{+} ion and sugar
b. High pH
c. Osmotic effect of ions present in guard cells
d. None of the above

Ans. (a) Accumulation of K^{+} ion and sugar

986. Choose the correct sequence of events during wilting

a. Exosmosis, deplasmolysis, temporary wilting, permanent wilting
b. Exosmosis, plasmolysis, temporary wilting, permanent wilting
c. Endosmosis, plasmolysis, temporary wilting, permanent wilting
d. Exosmosis, deplasmolysis, temporary wilting, permanent wilting

Ans. (b) Exosmosis, plasmolysis, temporary wilting, permanent wilting

987. Which can preserve food stuff?

a. Sugar and vinegar
b. Salt and sugar
c. Vinegar
d. All the above

Ans. (d) All the above

988. If turgor pressure becomes equal to osmotic pressure

a. Water leaves the cells
b. Water enter the cell
c. No exchange of water takes place
d. Solute pass out of the cell

Ans. (c) No exchange of water takes place

989. Risk of spoilage is less in salted pickles as it causes

a. Guttation
b. Imbibition
c. Diffusion
d. Plasmolysis

Ans. (d) Plasmolysis

990. Solution A has ψ_{ss} = –30 bars and ψ_p = 5 bars. Solution B has ψ_s = –10 bars and ψ_p = 0 atm. The two are separated by semipermeable membrane. Flow of water will be

a. b to a
b. a to b
c. Equal in both directions
d. No flow of water

Ans. (a) b to a

991. Amount by which water potential is reduced due to presence of solute is called?

a. Pressure potential
b. Solute potential
c. Matric potential
d. None of the above

Ans. (b) Solute potential

992. Uniformly sweet taste of Tea or Coffee is due to

a. Spreading
b. Osmosis
c. Permeability
d. Diffusion

Ans. (d) Diffusion

993. Exchange of substances between a cell and its environment is due to

a. Osmosis
b. Active transport
c. Diffusion
d. All the above

Ans. (d) All the above

994. Turgor pressure develops in epiblema cells of root due to

a. High water potential of cortical cells
b. Entry of water into root hairs and increase in volume of cell sap
c. Filling of large vacuole in root hair with cell sap
d. Osmotic diffusion of water into pericycle through passage cells

Ans. (b) Entry of water into root hairs and increase in volume of cell sap

995. Root hairs absorb water from soil due to

a. Osmotic pressure
b. Turgor pressure
c. Suction pressure
d. Root pressure

Ans. (c) Suction pressure

996. Which is not associated with ascent of sap in tall trees?

a. Continuity of water column
b. Cohesion and adhesion of water molecules
c. Transpiration pull
d. Pressure of tracheary elements

Ans. (d) Pressure of tracheary elements

997. Cohesion force existing amongst water molecules contributes to

a. Plasmolysis
b. Ascent of sap
c. Osmosis
d. Translocation

Ans. (b) Ascent of sap

998. For ascent of sap capillary force theory was first proposed by

a. Sachs
b. Christian Wolf
c. Strasburger
d. Dixon and Joly

Ans. (b) Christian Wolf

999. Root pressure is maximum when?

a. Transpiration is high, absorption low
b. Transpiration low, absorption high
c. Both transpiration and absorption high
d. Both transpiration and absorption low

Ans. (b) Transpiration low, absorption high

1000. The experiment set up shown in the adjacent diagram is for

a. The demonstration of development of suction force due to transpiration
b. Measuring the rate of transpiration
c. The demonstration of ascent of sap
d. The demonstration of anaerobic respiration

Ans. (b) Measuring the rate of transpiration

ANIMAL PHYSIOLOGY

1. Which is true for the autonomic nervous system?

a. The sympathetic nervous system always stimulates the organ system
b. The parasympathetic nervous system always stimulates the organ system
c. It depends on the organ system whether the division stimulates or inhibits it
d. None of these

Ans. (c) It depends on the organ system whether the division stimulates or inhibits it

2. Which of the following statement is true?

a. Nodes of Ranvier are most easily seen in cross-section of peripheral nerve
b. Most nerves contain afferent and efferent fiber and thus carry both motor and sensory signals
c. Peripheral nerve is similar to smooth muscle in terms of the connective tissue investment
d. None of these

Ans. (b) Most nerves contain afferent and efferent fiber and thus carry both motor and sensory signals

3. Which of the following cells is responsible for myelin formation in the peripheral nervous system?

a. Schwann cell
b. Microglial cell
c. Astrocyte
d. All of these

Ans. (a) Schwann cell

4. Which of the following is not done by glial cells?

a. Producing insulating sheaths around axons
b. Giving metabolic support to neurons
c. Receiving and conducing electrochemical signals
d. Removing debris after the death of a neuron

Ans. (c) Receiving and conducing electrochemical signals

5. The perineurium is the connective tissue layer

a. Surrounding an entire nerve
b. Surrounding individual axons in the CNS
c. Surrounding individual axons in the PNS
d. Surrounding fascicles of axons in the PNS

Ans. (d) Surrounding fascicles of axons in the PNS

6. The system that controls smooth muscle, cardiac muscle, and gland activity is the

a. Autonomic nervous system
b. Somatic nervous system
c. Skeletal division
d. None of these

Ans. (a) Autonomic nervous system

7. Neurotransmitters are removed from the synaptic deft by

a. Diffusion
b. Cellular uptake
c. Enzymatic breakdown
d. Axonal transport
e. All a, b and c

Ans. (e) All a, b and c

8. Which of the following is true of the sympathetic nervous system?

a. It's voluntarily controlled via the forebrain
b. It's voluntarily controlled via the reticular formation
c. It uses different neurotransmitters at the ganglion and at the synaptic cleft
d. It's a subdivision of the somatic nervous system

Ans. (c) It uses different neurotransmitters at the ganglion and at the synaptic cleft

9. The effect of parasympathetic nervous stimulation on the heart is

a. Increased activity of the SA node
b. Increased activity of the AV node
c. Increased force of contraction
d. Slowing of the heart

Ans. (d) Slowing of the heart

10. The action potential of a neuron

a. Is terminated by efflux of Na^+
b. Is terminated by efflux of K^+
c. Declines in amplitude as it moves along the axon
d. None of these

Ans. (b) Is terminated by efflux of K^+

11. Action potentials are conducted more rapidly in

a. Larger diameter axons than small diameter axons
b. Small diameter axons than large diameter axons
c. Unmyelinated axons than myelinated axons
d. Axons that lack a warpping of schwann cell

Ans. (a) Larger diameter axons than small diameter axons

12. An inhibitory neuron could affect the neuron with which it synapses by

a. Producing an IPSP within the neuron
b. Increasing K+ efflux from the neuron
c. Hyperpolarizing the neuron
d. All of the above

Ans. (d) All of the above

13. Which of the following comparisons are true?

a. Nerve impulses produce their effects quickly, whereas hormonal responses generally are slower.
b. Nervous system effects are brief, whereas endocrine system effects are longer lasting
c. The nervous system can stimulate or inhibit the release of hormones by the endocrine system
d. All of the above

Ans. (d) All of the above

14. Long term reflex action such as cycling and swimming are controlled by

a. Cerebellum
b. Spinal cord
c. Cerebrum
d. Hypothalamus

Ans. (a) Cerebellum

15. Which of the following sequence describes the passage of an action potential in the neuron?

a. Dendrite, cell body, axon, synaptic cleft
b. Dendrite, synaptic cleft, cell body, axon
c. Axon, cell body, dendrite, synaptic cleft
d. None of these

Ans. (a) Dendrite, cell body, axon, synaptic cleft

16. Which of the following statements are true?

a. The frequency of impulses and the number of activated sensory neurons encodes differences in stimuli intensity
b. Larger-diameter axons conduct nerve impulses faster than smaller-diameter ones
c. The diameter of an axon and the presence or absence of a myelin sheath are the most important factors that determine the speed of nerve impulse propagation
d. All of the above

Ans. (d) All of the above

17. Which of the following statements are true?

a. Two of more neurotransmitters nay be present in many neurons
b. An excitatory neurotransmitter can never be inhibitory regardless of the neuron that produces it
c. The catecholamine neurotransmitter acetylcholine is synthesized from the amino acid tyrosine
d. Both a and b

Ans. (d) Both a and b

18. The most sensitive vertebrate chemoreceptor known are the

a. Organs of corti of humans
b. Olfactory receptors of mammals
c. Taste receptors of fishes
d. Rod and cone cells of mammals

Ans. (c) Taste receptors of fishes

19. Which of the following statement is correct?

a. The function of the crystalline lens is t bend light rays and focus them on the optic nerve
b. Near sightedness is a condition resulting from loss of lens elasticity
c. The space anterior to the lens is filled with the vitreous humor
d. None of these

Ans. (b) Near sightedness is a condition resulting from loss of lens elasticity

20. The fovea of the eye

a. Is the region of highest visual acuity
b. Contain only rods
c. Contain only cones
d. Contain only red and green cones

Ans. (a) Is the region of highest visual acuity

21. The fluid that fills the posterior chamber of the eye is the

a. Choroid humor
b. Vitreous humor
c. Aqueous humor
d. None of these

Ans. (b) Vitreous humor

22. Some diseases damage the hair cells in the ear. When the damage to the outer hair cells is greater than the damage to the inner hair cells?

a. The K^+ concentration in perilymph is decreased
b. The K^+ concentrations in endolymph is decreased
c. The affected hair cells fail the shorten when exposed to sound
d. The perception of vertical acceleration is disrupted

Ans. (c) The affected hair cells fail the shorten when exposed to sound

23. The basilar membrane of the cochlea

a. Vibrates in a pattern determined by the form of the travelling wave in the fluids in the cochlea
b. Vibrates when the body is subjected to linear acceleration
c. Covers the oval window and the round window
d. All of these

Ans. (a) Vibrates in a pattern determined by the form of the travelling wave in the fluids in the cochlea

24. Most of the CO_2 transported in the blood

a. Dissolved in plasma
b. In carbamino compounds formed from plasma protein
c. Bound to Cl^-
d. In the form of HCO_3^-

Ans. (d) In the form of HCO_3^-

25. Which of the following has the greatest effect on the ability of blood to transport oxygen?

a. pH of plasma
b. Temperature of the blood
c. Amount of haemoglobin in the blood
d. None of these

Ans. (c) Amount of haemoglobin in the blood

26. Variations in which of the following components of blood or cerebrospinal fluid do not affect respiration

a. Arterial H^+ concentration
b. Arterial HCO_3^- concentration
c. Arterial Na^+ concentration
d. cerebrospinal fluid CO_2 concentration

Ans. (c) Arterial Na^+ concentration

27. The most important factor in determining the percent oxygen saturation of haemoglobin is

a. Acidity
b. The temperature
c. The partial pressure of carbon dioxide
d. The partial pressure of oxygen

Ans. (d) The partial pressure of oxygen

28. The most abundant protein in human blood is

a. Albumin
b. Globulin
c. Haemoglobin
d. Transferring

Ans. (c) Haemoglobin

29. Leukopenia is a term used to described

a. High RBC count
b. High WBC count
c. Low WBC count
d. Low RBC count

Ans. (c) Low WBC count

30. Which of the following contains oxygenated blood in an adult human?

a. Right atrium
b. Pulmonary vein
c. Pulmonary artery
d. All of these

Ans. (b) Pulmonary vein

31. Which of the following is the most muscular chamber in a bird's heart of a mammal's heart?

a. The left atrium
b. The left ventricle
c. The right atrium
d. The right ventricle

Ans. (b) The left ventricle

32. Which of the following statement about circulatory systems is true?

a. Hormones are transported in the blood
b. All invertebrates have an open circulatory system
c. Capillaries have thicker walls than veins
d. The systemic circulation carries blood to and from the lungs

Ans. (a) Hormones are transported in the blood

33. Which one of the following series represents the correct path of blood circulation?

a. Right atrium, left ventricle, lungs left atrium, left ventricle, body
b. Left atrium, left ventricle, right atrium, right ventricle, lungs, body
c. Right atrium, right ventricle, lungs, left atrium, left ventricle, body
d. None of these

Ans. (c) Right atrium, right ventricle, lungs, left atrium, left ventricle, body

34. Which of the following statement about the heart is false?

a. Contraction is initiated by a nerve impulse
b. The heart contains a number of cells with an unstable membrane potential
c. The heart contains a number of cells with a stable membrane potential
d. None of these

Ans. (a) Contraction is initiated by a nerve impulse

35. The *lub* of the *lub-dub* sound the heart makes is caused by the

a. Closing of the mitral and tricuspid valves
b. Closing of the pulmonary and aortic valves
c. Sound of blood rushing in to the atria
d. Sound of blood rushing in to the ventricle

Ans. (a) Closing of the mitral and tricuspid valves

36. If communication between the SA node and the AV node became blocked, which will most likely occur?

a. The rate of atrial contraction will decrease
b. The rate of ventricular contraction will decrease
c. Stroke volume will increase to 5L/beat
d. Afterload will increase

Ans. (b) The rate of ventricular contraction will decrease

37. When compared to arteries, veins generally?

a. Have more muscle in the tunica media
b. Are thinner walled
c. Carry faster moving blood
d. Have thicker endothelium

Ans. (b) Are thinner walled

38. Which of the following is the primary factor regulation normal coronary blood flow?

a. Systolic wall tension
b. Mycocardial oxygen consumption
c. Aortic diastolic pressure
d. Coronary perfusion pressure

Ans. (c) Aortic diastolic pressure

39. Administration of a local anaesthetic with epinephrine will most likely produce which of the following cardiovascular effect?

a. Increased diastolic blood pressure
b. Increased heart beat
c. Decreased heart rate
d. Decreased systolic blood pressure

Ans. (b) Increased heart beat

40. The lymphatic system

a. Is an open circulatory system
b. Contains one-way valves
c. Returns fluids to the bloodstream
d. All of the above

Ans. (d) All of the above

41. Fluid is driven through the lymphatic system by

a. Squeezing of the lymphatic vessels by the body's muscles
b. Contractions of the lymph nodes
c. Pressure created by the pumping of the heart
d. Contraction of the walls of the lymphatic vessels

Ans. (a) Squeezing of the lymphatic vessels by the body's muscles

42. Which of the following statements are correct?

a. Passive exhalation results from elastic recoil of the chest wall and lungs
b. Air flow during breathing is due to a pressure gradient between the lungs and the atmospheric air
c. During normal breathing the pressure between the two pleural layers is always sub-atmospheric
d. All of the above

Ans. (d) All of the above

43. Which of the following factors affect the rate of external respiration?

a. Partial pressure differences of the gases
b. Surface area for gas exchange
c. Diffusion distance
d. Solubility and molecular weight of the gases
e. All of the above

Ans. (e) All of the above

44. Which gas law that states that each gas in a mixture exerts its own pressure as if all the other gases were not present?

a. Henry's law
b. Dalton's law
c. Boyle's law
d. Haldane's law

Ans. (b) Dalton's law

45. Which of the following statements are true?

a. It is impossible for people to kill themselves by holding their breath
b. Emotional stimuli can alter respiration
c. Certain chemical stimulation alter the rate and depth of breathing
d. All of the above

Ans. (d) All of the above

46. On the summit of Mt. Everest, where the barometric pressure is about 250 mm Hg, the partial pressure of O_2 is about

a. 0.1 mm Hg
b. 0.5 mm Hg
c. 5.0 mm Hg
d. 50 mm Hg

Ans. (d) 50 mm Hg

47. The tidal volume in a normal man at rest is about

a. 0.5 L
b. 1.2 L
c. 2.5 L
d. 3.5 L

Ans. (a) 0.5 L

48. Which of the following is responsible for the movement of O_2 from the alveoli in to the blood in the pulmonary capillaries?

a. Passive diffusion
b. Secondary active transport
c. Filtration
d. Active transport

Ans. (a) Passive diffusion

49. Concerning the functional histology of the kidney

a. The superficial nephrons have short loops of henle; thus, they have a low capacity to reabsorb salt
b. In dehydration, the blood flow to deep nephrons tends to increase
c. The deep nephrons have long loops of henle; thus have a high capacity to reabsorb salt and water
d. All of these

Ans. (d) All of these

50. Which of the following is a function of the kidneys?

a. Release of hormones
b. Maintenance of plasma pH
c. Maintenance of plasma
d. All of these

Ans. (d) All of these

51. In the distal convoluted tubule of the nephrons

a. Sodium reabsorption requires energy
b. Secretion of potassium does not require energy
c. Water reabsorption requires energy
d. Ammonia is secreted

52. Reabsorption of chloride ions from the glomerular filtrate in the kidney tubule is carried out by

a. Active transport
b. Passive transport
c. Diffusion
d. Osmosis

Ans. (c) Diffusion

53. Drinking which of the following would lead to the highest rate of ADH secretion and release?

a. Two liters of distilled water
b. Two liters of sea water
c. Two liters of iso-osmotic saline
d. Two liters of human blood plasma

Ans. (b) Two liters of human blood plasma

54. An increase secretion of rennin would be expected to have what effect on sodium excretion and potassium excretion in urine?

a. Increase in Na^+ excretion and increase K^+ excretion
b. Increase in Na^+ excretion and decrease K^+ excretion
c. Decrease in Na^+ excretion and increase K^+ excretion
d. Decrease in Na^+ excretion and decrease K^+ excretion

Ans. (c) Decrease in Na^+ excretion and increase K^+ excretion

55. Which of the following is not a function of atrial natriuretic peptide?

a. It acts to decrease aldosterone release from the adrenal cortex
b. It acts to increase urine output
c. It acts to increase blood pressure
d. It acts to decrease ADH release

Ans. (c) It acts to increase blood pressure

56. Which of the following is incorrect?

a. Aldosterone is mad in the hypothalamus and released from the anterior pituitary
b. Aldosterone affects water reabsorption
c. Aldosterone stimulates the secretion of K^+
d. None of these

Ans. (a) Aldosterone is mad in the hypothalamus and released from the anterior pituitary

57. The majority of reabsorption occurs in the

a. Renal capsule
b. Collecting duct
c. Proximal convoluted tubule
d. Ascending limb of the loop of Henle

Ans. (c) Proximal convoluted tubule

58. Concerning water reabsorption by the proximal tubule

a. Main driving forces for water reabsorption in the proximal tubule are solute uptake and oncotic pressure in peritubular capillaries
b. A significant amount of water uptake in the proximal tubule is dependent on sodium uptake by the Na^+/H^+ antiports present in their luminal membrane
c. Both a and b
d. None of these

Ans. (c) Both a and b

59. Concerning arterial blood pressure regulation

a. Main driving forces for water reabsorption in the proximal tubule are solute uptake and oncotic pressure in peritubular capillaries
b. Prostaglandins and dopamine and bradykinin are vasodilators
c. ADH, angiotensin II and epinephrine are vasoconstrictors
d. None of these

Ans. (d) None of these

60. The following is/are correct for the countercurrent multiplier system

a. The ascending limb of the loop of Henle transports Nacl by active transport
b. The descending limb is quite permeable to water
c. The fluid of the ascending limb becomes relatively dilute
d. All of the above are correct

Ans. (d) All of the above are correct

61. The site of production of cholecystokinin and secretin is the

a. Small intestine
b. Large intestine
c. Stomach
d. Pancreas

Ans. (a) Small intestine

62. Which of the following is not a function of the liver?

a. Storage of glucose
b. Production of bile
c. Storage of vitamin C
d. None of these

Ans. (c) Storage of vitamin C

63. The gall ballbladder

a. Produces bile
b. Is attached to the pancreas
c. Stores and concentrates bile
d. Produces cholecystokinin

Ans. (c) Stores and concentrates bile

64. Which structure thickens in certain regions of the alimentary canal in order to act as a sphincter?

a. Circular layer of the muscularis externa
b. Longitudinal layer of the muscularis mucosae
c. Circular layer of the muscularis mucosae
d. None of these

Ans. (a) Circular layer of the muscularis externa

65. The 3 pairs of extrinsic salivary glands are the

a. Parotid, submandibular, and sublingual
b. Parotid, submandibular, and buccal
c. Parotid, sublingual, and ethmodial
d. Parotid, buccal, and submaxillary

Ans. (c) Parotid, sublingual, and ethmodial

66. The gastric gland cell whose absence could lead to pernicious anemia is the

a. Parietal cell
b. Goblet cell
c. Chief cell
d. Mucous neck cell

Ans. (a) Parietal cell

67. A major function of the large intestine is to

a. Remove waste materials
b. Secrete digestive enzymes
c. Secrete water in order to regulate blood volume
d. All of the above

Ans. (a) Remove waste materials

68. Which of the following statements are correct?

a. Mechanical digestion occurs in the stomach
b. Cholecystokinin, gastrin and secretin are produced by an enteroendocrine cells
c. Pancreas, small intestine and salivary glands produce digestive enzyme
d. Mucous neck cell, chief cells, parietal cells present in the stomach
e. All of the above

Ans. (e) All of the above

69. Each of the following statement about Brunner's glands is correct *except*

a. They produce a serous secretion rich in digestive enzyme
b. They are characteristic component of the duodenal wall
c. They lie in the submucosal layer
d. All of the above

Ans. (a) They produce a serous secretion rich in digestive enzyme

70. Which of the following statement is/are correct?

a. Pepsinogen is synthesized and released by chief cells
b. Hormones mainly involved in controlling pancreatic exocrine secretions are cholecystokinin and secretin
c. Chief cells in children secrete an enzyme rennin
d. All of the above are correct

Ans. (d) All of the above are correct

71. The function of the hepatic portal circulation is to

a. Collect absorbed nutrients for metabolic processing or storage
b. Carry toxins to the venous system for disposal thru the urinary trac
c. Hormone distribution
d. Transfer bile to the liver from the pancreas

Ans. (a) Collect absorbed nutrients for metabolic processing or storage

72. Which of the following is false of the small intestine?

a. Most rapid absorption of galactose
b. First site of protein hydrolysis

c. Site of the majority of water absorption in the GI tract
d. Site of carbohydrate, protein and fat digestion

Ans. (b) First site of protein hydrolysis

73. Digestive processes in the large intestine include

a. Mass peristalsis
b. Absorption of some vitamins and electrolytes
c. Elimination of cellulose-base material
d. All of the above

Ans. (d) All of the above

74. Hormones

a. Generally utilize negative feedback mechanisms to regulate their secretion
b. Will only cause an effect on cells with receptors for the hormone
c. Can regulate the responsiveness of the target tissue by controlling the number of receptors for the hormone
d. All of the above

Ans. (d) All of the above

75. The pituitary gland's posterior lobe produces two hormones, i.e.

a. Progesterone and estradiol
b. Cortisone and corticosterone
c. Vasopressin and oxytocin
d. None of the above

Ans. (c) Vasopressin and oxytocin

76. In which of the following combinations is the name of the hormone, its chemical type and its tissue of origin correctly matched ?

a. Aldosterone → peptide → pancreas
b. ACTH → polypeptide → adrenal cortex
c. Glucagons → peptide → adrenal cortex
d. Vasopression → peptide → posterior pituitary

Ans. (d) Vasopression → peptide → posterior pituitary

77. Which of the following hormones does not act by a second messenger system?

a. Glucagon
b. Epinephrine
c. Testosterone
d. Follicle stimulating hormone

Ans. (c) Testosterone

78. Which hormone binds to intracellular receptors?

a. Growth hormone
b. Insulin
c. Triiodothyronine
d. Thyroid stimulating hormone

Ans. (c) Triiodothyronine

79. Which of the following hormones does not act by a second messenger system?

a. Aldosterone
b. Glucagon
c. Luteinizing hormone
d. None of these

Ans. (c) Luteinizing hormone

80. Which one of the following statements with respect to testosterone is not true?

a. Testosterone receptor mutant is embryonic lethal
b. Testosterone receptor is essential for male reproduction
c. Testosterone is produce in female rats
d. Testosterone is not essential for fetal growth

Ans. (a) Testosterone receptor mutant is embryonic lethal

81. Administration of estrogen to adult male rats results in

a. Decreased testosterone production
b. Decrease luteinizing hormone and testo-sterone production
c. Increased estrogen secretion in the testis
d. None of the above

Ans. (d) None of the above

82. Radioactive iodine can be incorporated in to

a. Threonine
b. Tyrosine
c. Serine
d. Leucine

Ans. (b) Tyrosine

83. The receptor for which of the following hormones is a transcription factor?

a. Estradiol
b. Glucagon
c. Insulin
d. Adrenalin

Ans. (a) Estradiol

84. The development of adult characteristics in a molting insect is promoted by

a. Ecdysone
b. Thyroxine
c. Juvenile hormone
d. Pheromone

Ans. (a) Ecdysone

85. The fight-or-flight response is developed by hormones of the

a. Adrenal medulla
b. Hypothalamus
c. Adrenal cortex
d. None of these

Ans. (a) Adrenal medulla

86. Epinephrine and nor epinephrine functions as both hormones and

a. Neurotransmitters
b. Ions to promote action potentials
c. Fuel for cellular respiration
d. Solutes to promote osmotic flow

Ans. (a) Neurotransmitters

87. All the hormones of the adrenal cortex are synthesized from

a. Cholesterol
b. Tyrosine
c. Fats
d. Glycoproteins

Ans. (a) Cholesterol

88. Thyroxine and triidothyronine, produce by the thyroid gland, are synthesized from iodine and

a. Glycoprotein
b. Cholesterol
c. Tyrosine
d. Phenylalanine

Ans. (c) Tyrosine

89. The parathyroid glands are located adjacent to the

a. Parathyroid gland
b. Thyroid gland
c. Pancreas
d. Adenoids

Ans. (b) Thyroid gland

90. A person with diabetes mellitus does not secrete enough

a. Sugar
b. Glucagons
c. Epinephrine
d. Insulin

Ans. (d) Insulin

91. The neurons of a person with diabetes mellitus do not produce sufficient

a. Fatty acid
b. Enzymes
c. Vitamins
d. ATP

Ans. (d) ATP

92. Which of the following are true concerning androgens?

a. They stimulate the male pattern of development
b. They contribute to sex drive in males and females
c. They stimulate protein synthesis
d. All of the above

Ans. (d) All of the above

93. Which of the following hormones is a modified amino acid?

a. Epinephrine
b. Progesterone
c. Estrogen
d. Prostaglandin

Ans. (a) Epinephrine

94. Thyroxin is important in the control of

a. Diabetes mellitus
b. Calcium uptake
c. Cellular metabolic rates
d. Mitochondrial respiration

Ans. (c) Cellular metabolic rates

95. The primary target organ of aldosterone action is

a. Liver
b. Kidney
c. Heart
d. Pancreas

Ans. (b) Kidney

CHECK YOUR GRASP

1. The Brownian movement was discovered in 1827 by the Scottish botanist

a. Tyndall b. Robert brown
c. Murrfy d. Stayler

2. A plant hormone, which is primary regulator of abscission process is

a. Ethylene b. Auxin
c. ABA d. Gibberellins

3. Increase in wheat yield potential so far results from

a. Increase in HI
b. Increase in dry matter production
c. Increase in stem weight
d. Increase in leaf weight

4. VAM is mostly used in

a. Perennial trees b. Annual crops
c. Biennial crops d. All

5. The CO_2 conc. at which photosynthetic fixation just balances respiratory loss is known as

a. O_2 compensation point b. O_2 saturation point
c. CO_2 compensation point d. CO_2 saturation point

6. In which cell organelle, PEP carboxylation is taking place in C_4 plants

a. Epidermal cells b. Mesophyll cells
c. Xylem cells d. Bundle sheath cells

7. Major form of carbon transfer in plants is by

a. Sucrose b. Glucose
c. Fructose d. Maltose

8. The term vernalization relates

a. To low temperature promotion of flowering
b. To low temperature promotion of early germination
c. To high temperature for early ripening
d. None

9. Which cell organelle concerned with glyoxylate metabolism

a. Spherosomes b. Lysosomes
c. Ribosomes d. Glyoxysomes

10. Which statement about the function of the casparian strip is correct?

a. It prevents excess transpiration from leaves
b. It regulates ions movement into root vascular cylinder
c. It prevent disease causing organisms from invading the plant
d. It is the pathway for nutrient transfer from xylem to phloem

11. The class of water in the soil, that provides most of the water of plants and is thus the most important, is

a. Gravitational b. Field capacity
c. Capillary d. Hygroscopic

12. When a cell is placed in a hypertonic solution, its water potential

a. Increase
b. Decrease
c. Equal
d. First increase and then decrease

13. In soil, water available to the root is

a. Capillary water b. Gravitational water
c. Chemically bound water d. Hygroscopic water

14. A cells is placed in 4 M solution of salt and no change in the volume of the cell is observed. The concentration of cell sap is

a. 0.4 M b. 4 M
c. 40 M d. 0.01 M

15. The cell sap is

a. Living content of the vacuole
b. Living content of the cell
c. Non living content of the cell
d. Non living content of the vacuole

16. The metabolic activities of root cells are the main cause of water absorption in

a. Passive absorption
b. Active absorption
c. Both passive and active absorption
d. None of the above

In case of less than 80% score, go through brief review and glance once again from chapter

Key: 1-b 2-c 3-a 4-a 5-c 6-b 7-a 8-a 9-d 10-b 11- c 12-b 13-a 14-a 15-d 16-b

10

Microbiology and Pathology

1. Who is credited with discovery of bacteria?

a. Louis pasteur b. Leeuwenhoek
c. Needham d. Tyndall

Ans. (b) Leeuwenhoek

2. Founder of modern bacteriology is

a. Leewenhoek b. Pasteur
c. Robert Koch d. None

Ans. (c) Robert Koch

3. Founder of bacteriological techniques is

a. Pasteur b. Koch
c. Gram d. Buchner

Ans. (b) Koch

4. Gram staining was discovered by gram in year

a. 1762 b. 1932
c. 1884 d. 1890

Ans. (c) 1884

5. Gram stain used is an example of

a. Simple stain b. Differential stain
c. Acid fast stain d. None

Ans. (b) Differential stain

6. Acid fast staining used for such bacteria

a. Mycobacterium b. Rhizobium
c. Bacillus sp. d. Clostridium

Ans. (a) Mycobacterium

7. Counter stain used in gram staining

a. Ethyl alcohol b. Iodine solution
c. Crystal violet d. Safranin

Ans. (d) Safranin

8. Agar-Agar was developed by

a. Joseph Lister b. Koch
c. Hesse d. Pasteur

Ans. (c) Hesse

9. Facultative free living 'N' fixing bacterium

a. Rhizobium b. Azotobacter
c. Klebsiella d. None

Ans. (b) Azotobacter

10. Cubical packets of 8 cells is called in bacteria

a. Staphylococcus b. Diplococcus
c. Bacillus d. Sarcinae

Ans. (d) Sarcina

11. Braun's lipoprotein is present in

a. Gram +ve bacteria b. Gram -ve bacteria
c. Bacteriophage d. Yeast

Ans. (b) Gram -ve bacteria

12. In endospore staining which one is used

a. Malachite green b. Basic fuschin
c. Indian ink d. Methylene blue

Ans. (a) Malachite green

13. Pseudomurein is present in which organism

a. Archaebacteria b. Eubacteria
c. Eukaryote d. Fungi

Ans. (a) Archaebacteria

14. Mesosomes are well developed in

a. Gram +ve bacteria b. Yeast
c. *E.coli* d. Mycoplasma

Ans. (a) Gram +ve bacteria

15. Energy parasite

a. Spirilla b. Mycoplasma
c. Chlamydia d. Archaebacteria

Ans. (c) Chlamydia

16. Example of pleomorphic bacteria

a. Acetobacter b. Azotobacter
c. Achromobacter d. Arthrobacter

Ans. (b) Azotobacter

17. N–reserve materials in cyanobacteria

a. Volutin granular
b. PHB
c. Polysaccharidesd.
d. Cyanophycin granules

Ans. (d) Cyanophycin granules

18. Cyst formation is characteristic feature of

a. Acetobacter b. Arthrobacter
c. Azotobacter d. None

Ans. (c) Azotobacter

19. Lysozyme treated cells of gram +ve bacteria are called

a. Protoplast b. Sphaeroplast
c. Cytoplasm d. None

Ans. (a) Protoplast

20. Bacteria having especially high rate of respiration

a. Rhizobium b. Azotobacter
c. *E.coli* d. Acetobacter

Ans. (b) Azotobacter

21. Lysozyme treated cells of gram -ve bacteria are called

a. Protoplast b. Spheroplast
c. Cytoplasm d. Mesosomes

Ans. (b) Spheroplast

22. Species of mycoplasma are inhibited by

a. Penicillin b. Tetramycin
c. Both d. None

Ans. (b) Tetramycin

23. Xanthomonas is an example of

a. Monotrichous b. Peritrichous
c. Lophotrichous d. Cephalotrichous

Ans. (a) Monotrichous

24. Test organism for pasteurization is

a. Coxicella burnetti
b. Clostridium pasteurizanum
c. Bacillus subtilis
d. Bacillus steareothermophillus

Ans. (a) Coxicella burnetti

25. Ray fungi is the name given to

a. Rhizopus b. Yeast
c. Actinomycetes d. Mycoplasma

Ans. (c) Actinomycetes

26. Actinomycetes are

a. Gram +ve, aerobic b. Gram +ve, anaerobic
c. Gram -ve, aerobic d. Gram -ve, anaerobic

Ans. (a) Gram +ve, aerobic

27. Example for microaerophilic N_2 fixer

a. Rhizobium b. Azotobacter
c. *E.coli* d. Frankia

Ans. (b) Azotobacter

28. Citric acid is produced by

a. *Aspergillus niger* b. Acetobacter
c. Acetobutylicum d. none

Ans. (a) Aspergillus niger

29. Vitamin B_2 is produced by

a. *Ashbya gossypii* b. Pseudomonas
c. Brevibacterium d. None

Ans. (a) *Ashbya gossypii*

30. Bacitracin is produced by

a. *Bacillus subtilis* b. Aspergillus niger
c. *E. coli* d. Yeast

Ans. (a) *Bacillus subtilis*

31. Production of vinegar is by

a. Bacillus subtilis b. Azotobacter
c. Glucanobacter d. none

Ans. (c) Glucanobacter

32. First antifungal antibiotic

a. Cycloheximide b. Aureofungin
c. Neomycin d. Nystatin

Ans. (d) Nystatin

33. Neomycin is produced by in activate the bacteria DNA polymerase

a. *S. Nouesii* b. *S. fradiae*
c. *S. Erthyreus* d. *S. Venezuelea*

Ans. (b) *S. fradiae*

34. Inhibitory action of penicillin is

a. Cell wall synthesis b. Protein synthesis
c. Both d. None

Ans. (a) Cell wall synthesis

35. Organism involved in swiss cheese ripening

a. Penicillium sp. b. Propionibacterium
c. Streptococcus sp. d. None

Ans. (b) Propionibacterium

36. Phosphorus solubilising microorganism

a. VAM b. Mucor
c. Rhizopus d. *E.coli*

Ans. (a) VAM

37. The term mycorrhiza is coined by

a. Frank b. Hartig
c. De bary d. Winogradasky

Ans. (a) Frank

38. Name the scientists involved in commercial production of Penicillin

a. Alexander Flemming b. Florey and Chain
c. Tulsane Brothers d. Louis Pasteur

Ans. (a) Alexander Flemming

39. Development of plants due to increase in number of cells is called

a. Hypertrophy b. Hypotrophy
c. Hyperplasia d. Hypoplasia

Ans. (c) Hyperplasia

40. Name the bacterium producing endospore is

a. Bacillus b. Agrobacterium
c. Xanthomonas d. *E.coli*

Ans. (a) Bacillus

41. The most resistant form of microbial life in the bacteria is

a. Cyst b. Endospore
c. Vegetative stage d. None

Ans. (b) Endospore

42. UV light is most germicidal at the wavelength of

a. 245 nm b. 255 nm
c. 265 nm d. None

Ans. (c) 265 nm

43. UV light are microcidal due to the formation of

a. Pyrine dimers
b. Pyrimidene dimmers
c. DNA damage
d. RNA damage

Ans. (b) Pyrimidene dimmers

44. Low pH of media inhibits the growth of

a. Bacteria b. Molds
c. Both d. None

Ans. (a) Bacteria

45. Canning is a food preservation technique first derived by

a. Appert b. Pasteur
c. Buchner d. Menton

Ans. (a) Appert

46. Which of the following is/are bioinsecticides

a. *Bacillus thuringiensis* b. *Bacillus popilliae*
c. Both d. None

Ans. (c) Both

47. Fumaric acid produced by

a. *Aspergillus niger* b. *Aspergillus terrus*
c. *Aspergillus fumigates* d. *Rhizopus nigricans*

Ans. (d) Rhizopus nigricans

48. Ionizing radiation to sterilize materials is called

a. Ionization b. Pasteurization
c. Cold sterilization d. Tyndallisation

Ans. (c) Cold sterilization

49. Rhizosphere was coined by

a. Hiltner b. Beijernick
c. Winogradasky d. None

Ans. (a) Hiltner

50. ATP needed for N_2 fixation

a. 12 b. 16
c. 28 d. 32

Ans. (b) 16

51. Factor which does not affect legume root nodulation

a. Temperature b. Light
c. Combined N_2 d. H^+ ion conc.

Ans. (b) Light

52. Microaerophillic N_2 fixing bacteria

a. Azotobacter b. Azospirillum
c. Clostridium d. Enterobacter

Ans. (b) Azospirillum

53. Bacteria which can ferment sugar faster than yeast

a. Clostridium b. Bacillus
c. Thiobacillus d. Zygomonas

Ans. (d) Zygomonas

54. Father of soil microbiology is

a. Winogradasky b. Beijernick
c. Hiltner d. Spermi

Ans. (a) Winogradasky

55. Glycolysis inhibition in the presence of oxygen is called

a. Warburg effect
b. Hypoglycolytic effect
c. Pasteur effect
d. None

Ans. (c) Pasteur effect

56. Wood sugar is

a. Glucose
b. Mannose
c. Xylose
d. Arabinose

Ans. (c) Xylose

57. A mat of organism formed at the surface of a liquid culture is called

a. Biofilm
b. Pellicle
c. Scum
d. Foam

Ans. (c) Biofilm

58. Alginates are isolated from

a. Rhodophyta
b. Bryophyta
c. Chlorophyta
d. Phaeophyta

Ans. (d) Phaeophyta

59. The first antiseptic agent used was

a. Mercuric chloride
b. Carbolic acid
c. Alcohol
d. Hyposolution

Ans. (b) Carbolic acid

60. All bacteria having a conjugative plasmid will have

a. Drug resistance
b. Sex pili
c. Flagella
d. All of the above

Ans. (b) Sex pili

61. A fluorescent dye used in fluorescent microscopy is

a. Acridine orange
b. Phosphotungstic acid
c. Ethium bromide
d. Luciferin

Ans. (c) Ethium bromide

62. A mutation with multiple effect on the phenotype is called

a. Multiple mutation
b. Frame shift mutation
c. Pleotropic mutation
d. None

Ans. (c) Pleotropic mutation

63. Which among the following is used for insertion of foreign DNA into cells?

a. Agrobacterium
b. Vaccinia virus
c. Hela cells
d. All of these

Ans. (a) Agrobacterium

64. Starting material for wine making is

a. Molasses
b. Barley malt
c. Grape juice
d. Beet root mash

Ans. (c) Grape juice

65. Virus quantification in a given sample is done by

a. End point efflux
b. End point dilution
c. End point titration
d. All of these

Ans. (b) End point dilution

66. Which among the following is a flagellated cyanobacteria?

a. Chroococcum
b. Nostoc
c. Both a and b
d. None

Ans. (d) None

67. Which among the following is a restriction modification in DNA?

a. Capping
b. Tailing
c. Methylation
d. Phosphorylation

Ans. (c) Methylation

68. First antifungal antibiotic is

a. Nystatin
b. Cycloheximide
c. Aureofungin
d. None

Ans. (a) Nystatin

69. A medium in which different types of micro-organisms exhibit different growth forms so that they could be distinguished is called

a. Selective medium
b. Synthetic medium
c. Differential medium
d. Preferential medium

Ans. (c) Differential medium

70. Cell–cell interaction and differentiation is mostly studied on

a. *Arabidopsis thaliana*
b. *Cenorabditis elegens*
c. *E.coli*
d. *Dictyostlium discodeum*

Ans. (d) *Dictyostlium discodeum*

71. Milky disease is caused by

a. *Bacillus thuringiensis*
b. *Lactobacillus lactis*
c. *Bacillus papillae*
d. None

Ans. (c) *Bacillus papillae*

72. A bacterial cell which lacks a chromosome but contains all the components for transcription and translation

a. Maxi cell
b. Empty cell
c. Mini cell
d. Ghost cell

Ans. (c) Mini cell

73. Fractional sterilization is

a. Appertization
b. Pasteurization
c. Tyndalization
d. Cold sterilization

Ans. (c) Tyndalization

74. In gram staining the alcohol acts on

a. Teichoic acid
b. Peptidoglycan
c. Periplasm
d. Membrane lipids

Ans. (d) Membrane lipids

75. Partial diploid in bacteria is called

a. Merozygote
b. Heterokaryon
c. False zygote
d. None

Ans. (a) Merozygote

76. Specialized N fixing cells in filamentous cyanobacteria are

a. Akinites
b. Endospores
c. Cysts
d. Heterocysts

Ans. (d) Heterocysts

77. Cell to cell communication in legume rhizobium symbiosis is carried out by

a. Lectins
b. Flavanoids
c. Isoflavons
d. Haemoglobin

Ans. (a) Lectins

78. Bacterial endospores are characterized by the presence of

a. Diaminopimelic acid
b. Polybetahydroxy butyrate
c. Dipicolinic caid
d. All

Ans. (d) All

79. In leghaemoglobin the heme portion is specified by

a. Plantgenes
b. Bacterial genes
c. Both
d. None

Ans. (b) Bacterial genes

80. Giemsa stain are used as particularly applicable for staining

a. Rickettsias
b. Spores
c. Protozoa
d. Both a and c

Ans. (d) Both a and c

81. Name the organism which are predatory on bacteria

a. Virus
b. Viroid
c. Bdellovibrios
d. Prion

Ans. (c) Bdellovibrios

82. In cocoa fermentation the microbial inoclumn used is of

a. Aspergillus niger
b. Candida krusei
c. Rhizopus oryzae
d. None

Ans. (b) Candida krusei

83. Riboflavin can be obtained by microbial fermentation using fungi

a. *Ashbya gossypii*
b. *Rhizopus oryzae*
c. Sacchromycetes
d. None

Ans. (a) Ashbya gossypii

84. Tetracycline is effective against

a. Gram +ve bacteria
b. Gram -ve bacteria
c. Fungi
d. Broad spectrum

Ans. (d) Broad spectrum

85. Bacitracin is effective against

a. Gram +ve bacteria
b. Gram -ve bacteria
c. Fungi
d. Broad spectrum

Ans. (a) Gram +ve bacteria

86. Pili are filamentous hair like structures on the surface of only

a. Gram +ve bacteria
b. Gram -ve bacteria
c. Both
d. None

Ans. (b) Gram -ve bacteria

87. The phenomenon of inhibiting the growth of bacteria without killing them

a. Bactericidal
b. Bacteriostatic
c. Both
d. None

Ans. (b) Bacteriostatic

88. A cell wall component which anchors the outer membrane of enteric gram negative bacteria to the peptidoglycan layer

a. Teichoic acid
b. Lignic acid
c. Braun lipoprotein
d. None

Ans. (c) Braun lipoprotein

89. Protein coat of a virus

a. Capsule
b. Capsid
c. Envelope
d. Coat

Ans. (b) Capsid

90. An antiviral substance produced by animal tissue

a. Virion
b. Interferon
c. Antibody
d. Antigen

Ans. (b) Interferon

91. Nitrogenous enzyme first isolated from

a. *Clostridium pasteurianum*
b. *Bacillus* sp.
c. *Azotobacter*
d. Penicillium

Ans. (a) *Clostridium pasteurianum*

92. Fungi used for bioassay of biotin

a. Neurospora
b. Yeast
c. Aspergillus
d. Penicillium

Ans. (a) Neurospora

93. Which is a plant pathogen bacteria

a. Shigella
b. *E. coli*
c. Salmonella
d. Erwinia

Ans. (d) Erwinia

94. Anaerobic free living N fixing bacterium

a. Azotobacter
b. Acetobacter
c. Kelbsiella
d. Clostridium

Ans. (d) Clostridium

95. Virus – "Contangium vivum fluidum" was given by

a. A. Mayer
b. Beijernick
c. Iwanoski
d. None

Ans. (b) Beijernick

96. Itaconic acid produced by

a. Aspergillus terrus
b. Aspergillus itaconicus
c. Both
d. None

Ans. (c) Both

97. Phagocytosis is discovered by

a. Robert Koch
b. Elie Metchnikoff
c. Joseph Lister
d. Fanny Hesse

Ans. (b) Elie Metchnikoff

98. Lipopolysaccharide is found in cell wall of

a. Gram +ve bacteria
b. Gram –ve bacteria
c. Both
d. Fungi

Ans. (b) Gram –ve bacteria

99. In autoclave which form of heat is used?

a. Dry heat
b. Moist heat
c. Vaccum heat
d. None

Ans. (a) Dry heat

100. Who developed cell free fermentation of modern science?

a. Koch
b. Pasteur
c. Buchner
d. None

Ans. (c) Buchner

101. Nitrogenase enzyme has how many components?

a. 1
b. 2
c. 3
d. 4

Ans. (b) 2

102. Antiseptic surgery is given by

a. Joseph Lister
b. Koch
c. Schrcedes
d. Jenner

Ans. (a) Joseph Lister

103. Number of chromosome in bacteria

a. 0
b. 2
c. 1
d. Many

Ans. (c) 1

104. Murein is present in

a. Cyanobacteria
b. Halobacterium
c. Methanobacterium
d. None

Ans. (a) Cyanobacteria

105. Sterols are present in

a. Eubacteria
b. Fungi
c. Mycoplasma
d. None

Ans. (c) Mycoplasma

106. Father of bacteriology

a. Eichels
b. Woose
c. Haeckenl
d. Chester

Ans. (a) Eichels

107. Microorganism which are associated with non legumes

a. Anabaena
b. Klebsiella
c. Both
d. None

Ans. (c) Both

108. In archaebacteria which one is present in cell wall?

a. Murein
b. Pseudomurein
c. Both
d. None

Ans. (b) Pseudomurein

109. Mesosomes are well developed in

a. *E. coli*
b. Proteus vulgaris
c. Bacillus
d. None

Ans. (c) Bacillus

110. Smallest self replicating prokaryotes capable of generating their own energy

a. Mycoplasma
b. Virus
c. Chlamydia
d. Rickettias

Ans. (a) Mycoplasma

111. Species of mycoplasma are inhibited by

a. Penicillin
b. Tetracycline
c. Both
d. None

Ans. (b) Tetracycline

112. Principal sites for CO_2 fixation in autotrophic prokaryotes

a. Chromosomes
b. Carboxysomes
c. Both
d. None

Ans. (b) Carboxysomes

113. Which one is not correct about mesosomes?

a. Prominemty in gram + ve bacteria
b. Prominemty in gram -ve bacteria
c. Helps in cell division
d. Helps in DNA replication

Ans. (b) Prominemty in gram -ve bacteria

114. In gram + ve bacteria flagella

a. Only M ring is present
b. Only S ring is present
c. Only S and M rings are present
d. All rings L, P, S and M are present

Ans. (c) Only S and M rings are present

115. Bacteria are commonly seen in soils such as

a. Acidic
b. Neutral
c. Alkaline
d. Saline

Ans. (b) Neutral

116. In archaebacteria, first aminoacid to initiate a new polypeptide chain

a. Methionine
b. Cysteine
c. Lysine
d. None

Ans. (a) Methionine

117. Amylases produced by

a. Aspergillus sp.
b. Bacillus sp.
c. Both
d. None

Ans. (c) Both

118. Lipase produced by

a. Bacillus subtilis
b. Rhizopus sp.
c. Aspergillus sp.
d. None

Ans. (b) Rhizopus sp.

119. Red pigment produced by

a. Serratia
b. Micrococcus
c. Both
d. None

Ans. (a) Serratia

120. Bacillus is a

a. Psychrophillic
b. Thermophillic
c. Osmophillic
d. Gas former

Ans. (b) Thermophillic

121. Commercial (now a days) production of penicillin is

a. *Penicillium notatum*
b. *Penicillium chrysogenium*
c. *Aspergillus* sp.
d. None

Ans. (b) *Penicillium chrysogenium*

122. Antibiotic streptomycin was isolated by

a. Buiknokles
b. Flemming
c. Walksman
d. Duggar

Ans. (c) Walksman

123. An aminoglycoside antibiotic

a. Penicillin
b. Streptomycin
c. Tetracycline
d. None

Ans. (b) Streptomycin

124. Mesophiles have temperature range of

a. 25–45°C
b. 15–30°C
c. 20–45°C
d. 15–45°C

Ans. (d) 15–45°C

125. Root surface that can be colonized by the microbes

a. Rhizosphere
b. Rhizoplane
c. Both
d. None

Ans. (b) Rhizoplane

126. Numbers of layers surrounding the heterocyst

a. 1
b. 2
c. 3
d. 4

Ans. (c) 3

127. Heterocyst lack

a. PS I
b. PS II
c. Both
d. None

Ans. (a) PS I

128. Fungi used for bioassay of pantothenic acid

a. Yeast
b. Neurospora
c. Mucor
d. Aspergillus

Ans. (a) Yeast

129. Fermenting organism involved in yoghurt

a. Streptococcus
b. Aspergillus
c. Podiococcus
d. None

Ans. (a) Streptococcus

130. Microbe used for sarurkraut preparation

a. A. Niger
b. Streptococcus sp.
c. Leuconostoc sp.
d. None

Ans. (c) Leuconostoc sp.

131. Ropiness of unpacked bread is due to growth of

a. Bacillus subtilis
b. A. Niger
c. Streptococcus sp.
d. Clostridium sp.

Ans. (a) Bacillus subtilis

132. Example of chemolithotroph

a. *E.coli*
b. Bacillus
c. Azotobacter
d. Nitrosomonas

Ans. (d) Nitrosomonas

133. Iron bacteria which oxidises ferrous into ferric compound

a. Leptothrix
b. Beggiotoa
c. Both
d. None

Ans. (a) Leptothrix

134. Nitrate reductase enzyme present in

a. Cytoplasm
b. Chloroplast
c. Mitochondria
d. Nucleus

Ans. (a) Cytoplasm

135. Test organism for phenol coefficient

a. Salmonella typhii
b. Staphylococcus aureus
c. Both
d. None

Ans. (c) Both

136. Microbe involved in fibre retting

a. *Micrococcus* sp.
b. *Bacillus subtilis*
c. *Clostridium butrycium*
d. *Lactobacillus* sp.

Ans. (c) *Clostridium butrycium*

137. Microbe involved in tobacco curing

a. *Micrococcus* sp.
b. *Bacillus subtilis*
c. A. Niger
d. *Lactobacillus* sp.

Ans. (a) Micrococcus sp.

138. Urea degrading bacteria

a. *Bacillus pasturi*
b. *Clostridium pasteurianum*
c. A. Niger
d. *Micrococcus* sp.

Ans. (a) Bacillus pasturi

139. 'P' solubilizing bacteria

a. Bacillus megatherium
b. Clostridium pasteurianum
c. A. Niger
d. Micrococcus sp.

Ans. (a) Bacillus megatherium

140. Example of eukaryotic inhibitor antibiotic

a. Cycloheximide
b. Penicillium
c. Tetracycline
d. Streptomycin

Ans. (a) Cycloheximide

141. Lactose sugar of milk is converted into lactic acid by

a. *Streptococcus lactis*
b. *Lactobacillus* sp.
c. *Clostridium* sp.
d. None

Ans. (b) *Lactobacillus* sp.

142. Which of the following is used to detect the presence of HIV?

a. ELISA test
b. Benedict's test
c. Widal test
d. Biuret's test

Ans. (a) ELISA test

143. Which of the following does not produce any enzyme?

a. Amoeba
b. Virus
c. Bacteria
d. Fungi

Ans. (b) Virus

144. A virus that may not destroy the host

a. Virulent phage
b. Temperate phage
c. Cyano phage
d. Lytic cycle

Ans. (b) Temperate phage

145. Prions are

a. Organism containing only nucleic acid
b. Proteins which are capable of replications in certain mammalian cells
c. Small cells which are infectious
d. Fungal toxins

Ans. (b) Proteins which are capable of replications in certain mammalian cells

146. A virions is a

a. Infectious nucleic acid
b. Infectious virus particle
c. A virus parasite on bacteria
d. None

Ans. (b) Infectious virus particle

147. Which bacterium solublizes tricalcium phosphate in soluble rock phosphates in soils

a. Bacillus polymyxa
b. Pseudomonas striata
c. Spirillum lipoferum
d. Both a and b

Ans. (b) Pseudomonas striata

148. Number of flagella in cyanobacteria are

a. 0
b. 1
c. 2
d. 3

Ans. (a) 0

149. Type of relationship between Acetobacter diazotrophicus and sugarcane is

a. Symbiotic
b. Associative
c. Endophytic
d. Free living

Ans. (c) Endophytic

150. Example of VAM fungi

a. Pisoletecis
b. Sclerotenia
c. Glomus
d. Trichoderma

Ans. (c) Glomus

151. Chemolithotrophs are those bacteria which can utilize

a. Inorganic material as the energy source
b. Light as the energy source
c. Organic compound as the electron source
d. Crude oil as carbon source

Ans. (a) Inorganic material as the energy source

152. The spirochete responsible for syphilis is

a. Borellia
b. Spirocheta
c. Leptospira
d. Treponema

Ans. (d) Treponema

153. A lysogen of *E. coli* becomes resistant to further infection by bacteriophage lambda because

a. *E. coli* no longer contains receptors on its cell surface
b. One copy of phage is already present inside the cell
c. Presence of repressor in cell
d. *E. coli* is dead

Ans. (b) One copy of phage is already present inside the cell

154. All the members of genus Bacillus are known as

a. Their ability to break down sulphur containing compounds
b. Their ability to form spores
c. Their ability to live in the absence of oxygen
d. The capsules they possess

Ans. (b) Their ability to form spores

155. Autoclaves are routinely used in labs for sterilization. It acts by

a. Disrupting cell membranes
b. Denaturing proteins
c. Changing physically membrane lipids
d. All

Ans. (d) All

156. Mycoplasmas are different from other prokaryotes by

a. Presence of chitin in cell walls
b. Presence of murein in cell walls
c. Presence of protein in cell walls
d. Absence of cell wall itself

Ans. (d) Absence of cell wall itself

157. During conjugation

a. Cell to cell contact required
b. Naked DNA transferred
c. Bacteriophage mediates DNA transfer
d. Only plasmid is transferred from donar to recipient

Ans. (a) Cell to cell contact required

158. Archaeal cells usually do not contain peptidoglycan, rather contain pseudopeptidoglycan which is mainly composed of

a. N-acetylmuramic acid and L- aminoacid
b. N-acetyltalosaminuronic acid and D- aminoacid
c. N-acetylmuramic acid D- aminoacid
d. N-acetyltalosaminuronic acid L- aminoacid

Ans. (d) N-acetyltalosaminuronic acid L- aminoacid

159. Chalamydiae are distinguished by all the following characteristics *except*

a. They are tiny bacteria
b. Their developmental cycle includes an elementary body and a reticulate body
c. They cause rocky mountain spotted fever and typhus
d. They multiply only in living cells

Ans. (c) They cause rocky mountain spotted fever and typhus

160. Pasteurization of milk is done by

a. Boiling the milk for 20 minutes
b. Heating the milk at 72°C for 30 minutes
c. Heating the milk at 72°C for 20 minutes
d. Heating the milk at 62°C for 30 minutes

Ans. (d) Heating the milk at 62°C for 30 minutes

161. The group of organism which uses light as energy source and CO_2 as the principal carbon source

a. Photoheterotrophs
b. Chemoautotrophs
c. Chemoheterotrophs
d. Photoautotrophs

Ans. (d) Photoautotrophs

162. Which one of the following sequences has helped in identifying eukaryotes. Eubacteria and archaebacterial cell types?

a. Signature sequence
b. Signal sequence
c. Shine-dalgarno sequence
d. Aminoacid sequence

Ans. (a) Signature sequence

163. Media containing spores and thermolabile constituents are sterilized by

a. Pasteurization
b. UV irradiation
c. Dry heat
d. Tyndallisation

Ans. (b) UV irradiation

164. A highly aerobic and metabolically versatile organism used in oil spill clearing is

a. Mycobacterium smegmatis
b. Azotobacter vinelandii
c. Pseudomonas cepacia
d. Leuconostoc mesenteroides

Ans. (c) Pseudomonas cepacia

165. Penicillin and lysozyme prevent synthesis and cause lysis, respectively, of cell walls of

a. Micrococcus lysodeikticus
b. *E. coli*
c. S. Cerevisiae
d. Methanobacterium barkeri

Ans. (a) Micrococcus lysodeikticus

166. In an $F^+ \times F^-$ cross

a. F^+ cell becomes an hfr cell
b. F^- cell becomes an hfr cell
c. F^+ cell becomes an F^- cell
d. F^- cell becomes an F^+ cell

Ans. (d) F^- cell becomes an F^+ cell

167. A bacterial cell that is mostly haploid, but is diploid for some regions of the genome is called

a. Heterodiploid
b. Pseudodiploid
c. Half diploid
d. Mero diploid

Ans. (d) Mero diploid

168. Interferon

a. Is species specific
b. Reacts directly with virus particles to inactivate them
c. Reacts with cells, and the affected cells then become resistant to a no. of different values
d. Is constitutively produced at high levels in cells but require an inducer for activity

Ans. (c) Reacts with cells, and the affected cells then become resistant to a no. of different values

169. Bacteria which directly convert atmospheric nitrogen into NH_4^+ are called

a. Denitrifying bacteria
b. Nitrifying bacteria
c. Nitrogen fixing bacteria
d. b and c

Ans. (c) Nitrogen fixing bacteria

170. Pili represent

a. Extra chromosomal genetic elements
b. Protoplasmic outgrowths of donor cells
c. Small flagella
d. Special bacterial cells

Ans. (b) Protoplasmic outgrowths of donor cells

171. Streaming of protoplasm is absent in

a. Parenchyma and collenchymas cells
b. Bacterial cells and vessels
c. Cells of higher plants
d. Cells of hydrilla

Ans. (b) Bacterial cells and vessels

172. Which of the following is essential for living cells?

a. Flagella
b. Capsule
c. Cell wall
d. Cytoplasmic membrane

Ans. (d) Cytoplasmic membrane

173. Bacterial flagella impart motility to the cell by

a. Undulating membrane
b. Rotatory membrane
c. Gliding
d. Both a and b

Ans. (b) Rotatory membrane

174. Bacteria broth cultures eventually stop growing and enter stationary phase because they

a. Deplete essential nutrients
b. Accumulate toxic products
c. Become too crowded
d. Both a and b

Ans. (d) Both a and b

175. Genome of organism includes genes from

a. Chromosome
b. Mitochondria
c. Plasmids
d. All

Ans. (d) All

176. A virion is a

a. Naked, infectious piece of DNA
b. Complete, infectious virus particle
c. Nucleic acid without a capsid
d. Naked, infectious piece of RNA

Ans. (b) Complete, infectious virus particle

177. Animal viruses usually penetrate a host cell by

a. Injection
b. Exocytosis
c. Endocytosis
d. A vector

Ans. (c) Endocytosis

178. An envelope is acquired during which of the following steps?

a. Penetration
b. Release
c. Lysis
d. Assembly

Ans. (b) Release

179. A virus with RNA–dependent RNA polymerase

a. Synthesizes DNA from RNA template
b. Synthesizes dsRNA from RNA template
c. Synthesizes dsRNA from DNA template
d. Transcribes mRNA from DNA

Ans. (b) Synthesizes dsRNA from RNA template

180. Ability of a virus to infect an organism is regulated by

a. Host species
b. Type of cells
c. Availability of an attachment site
d. All

Ans. (d) All

181. Which of the following statement is incorrect?

a. Bacteria divide by binary fission
b. No. of bacteria increases exponentially
c. Bacterial growth is defined in terms of population size
d. None

Ans. (d) None

182. HIV, a retrovirus contains

a. Two copies of negative sense ssRNA
b. One ssRNA
c. Two copies of dsRNA
d. Two copies of positive sense ssRNA

Ans. (d) Two copies of positive sense ssRNA

183. Bacteria that must have organic molecules both for energy and as a source of carbon are called

a. Photoautotrophs
b. Photoheterotrophs
c. Chemoheterotrophs
d. Chemoautotrophs

Ans. (c) Chemoheterotrophs

184. Bacteria that get their energy by fermentation and for whom oxygen is lethal are called

a. Obligate anaerobes
b. Obligate aerobes
c. Facultative aerobes
d. Facultative anaerobes

Ans. (a) Obligate anaerobes

185. Bacteria (*Treponema pallidium*) that cause the venereal disease syphilis are

a. Pseudomonads
b. Purple nonsulfur
c. Rickettsias
d. Spirochetes

Ans. (d) Spirochetes

186. Heterocyst of cyanobacteria

a. Specialized for oxygenic photosynthesis
b. Forms spores
c. Specialized for gamete formation
d. Specialized for N_2 fixation

Ans. (d) Specialized for N_2 fixation

187. What is true about *E. coli*?

a. It is a parasite in the liver of man
b. It shows syngamy and meiosis
c. It exhibits alternation of generation
d. It lives symbiotically in the colon of humans

Ans. (d) It lives symbiotically in the colon of humans

188. Periplasm is

a. Found in both gram –ve and gram + ve bacteria
b. Found to contain specific bacterial lipids
c. Space between two plasma membrane
d. Artifact from microscopic aberrations

Ans. (a) Found in both gram –ve and gram + ve bacteria

189. Which is true for bacteria?

a. Bacteria lack DNA
b. Mitochondria and nuclear membrane is present
c. Nuceoid is the region which contains DNA
d. RNA acts as genetic material

Ans. (c) Nuceoid is the region which contains DNA

190. Plasmids do which of the following?

a. Direct synthesis of conjugation pili
b. Provide resistance to certain antibiotics
c. Induce the formation of tumors in plants
d. All

Ans. (d) All

191. Retrovirus RNA encodes for all of the following genes, *except*

a. gag
b. pol
c. env
d. ela

Ans. (d) ela

192. Which of the following statement is false?

a. Most bacteria in nature are lysogens
b. Lysogenic phage contains ds DNA
c. Biosynthesis of DNA containing animal virus occur in nucleus
d. TMV is minus ssRNA virus

Ans. (d) TMV is minus ssRNA virus

193. Retroviruses have RNA genome, however they replicaye through ds DNA formation. This process involves

a. Polymerase coded by virus itself
b. Polymerase coded by host
c. Host DNA polymerase
d. Unknown mechanism

Ans. (a) Polymerase coded by virus itself

194. Bacteriophage MS2

a. Contains ds DNA as genetic material
b. Contains ss RNA and infect only F^+ *E. coli*
c. Contains minus (–) stranded RNA
d. Does not require pili for infection to E. coli

Ans. (b) Contains ss RNA and infect only F^+ E. Coli

195. RNA as genetic material found in which of the following organism?

a. Plasmodium
b. *Staphylococcus aureus*
c. *Schizosaccharomyces cerevisiae*
d. Polio virus

Ans. (d) Polio virus

196. Which one of the following viruses replicate in the cytoplasm?

a. SV40
b. Adenovirus
c. Vaccinia virus
d. Herpex simplex virus

Ans. (c) Vaccinia virus

197. Oncoprotein Ras is a

a. Kinase
b. ATPase
c. GTPase
d. Phosphotase

Ans. (c) GTPase

198. Bacteriophage M13 contains as its genetic material

a. ssRNA
b. dsRNA
c. ss DNA
d. ds DNA

Ans. (c) ss DNA

199. Genome of cauliflower mosaic virus is

a. +ve stranded RNA
b. ss DNA
c. ds DNA
d. dsRNA

Ans. (c) ds DNA

200. Infectious ssRNAs in plants that are not associated with any protein are called

a. Viruses b. Viroids
c. Prions d. Satellite viruses

Ans. (b) Viroids

PATHOLOGY

201. In 1845, the late blight of potato destroyed the potato crop of Ireland was caused by

a. *Phytophthora infestans*
b. *Alternaria solani*
c. *Pythium aphanidermatum*
d. *Pseudomonas solanacearum*

Ans. (a) *Phytophthora infestans*

202. In 1943, Bengal had faced a serious famine which cause a great loss in rice yield was caused by

a. *Helminthosporium oryzae*
b. *Colletotrichum falcatum*
c. *Pyricularia oryzae*
d. *Fusarium udum*

Ans. (a) *Helminthosporium oryzae*

203. Who is the father of plant pathology?

a. TJ Burill b. Needham
c. Anton de Bary d. EJ Butler

Ans. (c) Anton de Bary

204. Who advanced the gene for gene concept of disease resistance and susceptibility in 1946

a. Flor b. Vanderplank
c. Gaumann d. Muller

Ans. (a) Flor

205. Who describes the first plant nematode disease, the seed gall caused by A nguina tritici in1743 AD

a. Berkeley b. Kuhn
c. Needham d. NA Cobb

Ans. (c) Needham

206. Who is the father of American Nematology?

a. Kuhn b. H Schacht
c. NA Cobb d. TJ Burill

Ans. (c) NA Cobb

207. Who is considered founder of virology?

a. Beijernick b. AE Mayer
c. WM Stanley d. TO Diener

Ans. (a) Beijernick

208. The first Indian scientist who collected and identified fungi in India?

a. EJ Butler b. KR Kirtikar
c. JF Dastur d. KC Mehta

Ans. (b) KR Kirtikar

209. 'Fungi and disease in plants' was written in 1918 by

a. J F Dastur b. BB Mundakur
c. EJ Butler d. R. Prasad

Ans. (c) EJ Butler

210. 'Fungi and plant diseases' was written by

a. BB Mundakur b. J F Dastur
c. G Rangaswami d. KC Mehta

Ans. (a) BB Mundakur

211. In bacteria, variability is caused by

a. Conjugation
b. Transformation
c. Transduction
d. All

Ans. (d) All

212. Who done most of his work on rust diseases in India

a. R Prasad b. KC Mehta
c. BB Mundakur d. EJ Butler

Ans. (b) KC Mehta

213. Citrus canker, which originated from China is caused by pathogen

a. *Xanthomonas campestris* pv. Citri
b. *Albugo candida*
c. *Erwinia amylovora*
d. *Claviceps fusiformis*

Ans. (a) *Xanthomonas campestris* pv. Citri

214. Citrus greening disease mainly confined to

a. North India
b. South India
c. East India
d. West India

Ans. (a) North India

215. Select the disease caused by mycoplasma like organisms

a. Brinjal little leaf
b. Rice yellow dwarf
c. Sugarcane grassy shoot
d. Sesamum phyllody
e. All

Ans. (e) All

216. Select the organism which cannot synthesize protein by own enzymes

a. Bacteria b. Mycoplasma
c. RLO d. Virus

Ans. (d) Virus

217. Sandak spike disease of sandal is caused by

a. Bacteria b. Virus
c. Fungi d. MLO

Ans. (d) MLO

218. Tick out the sexual spores of fungi

a. Chlamydospores b. Sporangiospores
c. Zoospores d. Zygospores

Ans. (d) Zygospores

219. 'white blisters of crucifers' is caused by pathogen

a. Pythium debarynam b. Albugo candida
c. Sclerospora sorghi d. Plasmopora viticola

Ans. (b) Albugo candida

220. Who is the father of plant pathology in India?

a. E J Butler b. KC Mehta
c. BB Mundakur d. R Prasad

Ans. (a) E J Butler

221. Downey mildew of bajra is caused by

a. Sclerospora sorghi b. Sclerospora sacchari
c. S. graminicola d. Pernospora parasitica

Ans. (c) S. graminicola

222. Rust fungi completing their life cycle on one host are called

a. Polymorphic b. Autoecious
c. Heteroecious d. None

Ans. (b) Autoecious

223. Promycelium in Rust fungi bears

a. Basidiospores b. Aeciospores
c. Uredia d. Telia

Ans. (a) Basidiospores

224. Effective control of late blight of potato is possible by use of

a. Sanitation measures
b. Spray of metalaxl
c. Bordeaux mixture
d. All

Ans. (d) All

225. Bacterial colony known is

a. Spore b. Mycelium
c. Ooze d. Hypha

Ans. (c) Ooze

226. Albugo candida causes white blisters or white rust of crucifers is

a. Obligate parasite
b. Obligate saprophite
c. Facultative parasite
d. Facultative saprophyte

Ans. (a) Obligate parasite

227. Albugo candida produces

a. Basidiospores
b. Ascospores
c. Zoospores
d. Oospores

Ans. (d) Oospores

228. Green ear or downey mildew of pearlmillet was first time reported in India by

a. K C Mehta b. E J Butler
c. BB Mundakur d. R Prasad

Ans. (b) E J Butler

229. Downey mildew disease of pearlmillet is primarilya

a. Seed borne
b. Air borne
c. Soil borne
d. Water borne

Ans. (c) Soil borne

230. Stem gall of coriander is caused by

a. Protomyces macrosporus
b. Plasmopara viticola
c. Peronospora pisi
d. None

Ans. (a) Protomyces macrosporus

231. Symptoms of powdery mildew of pea first appears on

a. Stem b. Roots
c. Leaves d. Flowers

Ans. (c) Leaves

232. Disease caused by Leptosphaeria sacchari in sugarcane is

a. Red rot b. Black rot
c. Ring spot d. None

Ans. (c) Ring spot

233. Disease ergot of rye produces sclerotia is caused by

a. Claviceps purpurea b. C. fusiformis
c. C. sativae d. All

Ans. (a) Claviceps purpurea

234. Loose smut of wheat is

a. Internally seed borne b. Externally seed borne
c. Both a and b d. None

Ans. (a) Internally seed borne

235. Covered smut of barley is

a. Internally seed borne
b. Externally seed borne
c. Both a and b
d. None

Ans. (b) Externally seed borne

236. Which fungicide give effective control of covered smut of barley

a. Vitavax b. Ceresan
c. Agrosan 5W d. Sulphur dust

Ans. (a) Vitavax

237. Loose smut of barley is

a. Internally seed borne
b. Externally seed borne
c. Soil borne
d. All

Ans. (a) Internally seed borne

238. False smut of sugarcane can be controlled by adopting

a. Avoid the practice of ratooning
b. Disinfection of setts before planting
c. Removal of smutted whips from the field
d. All

Ans. (d) All

239. Infection of smut of maize occurs during

a. Vegetative stage b. Reproductive stage
c. After flowering d. Before sowing

Ans. (a) Vegetative stage

240. Grain smut of sorghum is externally seed borne disease caused by pathogen

a. Sphacelotheca reiliana
b. Sphacelotheca cruenta
c. Sphacelotheca sorghi
d. Tolyposporium enrenbergii

Ans. (c) Sphacelotheca sorghi

241. Smut of pearlmillet is a

a. Internally seed borne b. Externally seed borne
c. Soil borne d. All

Ans. (c) Soil borne

242. Karnal bunt of wheat first time reported in Karnal by Mitra in

a. 1929 b. 1931
c. 1941 d. 1951

Ans. (b) 1931

243. Karnal bunt of wheat is caused by

a. Neovossia indica b. Tilletia horrida
c. Urocystis tritici d. Ustilago tritici

Ans. (a) Neovossia indica

244. Karnal bunt of wheat gives foul smell in the field due to the presence of volatile compound

a. Tetramethyl amine
b. Trimethyl amine
c. Diallyl propyl sulphide
d. Allyl propyl disulphide

Ans. (b) Trimethyl amine

245. The causal organism Neovossia indica produces

a. Urediospores b. Zoospores
c. Oospores d. Teliospores

Ans. (d) Teliospores

246. The causal organism of bunt of rice is

a. Urocystis tritici
b. Tilletia foetida
c. Neovossia horrid
d. None

Ans. (c) Neovossia horrid

247. Effective control of flag smut of wheat can be done by adopting of

a. Use of resistant varieties
b. Seed treatment
c. Crop rotation
d. All

Ans. (d) All

248. Black rust or stem rust of wheat is caused by

a. Puccinia graminis tritici
b. Puccinia striformis
c. Puccinia recondita
d. Melampsora lini

Ans. (a) Puccinia graminis tritici

249. Which type of spores of Puccinia graminis tritici infect the barberry plant

a. Teliospores
b. Urediospores
c. Basidiospores
d. Aeciospores

Ans. (c) Basidiospores

250. In rust cycle the cereal host is infected by

a. Urediospores
b. Aeciospores
c. Teliospores
d. Basidiospores

Ans. (b) Aeciospores

251. Yellow rust of wheat is caused by

a. Puccinia striformis
b. Puccinia recondita
c. Puccinia graminis tritici
d. Puccinia hordei

Ans. (a) Puccinia striformis

252. In India the leaf rust of coffee was first time recorded in

a. 1856
b. 1870
c. 1880
d. 1943

Ans. (b) 1870

253. Rust of linseed and flax is caused by

a. Puccinia recondite
b. Puccinia striformis
c. Puccinia graminis tritici
d. Melampsora lini

Ans. (d) Melampsora lini

254. Rust of linseed and flax can be controlled by spray of

a. Borax
b. Dithane M-45
c. Vitavax
d. Agrosan GN

Ans. (a) Borax

255. Early blight of potato produces

a. Conidia
b. Telia
c. Uredia
d. Acecia

Ans. (a) Conidia

256. Early blight of potato is

a. Soil borne disease
b. Air borne
c. Seed borne
d. All

Ans. (a) Soil borne disease

257. Effective control of early blight of potato, which fungicide is most suitable

a. Zineb
b. Dithane M-45
c. Blitox
d. Difolatan

Ans. (b) Dithane M-45

258. Leaf spot or tikka disease of groundnut is caused by

a. Cercospora arachidicola
b. Cercosporidium personatum
c. Both a and b
d. Drechslera graminea

Ans. (c) Both a and b

259. Brown Leaf spot disease of rice is caused by

a. Drechslera graminea
b. Cercospora arachidicola
c. Xanthomonas oryzae
d. Pyricularia oryzae

Ans. (a) Drechslera graminea

260. Fungus of Drechslera oryzae produces toxins which are highly toxic to rice seedling, name of such toxin is

a. ABA
b. Trimethyl amine
c. Isobutylene
d. Cochliobolin

Ans. (d) Cochliobolin

261. Pathogen of rice blast or rotten neck is

a. Ustilago tritici
b. Pyricularia oryzae
c. Alternaria alternate
d. None

Ans. (b) Pyricularia oryzae

262. Tea rust is caused by

a. MLO
b. Virus
c. Bacteria
d. Algae

Ans. (d) Algae

263. Colletotrichum falcatum produces

a. Zygospores
b. Oospores
c. Ascospores
d. Conidiospores

Ans. (d) Conidiospores

264. Wilt of pigeonpea is caused by

a. Fusarium udum
b. Gibbrella indica
c. Rhizopus nigricans
d. Aspergillus flavus

Ans. (a) Fusarium udum

265. For the effective control of wilt, pigeonpea should be intercropped with

a. Maize
b. Pearlmillet
c. Sorghum
d. Mung

Ans. (c) Sorghum

266. The most important symptom of wilt of cotton is

a. Necrosis
b. Yellowing of tissues
c. Discolouration of tissues and plugging of vessels by hyphae
d. All

Ans. (c) Discolouration of tissues and plugging of vessels by hyphae

267. Wilt disease of sugarcane was first time reported in India from

a. Punjab
b. Tamil Nadu
c. Bihar
d. U.P.

Ans. (c) Bihar

268. Pathogen responsible for charcoal rot of soyabean is

a. Ascochyta rabiei
b. Macrophomina phaseolina
c. Rhizoctonia solani
d. Penicillium

Ans. (b) Macrophomina phaseolina

269. Incidence of black scurf of potato is more in

a. Sandy soil
b. Clay soil
c. Alluvial soil
d. Loam soil

Ans. (a) Sandy soil

270. Attack of sheath blight of rice is more during

a. Germination
b. Active tillering stage
c. Flowering
d. All

Ans. (b) Active tillering stage

271. The nematodes are

a. Monoblastic
b. Duoblastic
c. Triploblastic
d. all

Ans. (c) Triploblastic

272. The nematodes lack organs for

a. Circulation
b. Respiration
c. Both a and b
d. Excretory

Ans. (c) Both a and b

273. Citrus greening caused by

a. Fastidious bacteria
b. Fungi
c. Virus
d. MLO

Ans. (a) Fastidious bacteria

274. Uredospores of puccinia graminis are disseminated by

a. Wind
b. Animals
c. Insects
d. Birds

Ans. (a) Wind

275. G + C content of prokaryotes is

a. 20%
b. 30%
c. 50%
d. 70%

Ans. (a) 20%

276. MLO first discovered by

a. Louis Pasteur
b. Leuvenhoeck
c. Kuch
d. Mendal

Ans. (a) Louis Pasteur

277. Plant pathology written by

a. RS Singh
b. Agrios
c. VS Singh
d. AP Sinha

Ans. (b) Agrios

278. In north India and central India, the black rust inoculums cause from

a. South
b. Hilly area
c. From USA
d. From Nepal

Ans. (a) South

279. Plant disease written by

a. BB Mundakur
b. RS Singh
c. Agrios
d. KC Mehta

Ans. (b) RS Singh

280. MLO disease transmitted by

a. Leaf hopper
b. Aphid
c. Whitefly
d. Animals

Ans. (a) Leaf hopper

281. Teliospores of rust have germpores in number

a. 1
b. 2
c. 3
d. 4

Ans. (b) 2

282. Alternate host of black rust

a. Barberi b. Bajra
c. Jowar d. wheat

Ans. (a) Barberi

283. Hot water treatment of seed is useful for control of

a. Loose smut b. Covered smut
c. Rust d. Powdery mildew

Ans. (a) Loose smut

284. Smut of maize caused by

a. Ustilago tritici b. Ustilago maydis
c. Ustilago hordei d. None

Ans. (b) Ustilago maydis

285. Sterility mosaic disease of pigeonpea spread by

a. Virus b. Aphid
c. Whitefly d. Mites

Ans. (d) Mites

286. Phyllody disease of sesamum spread by

a. Leaf hopper b. Jassid
c. Aphid d. Whitefly

Ans. (a) Leaf hopper

287. Fungi imperfecti includes in

a. Deuteromycotina b. Basidiomycotina
c. Ascomycotina d. Oomycetes

Ans. (a) Deuteromycotina

288. Rust includes in

a. Deuteromycotina b. Basidiomycotina
c. Ascomycotina d. Oomycetes

Ans. (b) Basidiomycotina

289. Smut includes in

a. Deuteromycotina b. Basidiomycotina
c. Ascomycotina d. Oomycetes

Ans. (b) Basidiomycotina

290. Powdery mildew includes in

a. Deuteromycotina b. Basidiomycotina
c. Ascomycotina d. Oomycetes

Ans. (c) Ascomycotina

291. Downy mildew includes in

a. Oomycetes b. Chytridiomycetes
c. Zygomycetes d. Hypochytridiomycetes

Ans. (a) Oomycetes

292. Downy mildew of pea caused by

a. Pernospora pisi b. Albugo candida
c. Erysiphae polygoni d. None

Ans. (a) Pernospora pisi

293. Father of Indian Mycology

a. EJ Butler b. KC Mehta
c. Mundakur d. RS Singh

Ans. (a) EJ Butler

294. In 2005 which pathological scientist got Borlaug award

a. Rattan Lal b. VL Chopra
c. CD Mayee d. S Nagrajan

Ans. (d) S Nagrajan

295. Micrografting is used to produce plants free from

a. Virus b. RLO's
c. MLO's d. Bacteria

Ans. (a) Virus

296. Black heart is a physiological disorder of

a. Tomato b. Chilli
c. Potato d. Cabbage

Ans. (c) Potato

297. Tungro disease of rice is spread by

a. Nephotettix virescens
b. Sogatella furcifera
c. Nilaparvata lugens
d. Thrips tabaci

Ans. (a) Nephotettix virescens

298. Panama wilt is a disease of

a. Bamboo b. Mango
c. Pineapple d. Banana

Ans. (d) Banana

299. VAM is

a. Bacteria b. Fungi
c. Virus d. Algae

Ans. (b) Fungi

300. 'Buck eye rot' is a disease of which crop

a. Water chestnut
b. Sweet potato
c. Pods of garden pea
d. Tomato fruits

Ans. (a) Water chestnut

301. The major storage fungi that effects the food grain is

a. Rhizobium b. Mucor
c. Cercospora d. Aspergillus

Ans. (d) Aspergillus

302. Loose smut is controlled by

a. Soil treatment b. Seed treatment
c. Chemical spray d. None

Ans. (b) Seed treatment

303. Yellow leaf mosaic of bhindi crop spreads by

a. Jassids b. Borers
c. Jassids and Borers d. None

Ans. (c) Jassids and Borers

304. Yellow mosaic virus disease of moong is spread by

a. Bemisia tabaci b. Aphir crassivora
c. Nephotettix viruscens d. Amrasca bigulitula

Ans. (b) Aphir crassivora

305. Heterodera avenne is

a. Root knot nematode b. Cyst nematode
c. Lesion nematode d. Lance nematode

Ans. (b) Cyst nematode

306. Panama disease of banana is prevented by

a. Spraying zinc carrier
b. Spraying copper fungicide
c. Application of lime to soil
d. Providing adequate irrigation

Ans. (c) Application of lime to soil

307. Which one of the following fungicide is not systemic in nature

a. Vitavax b. Thiram
c. Benlate d. Topsin

Ans. (b) Thiram

308. Little leaf of brinjal is caused by a

a. Fungus b. Bacteria
c. Virus d. Mycoplasma

Ans. (d) Mycoplasma

309. Bacterial diseases are controlled by use of chemicals

a. Kelthane
b. Fungicide
c. Antibiotics
d. Viricides

Ans. (c) Antibiotics

310. Application of potash increases

a. Resistance to water logging
b. Frost resistance in plants
c. Disease resistance in plants
d. None

Ans. (c) Disease resistance in plants

311. Decomposition of organic matter in submerged soil is carried out by

a. Bacteria b. Actinomycetes
c. Fungi d. Earthworm

Ans. (a) Bacteria

312. Margosa is a highly effective product in reducing root knot population belongs to

a. Acacia arabica b. Azadirachta indica
c. Citrullus colosynthes d. Pongamia glabra

Ans. (b) Azadirachta indica

313. In plant buckling, puckering and blistering symptoms are produced by

a. Bacteria b. Fungi
c. Viruses d. Mycoplasma

Ans. (c) Viruses

314. The fungi which transmit plant viruses belong to class

a. Basidiomycetes
b. Ooomycetes
c. Zygoomycetes
d. Plasmodiophoromycetes

Ans. (d) Plasmodiophoromycetes

315. For quick and accurate detection of viruses can be done by

a. ELISA b. HADAS
c. IEM d. All

Ans. (d) All

316. Potato virus diseases are spread by

a. Aphids b. Jassids
c. Nematodes d. Tuber moth

Ans. (a) Aphids

317. Leaf curl of tomato is spread by

a. Jassids
b. White fly
c. Aphids
d. Nematodes

Ans. (b) White fly

318. Bunchy top of banana is caused by

a. Nematodes b. Fungi
c. White fly d. Leaf hoppers

Ans. (d) Leaf hoppers

319. Yellow mosaic of legumes was first reported in India from

a. Shimla b. Solan
c. Delhi d. Kanpur

Ans. (c) Delhi

320. Potato spindle tuber disease is transmitted

a. Mechanically b. Biologically
c. Water d. All

Ans. (a) Mechanically

321. Suicidal germination take place in

a. Dodder
b. Striga
c. Loranthus
d. Dendrophthoe falcate

Ans. (b) Striga

322. Ozone is toxic to expanding leaves of almost all types of plant at the conc. of equal or more than

a. 0.1 ppm b. 0.2 ppm
c. 0.3 ppm d. 0.5 ppm

Ans. (a) 0.1 ppm

323. SO_2 is toxic to plants at or above

a. 0.1–0.3 ppm b. 0.3–0.5 ppm
c. 0.5–0.7 ppm d. 1 ppm

Ans. (b) 0.3–0.5 ppm

324. Black heart of potato is the result of

a. High temp. during transit
b. Poor ventilation in the store
c. High temp. of soil during growth and maturation of tubers in the crop field
d. All

Ans. (d) All

325. Bordeaux mixture was first time used for the control of

a. Downey mildew of grape vines
b. Powdery mildew of pea
c. Root rot of beet
d. Damping off of pea

Ans. (a) Downey mildew of grape vines

326. Damping off and leaf blight are very effectively checked by

a. Bordeaux mixture b. Burgundy mixture
c. Thiram d. Copper oxychloride

Ans. (d) Copper oxychloride

327. Dinocap is sold in market as

a. Bravo b. Dexon
c. Botron d. Karathane

Ans. (d) Karathane

328. Nematicides inhibits which enzyme of nervous system in killing of nematodes

a. Kinase b. Isomerise
c. Phosphatase d. Acetyl cholinesterase

Ans. (d) Acetyl cholinesterase

329. Who discovered the downey mildew for the first time in India?

a. EJ Butler b. JF Dastur
c. BB Mundakur d. KR Kirtikar

Ans. (a) EJ Butler

330. Which one of the following is a single cell fungi

a. Yeast b. Aspergillus
c. Penicillium d. Alternaria

Ans. (a) Yeast

331. What is the source of agar–agar?

a. Bacteria b. Fungi
c. Mycoplasma d. Algae

Ans. (d) Algae

332. MLO and spiroplasma are mostly

a. Xylem inhibiting
b. Phloem inhibiting
c. Both a and b
d. Stomata inhibiting

Ans. (b) Phloem inhibiting

333. Mad cow disease is caused by

a. Virion b. Prion
c. Bacteria d. MLO

Ans. (b) Prion

334. Most widely used biocontrol agent is

a. *Pseudomonas florescence*
b. *P. putida*
c. *Bacillus subtilis*
d. Clostridium

Ans. (a) *Pseudomonas florescence*

335. Most widely used fungicide for rust fungi is

a. Vitavax b. Plantvax
c. Bavistin d. Dithane M-45

Ans. (b) Plantvax

336. Most widely used fungicide for smut fungi is

a. Vitavax b. Plantvax
c. Dithane M-45 d. Dithane Z-78

Ans. (a) Vitavax

337. Race specific resistance called

a. Vertical resistance
b. Horizontal resistance
c. Adult plant resistance
d. Apparent resistance

Ans. (a) Vertical resistance

338. When plant showed the partial resistance against all the races of pathogen then it is a type of

a. Horizontal resistance
b. Vertical resistance
c. Induced resistance
d. Non-host resistance

Ans. (a) Horizontal resistance

339. Which is the most recent widely used fungicide for the control of powdery mildew

a. Calaxin
b. Sulphur dust
c. Dithane M-45
d. Apron SD-35

Ans. (a) Calaxin

340. Which fungicide is used against downey mildew

a. Metalaxyl b. Karathane
c. Oxathind. Streptomycin

Ans. (a) Metalaxyl

341. Which one of the following can not be detected by ELISA technique

a. Virus b. Bacteria
c. Viroid d. Fungus

Ans. (c) Viroid

342. Nuclear polyhedrosis virus is the most effective for the control of

a. Chilo partellus
b. Pectionophora gossypiella
c. Helicoverpa armigera
d. Diacrasia oblique

Ans. (c) Helicoverpa armigera

343. Bacteria can be differentiated from plants and animals on the basis of which of the following characters

i. Asexual reproduction
ii. Prokaryotic nature of cell organization
iii. Presence of muramic acid in cell wall
iv. Have a cell wall

Choose the correct answer

a. ii, iii, iv b. i, ii
c. i, ii, iii d. iii, iv

Ans. (b) i, ii

344. Which of the following classes represent gram negative (–) becteria?

i. Pseudomonidaceae
ii. Enterobacteriaceae
iii. bacteridaceae
iv. Brucillaceae
v. Achromobacteriaceae

Choose the correct answer

a. i, ii, iii, v b. iii, iv, v
c. i, ii, iii d. i, ii, iii, iv,v

Ans. (d) i, ii, iii, iv,v

345. Match the correct pair

Organisms	Cell wall composition
i. Fungi	**c. Cellulose + other Polysaccharides + $CaCO_3$**
ii. Algae	**b. Mucopeptide**
iii. Bacteria	**c. Mainly cellulose**
iv. Diatoms	**d. Cellulose + chitin**
v. Plants	**e. Cellulose + silica + other polysaccharides**

Choose the correct answer

	I	*II*	*III*	*IV*	*V*
(a)	b	d	c	e	a
(b)	c	b	d	a	e
(c)	b	c	d	e	a
(d)	a	e	c	d	b

Ans. (a)

346. *Escherichia coli* in the genus *Escherichia* named after Escherich who?

a. Was a great Psycologist
b. Isolated this bacteria in 1885
c. Isolated virus in 1985
d. Was a great Embryologist

Ans. (b) Isolated this bacteria in 1885

347. Which of the following pair is not matched correctly?

Bacterial organelle	Stain used for identification
a. Capsule	Indian ink stain
b. Unusual cell walls	Ziehl Neelasen acid fast stain
c. Spore	Malachite green stain
d. Metachromatic	Sudan black

Ans. (d) Metachromatic Sudan black

348. Vogues-proskaeur test is a biochemical test used in bacteria for

a. The presence of cellulose
b. The presence of toxic molecules
c. Test end product of their metabolic processes
d. The presence of specific nitrogen source

Ans. (c) Test end product of their metabolic processes

349. In *E. coli* fimbriae is 75 to 100 A in thickness and is made up of two parallel protein rods (pilin) with a groove between them. The main function of fimbriae in bacteria is

a. Conjugation
b. Transduction
c. Translation
d. Transcription

Ans. (a) Conjugation

350. Archaebacteria differ from eubacteria because archaebacteria

a. Have ester linked lipids
b. Have ether linked lipids
c. Lack muramic acid in cell wall
d. Both a and b

Ans. (d) Both a and b

351. Which of the following is not the characteristic of archaebacteria?

a. These are found in colon (*E. coll*)
b. These are found in high salinity (*Halabacterium)*
c. These are found in hot springs (*Sulpholobus and Phyrococcus)*
d. They produce methane as a result of metabolism (*Methobacterium)*

Ans. (a) These are found in colon (*E. coll*)

352. Mesosomes are the imagination of the plasma membrane in bacteria which helps in

a. Locomotion b. Digestion
c. Cell division d. None of these

Ans. (c) Cell division

353. Eubacteria are frequently divided into two groups – Gram (+) and Gram (–) on the basis of their reaction to a stain devised by Christian Gram in 1884. Gram positive bacteria have

a. Both gram (+) and gram (-) have similar thickness of peptidoglycan layer
b. Thick layer of peptidoglycan
c. Thin layer of peptidoglycan
d. Thick layer of cellulose

Ans. (d) Thick layer of cellulose

354. Bacterial cell wall is composed of peptidoglycan, a complex of oligosaccharides and proteins. The oligosaccharide component consist of

a. Linear chain of glucose linked by β (1 – 4) linkage.
b. Linear chains of alternating NAG and NAM linked β(1 – 4) linkage
c. Linear chain of alternating NAG and NAM linked α(1 – 4) linkage
d. Linear chain of glucose linked by α(1 – 4) linkage

Ans. (b) Linear chains of alternating NAG and NAM linked β(1 – 4) linkage

355. Why peptidoglycan is resistant to the action of proteases?

a. Due to lack of amino acids
b. Due to presence of L-amino acids
c. Due to presence of D-amino acids
d. Due to presence of non-functional proteases

Ans. (c) Due to presence of D-amino acids

356. Large amount of teicoic acid polymer is found in

a. Green algae b. Gram negative bacteria
c. Gram positive bacteria d. Red algae

Ans. (c) Gram positive bacteria

357. Why antibiotic 'penicillin' affects only bacterial cell wall not human, cell wall?

a. Due to presence of L-amino acids
b. Due to presence of D-amino acids
c. Due to presence of NAM which absent in eukaryotes
d. Due to lack of amino acids

Ans. (b) Due to presence of D-amino acids

358. Lysozyme breaks down

a. Covalent cross-links in the peptidoglycan
b. (1 – 4) linkage between NAM and NAG
c. (1 – 4) linkage between NAM and NAG
d. (1 – 4) linkage between two glucose molecules

Ans. (b) (1 – 4) linkage between NAM and NAG

359. Bacterial cell wall become weak by the use of antibiotic penicillin due to

a. Inhibition of conjugation
b. Stimulation of lysozyme secretion by penicillin
c. Inhibition of enzyme that forms the covalent cross links in the peptidoglycan
d. Inhibition of transduction

Ans. (c) Inhibition of enzyme that forms the covalent cross links in the peptidoglycan

360. Which of the following enzyme digest peptidoglycan layer in bacterial cell wall?

a. Autolysins b. Trypsin
c. Rennin d. Pepsin

Ans. (a) Autolysins

361. Bacteria that are capable of growing in 3M NaCl, called

a. Aerotolerant b. Osmotolerant
c. Haplophiles d. Thermophiles

Ans. (b) Osmotolerant

362. Alkaliphiles bacteria grow at pH 8.5 – 11.5 whereas acidophiles grow at pH

a. 8.0 – 8.9 b. 0 – 5.5
c. 7.0 – 7.5 d. 12 – 14

Ans. (b) 0 – 5.5

363. Actinomycetes a sub group of filamentous bacteria is

a. Fuelgen positive b. Fuelgen negative
c. Gram negative d. Gram positive

Ans. (d) Gram positive

364. Gram negative bacteria is

a. *Erysipliilothrix* b. *Corynebacteria*
c. Spirilla d. *Lactobacilli*

Ans. (c) Spirilla

365. MDT (mean doubling time) is expressed as (where 'n' is generation number)

a. MDT = 2 + 2n b. MDT = 2×2^n
c. MDT = 2n d. MDT = 2 % 2n

Ans. (b) MDT = 2×2^n

366. Lodine is used as a sterilant agent because it is a strong

a. Reducing agent b. Oxidizing agent
c. Redox agent d. Heavy toxin

Ans. (b) Oxidizing agent

367. A toxoid is a

a. Toxin that losses its activity
b. Heavy toxin
c. Potent toxin
d. Harmful toxin

Ans. (a) Toxin that losses its activity

368. The most common type of reproduction in bacteria is

a. Budding b. Binary fission
c. Binary d. Sexual reproduction

Ans. (b) Binary fission

369. Diphtheria toxin is an exotoxin produced by

a. *Clostridium sp.* b. *Corynebacterium sp.*
c. *Streptococcus sp.* d. *Staphylococcus sp.*

Ans. (b) *Corynebacterium sp.*

370. Which of the iron bacteria oxidizes ferrous compounds into ferric compounds?

a. *Treponema pallidum* b. *Leptothrix ochracae*
c. *Bacillus thermophyllus* d. *Pasturella pestis*

Ans. (b) *Leptothrix ochracae*

371. Lactic acid is produced from pyruvic acid at industrial level by the help of

a. *Clostridium* b. *Streptococcus*
c. *Enterobacter* d. *Staphylococcus*

Ans. (b) *Streptococcus*

372. Microbes use inorganic compounds as electron donar and utilize solar energy are known as

a. Photo-organotrophs
b. Chemolithotrophs
c. Photolithotrophs
d. Chemo-organotrophs

Ans. (c) Photolithotrophs

373. Endotoxins are toxin chemicals secreted by pathogen inside the host cells, chemically they are

a. Lipopolysaccharides
b. Proteins
c. Lipids
d. Phospholipids

Ans. (a) Lipopolysaccharides

374. Food poisoning is caused by

a. *Pseudomonas fragi*
b. *Clostridium nigrificans*
c. *Salmonella typhimurium*
d. All of these

Ans. (d) All of these

375. 'Aggessins' are

a. Group of diffusible substances or cellular components produced by certain pathogens
b. Substances that activate the host response system
c. Group of chemical compounds resembling hormones
d. None of these

Ans. (a) Group of diffusible substances or cellular components produced by certain pathogens

376. The bacteria oxidizes molecular hydrogen in order to form water in soil is

a. *Rhizobium noduliformis* b. *Albugo candida*
c. *Bacillus pentatrophus* d. *Lactobacillus*

Ans. (c) *Bacillus pentatrophus*

377. Which of the following is true for photolithotrophs?

a. $NO_2 + O_2 \xrightarrow{\text{Nitrobacter}} NO_3$
b. $NH_2 + 3O_2 \xrightarrow{\text{Nitrosomonas}} NO_2 + H^+ + H_2O$
c. $H_2O + CO_2 \xrightarrow{\text{Light}} CH_2O + O_2$
d. $2H_2S + CO_2 \xrightarrow{\text{Nitrosomonas}} CH_2O + H_2O + 2S$

Ans. (c) $H_2O + CO_2 \xrightarrow{\text{Light}} CH_2O + O_2$

378. Which of the following is true?

i. $NO_2 + O_2 \xrightarrow{\text{Nitrobacter}} NO_3$ (Chemolithotroph)
ii. $2CH_3CHOHCH_3 + CO_2 \longrightarrow CH_2O + 2CH_3CCH_3 + H_2O$ (Photo-organotroph)
iii. $H_2O + CO_2 \xrightarrow{\text{Light}} CH_2O + O_2$ (Photolithotroph)
iv. $NH_2 + 3O_2 \xrightarrow{\text{Nitrosomonas}} NO_2 + H^+ + H_2O$

a. ii and iii only b. i, ii, iii only
c. i and ii only d. i, ii, iii and iv

Ans. (d) i, ii, iii and iv

379. 'Lecithinase' causes lysis of RBCs and other lipid containing tissues, is produced by

a. *Clostridium perfringenes*
b. *Streptococcus aureus*
c. *Streptococcus pyogenus*
d. *Aspergillus* sp.

Ans. (b) *Streptococcus aureus*

380. Single cell protein (SCP) containing 50–80% protein is sold as pruteen, brovile and Marmite trade name in various countries. The pruteen is obtained from

a. Salmonella typhi
b. Mycolbgacterium tuberculosis
c. Mythylophilus methulotropous
d. Pasturella pestis

Ans. (c) Mythylophilus methulotropous

381. Storage granule most often seen in bacterial cell is

a. Polyglucan granule
b. Poly-hydroxybutyrate
c. Polymetaphosphate
d. All of these

Ans. (d) All of these

382. Bacterial growth in liquid medium follow a typical pattern called bacterial growth curve. The correct sequence of phases in growth curve is

a. Stationary phase, lag phase, log phase, death phase
b. Log phase, lag phase, stationary phase, death phase
c. Lag phase, log phase, stationary phase, death phase
d. Log phase, stationary phase, lag phase, death phase

Ans. (c) Lag phase, log phase, stationary phase, death phase

383. The technique of three steps treatment of 90 – 100°C for 10 minute with 24 hours gaps in between is called

a. Radiation b. Tyndalization
c. Pasteurization d. Autoclaving

Ans. (b) Tyndalization

384. Streaking plate method and spread plate method is used for

a. Recombination of bacteria
b. Reproduction of bacteria
c. Isolation of bacterial strain or colonies
d. Sterilization of bacteria

Ans. (c) Isolation of bacterial strain or colonies

385. The number of bacteria in a culture can be estimated by

a. Using specialist electronic methods
b. Total count
c. Viable count
d. All of the above

Ans. (d) All of the above

386. In pure culture, the cells have arisen from

a. Gram positive and gram negative bacterium and form hybrid
b. Same original bacterium
c. Different strains of bacterium
d. None of the above

Ans. (b) Same original bacterium

387. Gram positive bacteria retain Gram's stain due to high percent age of

a. Proteins
b. Peptidoglycan
c. Lipoprotein
d. Lipopolysaccharides

Ans. (b) Peptidoglycan

388. Polymetaphosphate, a storage granule acts as a source of

a. Phosphate
b. Sulphate
c. Sulphur
d. Phosphoric acid

Ans. (a) Phosphate

389. Bacterial capsule surrounding cell wall commonly made up of

a. Polypetides
b. Polysaccharide
c. Monosaccharide
d. Polyglycogen

Ans. (b) Polysaccharide

390. The cocci bacteria is

a. *Streptococcus*
b. *Streptomyces*
c. *Staphylococcus*
d. *Sarcina*

Ans. (b) *Streptomyces*

391. Which of the following micro organism is a true homolactic fermentor?

a. Staphylococcus
b. Streptococcus
c. Clostridium
d. Propionobacterium

Ans. (b) Streptococcus

392. The bacteria, bacillus mesenteries is used for the production fo

a. Pectinase and cellulose
b. Polymerase and invertase
c. Amylase and protease
d. Cellulose and carboxylase

Ans. (c) Amylase and protease

393. Cold like symptoms are caused by which bacteria

a. Pseudomonas
b. *E. coli*
c. Haemophilus influenza
d. Haemophilus streptococcus

Ans. (c) Haemophilus influenza

394. Nitrifying bacteria are

a. Gram negative
b. Minute
c. Rod shaped
d. All of the above

Ans. (d) All of the above

395. Soil microorganisms are most active at

a. 15–20°C
b. 20–25°C
c. 34–36°C
d. 40–45°C

Ans. (c) 34–36°C

396. Greenhouse gas include

a. CO_2
b. CH_4
c. N_2O
d. All of the above

Ans. (d) All of the above

397. Bacteria, as a group, are responsible for

a. Nitrogen oxidation
b. Sulfur oxidation
c. Nitrogen fixation
d. All of the above

Ans. (d) All of the above

398. In the process of nitrogen fixation which of the following microorganisms is involved

a. Non symbiotic microogranisms only
b. Symbiotic microorganisms only
c. Non symbiotic and symbiotic microganisms
d. None of the above

Ans. (d) None of the above

CHECK YOUR GRASP

1.'Lecithinase' causes lysis of RBCs and other lipid containing tissues, is produced by

a. *Clostridium perfringenes*
b. *Streptococcus aureus*
c. *Streptococcus pyogenus*
d. *Aspergillus* sp.

2. The bacteria oxidizes molecular hydrogen in order to form water in soil is

a. *Rhizobium noduliformis*
b. *Albugo candida*
c. *Bacillus pentatrophus*
d. *Lactobacillus*

3. Example of VAM fungi

a. *Pisoletecis* b. *Sclerotenia*
c. *Glomus* d. *Trichoderma*

4. Lysozyme breaks down

a. Covalent cross-links in the peptidoglycan
b. (1 – 4) linkage between NAM and NAG
c. (1 – 4) linkage between NAM and NAG
d. (1 – 4) linkage between two glucose molecules

5. Cubical packets of 8 cells is called in bacteria

a. Staphylococcus b. Diplococcus
c. Bacillus d. Sarcina

6. Bacteria that are capable of growing in 3M NaCl, called

a. Aerotolerant b. Osmotolerant
c. Haplophiles d. Thermophiles

7. Name the organism which are predatory on bacteria

a. Virus b. Viroid
c. Bdellovibrios d. Prion

8. In 1845, the late blight of potato destroyed the potato crop of Ireland was caused by

a. Phytophthora infestans
b. Alternaria solani
c. Pythium aphanidermatum
d. Pseudomonas solanacearum

9. In cocoa fermentation the microbial inoclumn used is of

a. Aspergillus niger b. Candida krusei
c. Rhizopus oryzae d. None

10. Bacteriophage M13 contains as its genetic material

a. ssRNA b. dsRNA
c. ss DNA d. ds DNA

11. Brown Leaf spot disease of rice is caused by

a. Drechslera graminea
b. Cercospora arachidicola
c. Xanthomonas oryzae
d. Pyricularia oryzae

12. The cocci bacteria is

a. *Streptococcus* b. *Streptomyces*
c. *Staphylococcus* d. *Sarcina*

13. Plant pathology written by

a. RS Singh b. Agrios
c. VS Singh d. AP Sinha

14. Which is the most recent widely used fungicide for the control of powdery mildew

a. Calaxin
b. Sulphur dust
c. Dithane M-45
d. Apron SD-35

15. Vitamin B_2 is produced by

a. Ashbya gossypii b. Pseudomonas
c. Brevibacterium d. None

16. Microbe involved in fibre retting

a. Micrococcus sp.
b. Bacillus subtilis
c. Clostridium butrycium
d. Lactobacillus sp.

17. A virus that may not destroy the host

a. Virulent phage b. Temperate phage
c. Cyano phage d. Lytic cycle

In case of less than 80% score, go through brief review and glance once again from chapter

Key: 1-b 2-c 3-c 4-b 5-d 6-b 7-c 8-a 9-b 10-c 11-a 12-b 13-a 14-a 15-a 16-c 17-b

11

Bioinformatics

1. Swiss-Model is available at

a. ExPASy b. NCBI
c. TIGR d. DDBJ

Ans. (a) ExPASy

2. SEQRES records

a. Nucleic acid residue in file of Gen Bank
b. Amino acid or nucleic acid residue each chain of macromolecule at PDB
c. Amino acid or nucleic acid residues in EMBL
d. Amino acid or nucleic acid residues in DDBJ sequence file

Ans. (b) Amino acid or nucleic acid residue each chain of macromolecule at PDB

3. The ExPASy is dedicated to the analysis of protein sequences and structure as well as 2-D PAGE This server is maintained by

a. Swiss Institute of Bioinformatics
b. European Binformatics Institute
c. The Institute of Genome Research
d. Protein information Resource

Ans. (a) Swiss Institute of Bioinformatics

4. A database that classifies protein 3-D structure in a hierarchical scheme of structural classes

a. CATH b. PDB
c. PROSITE d. SCOP

Ans. (a) CATH

5. Protein data bank is available at

a. Research collaborator for structural Bioinformatics
b. Research collaborator for structural Biology
c. National Biomedical Research Foundation
d. Expert Protein Analysis System server

Ans. (a) Research collaborator for structural Bioinformatics

6. Deep View can be downloaded from

a. Expert protein analysis system server
b. Protein information resource
c. Molecular modeling database site at NCBI
d. DNA databank of japan

Ans. (a) Expert protein analysis system server

7. The full form of RCSB is

a. Research center for structural biology
b. Research collaboratory for structural bioinformatics
c. Research center for structural bioinformatics
d. None of these

Ans. (b) Research collaboratory for structural bioinformatics

8. PIR was established in

a. 1980 b. 1964
c. 1984 d. 2000

Ans. (c) 1984

9. Swiss-prot was established in

a. 1985 b. 1986
c. 1987 d. 1988

Ans. (b) 1986

10. Prosite is a database for

a. Searching the pattern or motif
b. Searching the ligand
c. Searching for RNA
d. None of these

Ans. (a) Searching the pattern or motif

11. The database which is a catalogue of human gene and genetic disorder

a. PRS
b. SCOP
c. TIGR
d. OMIM

Ans. (d) OMIM

12. TIGRFAM is a database of

a. Protein families based on Hidden Markov Models
b. Nucleotide families based on HMMs

c. Both nucleotide and protein families based on HMMs
d. None of thesed

Ans. (a) Protein families based on Hidden Markov Models

13. The TIGR Gene Indices are built using

a. Mega BLAST
b. Cap3
c. DNA-prptein search program
d. All of these

Ans. (d) All of these

14. iPro Class is

a. An identical protein classification database in NCBI
b. An identical protein classification database in EBI
c. An identical protein classification database in PIR
d. An identical parasite classification database

Ans. (c) An identical protein classification database in PIR

15. In PDB file the MODRES record

a. Provides descriptions of modification (e.g. chemical or post translational)
b. Provides description of mutation
c. Provides description of translation
d. All of these

Ans. (a) Provides descriptions of modification (e.g. chemical or post translational)

16. In PDB file FORMUL record represent

a. The chemical formula
b. The charge of a non standard group
c. The chemical formula and charge of a non standard group
d. None of these

Ans. (c) The chemical formula and charge of a non standard group

17. The major function of INSDC is

a. Promotion of human genome project
b. Validation of 3D model of proteins with respect to structures solved by either X-ray crystallography or NMR spectroscopy
c. Facilitating exchange of sequence data on a daily basis
d. None of these

Ans. (c) Facilitating exchange of sequence data on a daily basis

18. What does the term 'LOCUS' explain in Gen Bank flat file?

a. Accession number
b. Length of molecule
c. Type of molecule(DNA/RNA)
d. All of these

Ans. (d) All of these

19. Which of the following is similar to 'Organism' of Gen Bank flat file to EMBL data entry formal?

a. OS, OC
b. SO, CO
c. Source
d. Source organism

Ans. (a) OS, OC

20. Comment line '>' denotes.

a. Origin of sequence in nucleotide flat file
b. End of protein sequence in gene pept
c. Origin of nucleotide sequence in FASTA format
d. Origin of gene sequence in EMBL nucleotide sequence

Ans. (c) Origin of nucleotide sequence in FASTA format

21. What is Readseq?

a. A tool which helps to read and translate nucleotide sequences
b. A tool which converts sequence in one format to another format
c. Database which helps to download nucleotide sequences
d. A tool which reads the nucleotide sequences

Ans. (b) A tool which converts sequence in one format to another format

22. Bank it is

a. Use of informatics for DNA databank manipulation
b. A standalone multiplatform sequence submission program available on NCBI
c. A standalone sequence submission program available on EMBL
d. A web-based sequence submission tool available on NCBI

Ans. (d) A web-based sequence submission tool available on NCBI

23. PMC is

a. A digital archive of peer reviewed journals in life sciences
b. A protein Modelling center available at DDBJ
c. A secondary structure prediction tool
d. Aphylogeny method based on maximum parsimony method

Ans. (a) A digital archive of peer reviewed journals in life sciences

24. Uni Port stands for

a. Uniform protein database
b. Universal protein Database
c. Universal Polypeptide Database
d. Unique protein Database

Ans. (b) Universal protein Database

25. Which of the following is the role of MSD?

a. It deals with collection, management, and distribution of data about structures determined by X-ray crystallography, NMR spectroscopy, and 3D electron microscopy
b. It's central, public repository for storing and accessing protein-protein interaction information.
c. It's sequence submission tool at DDBJ site
d. It's sequence retrieval system

Ans. (a) It deals with collection, management, and distribution of data about structures determined by X-ray crystallography, NMR spectroscopy, and 3D electron microscopy

26. In PDB file FORMUL record represents

a. The chemical formula
b. The charge of a non-standard group
c. The chemical formula and charge of a none standard group
d. None of these

Ans. (c) The chemical formula and charge of a none standard group

27. In PDB file the SSBOND record identifies

a. Each disulphide bond in protein and polypeptide structures by identifying the two residues involved in the bond
b. Each hydrogen bond in protein and polypeptide structures by identifying all the residues involved in the bond
c. Each electrostatic bond in protein and polypeptide structure by identifying the tow residues involve in the bond
d. All of these

Ans. (a) Each disulphide bond in protein and polypeptide structures by identifying the two residues involved in the bond

28. In PDB file the SIGUIJ record represent

a. The standard deviations of anisotropic pressure factors scaled by a factor of 10**4 (Abgstrins**2)
b. The standard deviations of anisotropic temperature factors scaled by a factor of 10**4 (Abgstrins**2)
c. The standard deviations of anisotropic temperature and pressure factors scaled by a factor of 10**4 (Abgstrins**2)
d. None of these

Ans. (b) The standard deviations of anisotropic temperature factors scaled by a factor of 104 (Abgstrins**2)**

29. Within NCBI the NSP is

a. A database of structural nucleotide and protein
b. A database of single nucleotide polymorphism
c. A database for major histo-compatiblity complex
d. None of these

Ans. (b) A database of single nucleotide polymorphism

30. The database that deals with cancer disease in NCBI is

a. Cancer gene
b. Oncogene
c. Cancer chromosome
d. None of these

Ans. (c) Cancer chromosome

31. GENSAT database of NCBI is

a. Gene expression atlas of human
b. Gene expression atlas of mouse
c. Gene expression atlas of rice
d. Gene expression atlas of rat

Ans. (b) Gene expression atlas of mouse

32. GlycoMod in ExPASy database predicts

a. Possible oligosaccharide structures that occur on proteins from their experimentally determined masses
b. Possible oligosaccharide structures that occur on DNA from their experimentally determined masses
c. Possible oligosaccharide structures that occur on DNA and proteins from their experimentally determined masses
d. None of these

Ans. (c) Possible oligosaccharide structures that occur on DNA and proteins from their experimentally determined masses

33. In the ExPASy database Target P is used for the prediction of

a. Homologous protein
b. Sub-cellular location
c. Homologous DNA
d. None of these

Ans. (a) Homologous protein

34. The field of bioinformatics

a. Uses biometric algorithms to develop more efficient software
b. Integrates concepts and techniques from information technology and molecular biology
c. Requires complete genome sequences to be useful
d. Has only developed in the last five years

Ans. (b) Integrates concepts and techniques from information technology and molecular biology

35. The principle application of the BLAST family of algorithms is

a. Identifying sequences that are similar to a protein or nucleotide sequence in a biological sequence database
b. Aligning two nucleotide sequences from ene to end
c. Identifying the best possible alignment of two short protein sequence
d. Finding the minimum energy configuration of a polypeptide sequence

Ans. (a) Identifying sequences that are similar to a protein or nucleotide sequence in a biological sequence database

36. At the NCBI website, the default scoring matrix for protein-protein BLAST analysis (BLASTP) is the BLOSUM62 matrix. The most likely reason for this matrix to be selected by default is because

a. It represents a compromise between information content for each residue and the amount of information that contributes to the matrix
b. Only this matrix is appropriate for all protein comparisons
c. It incorporates 62 position-specific scoring patterns
d. Unlike PAM matrices, this matrix is based on explicit phylogenetic information

Ans. (a) It represents a compromise between information content for each residue and the amount of information that contributes to the matrix

37. RID stands for

a. Request identifier
b. Request in demand
c. Review in depth
d. Reservation is done

Ans. (a) Request identifier

38. PHYLIP signifies

a. Phylogeny inference package
b. A person who postulated phylogeny
c. A phylogeny editing tool
d. A bioinformatics language

Ans. (a) Phylogeny inference package

39. The software that follows the global alignment method is

a. CLUSTALW
b. Pile-up
c. T-COFFEE
d. All of these

Ans. (d) All of these

40. What is CINEMA?

a. A molecular viewer
b. Similarity search method
c. Multiple alignment editor
d. Database of 3D structure of protein

Ans. (c) Multiple alignment editor

41. KITSCH, a package in PHYLIP is based on

a. Maximum Likelihood method
b. Distance method
c. Maximum parsimony method
d. None of these

Ans. (b) Distance method

42. Maximum likelihood method is use in molecular phylogeny when

a. There is maximum similarity among the aligned sequences
b. There is minimum similarity among the aligned sequences
c. There is maximum number of hits found in BLAST
d. All the sequences are from same phylum

Ans. (b) There is minimum similarity among the aligned sequences

43. DNA pars is a

a. DNA translation tool
b. Partial DNA sequence
c. Molecular phylogeny tool
d. Multiple alignment tool

Ans. (c) Molecular phylogeny tool

44. The file formate that serves as input for Cn3D, the molecular viewer, is

a. GCG
b. PDB
c. Cn3
d. MOL

Ans. (c) Cn3

45. The green colour in RasMol indicates

a. Sulphur
b. Hydrogen
c. Disulphide bond
d. Hydrogen bond

Ans. (d) Hydrogen bond

46. Saul Needleman and chritan wunsch postulated an algorithm which is useful for

a. Multiple alignment of sequences
b. Global alignment of sequences
c. Local alignment of sequence
d. All of these

Ans. (b) Global alignment of sequences

47. The molecular viewer used for mutation in protein sequence is

a. Deep view
b. Cn3D
c. rasMol
d. pyMol

Ans. (a) Deep view

48. Intra-strands base pairing

a. Stabilizes the structure of DNA
b. Unstabilizes the structure of mRNA
c. Stabilizes the structure of Rrna-Trna
d. Never happens in RNA

Ans. (a) Stabilizes the structure of DNA

49. ClustalW does

a. Local alignment
b. Global alignment
c. Partial alignment
d. Multiple alignment editing

Ans. (d) Multiple alignment editing

50. The variation in DNA sequence that occurs on average once every 300–500 bp are known as

a. Point mutation
b. Polymorphism
c. Insertion
d. Deletion

Ans. (b) Polymorphism

51. A map showing the position of expressed DNA region relative to a particular

Chromosomal region is named as
a. c-DNA map
b. a-DNA map
c. z-DNA map
d. None of these

Ans. (a) c-DNA map

52. RNA polymerase II binds to the transcription initiation site known as

a. Black box
b. White box
c. TAGA box
d. TATA box

Ans. (d) TATA box

53. The program that implements gene structure prediction by using information on homologous protein is

a. ORF gene
b. Profound
c. B Link
d. SIM

Ans. (a) ORF gene

54. Translate is a bio-tool used for

a. Protein mass fingerprinting
b. Translation of nucleotide
c. Identifying the protein function
d. Topology prediction

Ans. (b) Translation of nucleotide

55. The previous name of Swiss PDB viewer was

a. Swiss view
b. Mole view
c. Deep view
d. Modelling view

Ans. (c) Deep view

56. In Swiss PDB viewer the colour of the first element of secondary structure is

a. Red
b. Violet
c. Green
d. White

Ans. (a) Red

57. In Deep View the colour of the last element of secondary structure is

a. Red
b. Green
c. White
d. Violet

Ans. (a) Red

58. The most popular plot, phi-psi plot, for protein conformation is known as

a. Raja raman plot
b. Ram mohan plot
c. Ram chandran plot
d. Ronald ross plot

Ans. (c) Ram chandran plot

59. How many windows are generated for opening RASMOL?

a. One
b. Two
c. Three
d. Four

Ans. (b) Two

60. VNTRS refers to

a. Variable number tandem repeat
b. Variable number of template region
c. Variable number of template recognition site
d. None of these

Ans. (a) Variable number tandem repeat

61. Two genes are said to be paralogous

a. When they are not orthologous
b. When there are no evidences of GENE duplication
c. When two copies of the duplicated gene and their progeny are found in the evolutionary lineage
d. None of these

Ans. (c) When two copies of the duplicated gene and their progeny are found in the evolutionary lineage

62. The number of edges that meet at every branch nolde of the phylogenetic tree is

a. Two
b. Three
c. Four
d. Any one of them are possible

Ans. (d) Any one of them are possible

63. If there are nine leaves in a phylogenetic tree then how many nodes are present in this rooted tree?

a. Eight
b. Ten
c. Seventeen
d. Twenty

Ans. (d) Twenty

64. Which of the following is not correct?

a. RNA Data bank was established by Japan
b. National Biochemical Research Foundation established the Protein Information System in 1984
c. National center for bioinformatics Institute was established in USA and serves as primary information databank and provider of information
d. None of these

Ans. (a) RNA Data bank was established by Japan

65. Which of the following is not correct?

a. In single letter codes, R denotes guanine or adenine, while Y denotes thymine or cytosine
b. Base sequence runs from the 3′ to the 5′ direction
c. In database, base sequence of ony one strand is listed
d. The nomenclature system adapted in bioinformatics is based on the recommendations of international Union of pure and applied chemistry

Ans. (b) Base sequence runs from the 3′ to the 5′ direction

66. Motif is a

a. Secondary structure
b. Tertiary structure
c. Super secondary structure
d. Quaternary structure

Ans. (b) Tertiary structure

67. Macromolecular crystallographic information file format is the input file format of

a. Cn3D
b. DALI
c. SPDV
d. None of these

Ans. (a) Cn3D

68. Database on DNA sequences contain which of the following types of sequence

a. Genomic DNA and cDNA sequence
b. EST and GST sequences
c. Organelle DNA sequence and sequences of other molecules such as t-RNA small RNAs
d. All of the above

Ans. (d) All of the above

69. Which of the following is correct about EST sequence?

a. One of the problems with ESTs is duplication
b. These sequences are obtained by sequencing only a part of the C-DNA
c. The sequences are dubbed as tags
d. All of the above

Ans. (d) All of the above

70. Which of the following is an example of major nucleotide sequence database?

a. Gene Bank held by NCBI, USA
b. DNA databank of Japan
c. Nucleotide sequence database main tained by EMBL
d. All of the above

Ans. (d) All of the above

71. Which of the following databases is used by ENTREZ for bibliographic or citation search?

a. PDB
b. TrEMBL
c. PubMed
d. SWISS-PORT

Ans. (c) PubMed

72. Which of the following software have not been developed for the prediction/detection of genes from genome sequence of eukaryotes?

a. GENMARK
b. GENIE
c. HMM Gene and GRAIL
d. Gene finder and GENESCAN

Ans. (a) GENMARK

73. Which of the following approaches have been used for the identification of genes?

a. Northern
b. Exon trapping
c. Zoo blot
d. All of the above

Ans. (d) All of the above

74. Which of the following programmes can be used for the identification/detection of genes from genome sequence of prokaryotes?

a. Genefinder b. Geneglamer
c. Genmark d. None of the above

Ans. (c) Genmark

75. The colour of phosphorus atom is RasMol is

a. White b. Yellow
c. Red d. Orange

Ans. (d) Orange

76. The software that takes file input in mmdb format is

a. Cn3D b. RasMol
c. SPDV d. PyMoL

Ans. (a) Cn3D

77. The proper order in protein modelling is

a. Loop modelling , side chain modelling, backbone generation
b. Template recognition, alignment correction, backbone generation
c. Model validation, loop modelling, model evaluation
d. Backbone generation, model evaluation, side chain modeling

Ans. (b) Template recognition, alignment correction, backbone generation

78. The key 's' is used in Cn3D for

a. Rotation b. Zooming in
c. Zooming out d. Stopping rotation

Ans. (d) Stopping rotation

79. In homology medelling the most suitable BLAST is

a. PSI-BLAST b. PHI-BLAST
c. GEO-BLAST d. RP BLAST

Ans. (a) PSI-BLAST

80. The expansion of NMR is

a. Nuclear magnetic resonance
b. Non-magnetic resource
c. Nuclear magnetic resolution
d. Nuclear magnetic resource

Ans. (a) Nuclear magnetic resonance

81. Which of the following bioinformatics tools can be used for the identification of protein motifs and protein domains?

a. BOCKS b. SMART
c. PRINTS d. All of the above

Ans. (d) All of the above

82. Which of the following is used for comparing the submitted nucleotide sequence with nucleotide database?

a. BLASTx b. BLASTt
c. BLASTn d. t-BLASTn

Ans. (c) BLASTn

83. Commercial software for both protein and nucleotide mutation is

a. DALI b. PyMoL
c. Biopolymer d. VAX

Ans. (b) PyMoL

84. The percentage of safe zone in homology modelling is

a. ≥40% b. ≥25%
c. ≥30% d. ≥20%

Ans. (c) ≥30%

85. Swiss-model is

a. Protein database
b. Modelling database
c. Commercial modelling software
d. Protein homology modelling server

Ans. (d) Protein homology modelling server

86. CPK is

a. Colin paul kit
b. Corey pauling kultum
c. Canning Pam kokin
d. None of these

Ans. (b) Corey pauling kultum

87. The commercial software for energy minimization is

a. GROMOS96 b. DISCOVER
c. GROMACS d. ROSSETA

Ans. (a) GROMOS96

88. Internal evaluation of homology model is done by

a. Porcheck b. CASP
c. Verfy 3D d. All of these

Ans. (a) Porcheck

89. Threading is a method of

a. X-ray crystallography
b. Circular dichroism
c. Protein modelling
d. Ab initio protein modeling

Ans. (c) Protein modelling

90. Verify 3D is used for

a. Model optimization
b. Loop modelling
c. External evaluation of model
d. Side-chain modeling

Ans. (c) External evaluation of model

91. Which of the following is used for comparing the submitted nucleotide sequence with amino acid sequence database?

a. BLASTx
b. BLASTt
c. BLASTn
d. t-BLASTx

Ans. (d) t-BLASTx

92. Which of the following is used for comparing the submitted amino acid sequence with nucleotide sequence database?

a. BLASTx
b. BLASTt
c. t-BLASTn
d. t-BLASTx

Ans. (c) t-BLASTn

93. Deep view accepts which of the following input files

a. Only PDB file
b. PDB, Cn3, and text files
c. Cn3, PDB, and Molfiles
d. PDB, Mol, mm CIF, and text files

Ans. (d) PDB, Mol, mm CIF, and text files

94. We can build 3D model of

a. Template
b. Tourism
c. Target
d. Turns of a protein

Ans. (a) Template

95. The alogithem used for energy minimization is Swiss-Model is

a. GROMOS96
b. GROMACS
c. Dnergy M
d. CharmM

Ans. (a) GROMOS96

96. Give the expansion of PHD, the protein secondary structure prediction software

a. Protein helix determination
b. Purely heetic days
c. Profile network from heidelberg
d. Protein of highest dimension

Ans. (c) Profile network from heidelberg

97. Which of the following one is threading software?

a. Libra I
b. PREDATOR
c. MODELLER
d. BUILDER

Ans. (c) MODELLER

98. The whole set of mRNA molecules in one or more population of biological cell in a specific environment is known as

a. Genome
b. Proteome
c. Transcriptome
d. Metabolome

Ans. (c) Transcriptome

99. The universal genetic code was discovered in

a. 1953
b. 1966
c. 1991
d. 1997

Ans. (b) 1966

100. PDBeCIF generates

a. CIF from PDB
b. mmCIF from PDB
c. Pseudo-PDB from PDB
d. All of these

Ans. (b) mmCIF from PDB

101. The first protein to be sequenced is

a. Insulin
b. Haemoglobin
c. Myosin
d. Tannin

Ans. (a) Insulin

102. The first biological sequence database was a

a. Nucleotide sequence database
b. Protein database
c. Transcriptone database
d. None of these

Ans. (b) Protein database

103. Name the database of genetic disorders and traits in animals, other than human and mouse

a. OMIM
b. OMIA
c. Cancer chromosome
d. EMB net

Ans. (b) OMIA

104. Gene expression data retrieval system of NCBI is

a. Entrez
b. GEO
c. SRS
d. Sakura

Ans. (a) Entrez

105. The data of molecular Modelling Database are sourced from

a. Protein information resource
b. Entrez protein
c. Protein data bank
d. UniProt

Ans. (c) Protein data bank

106. GENSAT is

a. A tool to predict genes
b. Atlas of gene expression data of CNS of mouse
c. Atlas of predicted genes within a species
d. None of these

Ans. (b) Atlas of gene expression data of CNS of mouse

107. The proteins showing clear evolutionary relationship are grouped under same

a. Fold
b. Family
c. Super family
d. Domain

Ans. (b) Family

108. Name the database that deals with structure classification

a. SCOP
b. CATH
c. VAST
d. All of these

Ans. (a) SCOP

109. Cn3D is a

a. Molecular file format
b. Molecular viewer
c. Molecular file format conversion
d. All of these

Ans. (b) Molecular viewer

110. Who introduced the concept of distinct species of animals and plants

a. Johan Ray
b. Carolus Linneeus
c. W. fleming
d. None

Ans. (a) Johan Ray

111. Who said"computers are to bilogy, what mathematics is to physics"

a. T. K. Ottwood
b. Harold Morowitz
c. Charles
d. a and b

Ans. (b) Harold Morowitz

112. Which is not the application of bioinformatics

a. Biodiversity
b. DNA Forensic
c. Classes
d. None of these

Ans. (c) Classes

113. In which year DBT launch the BTIS

a. 1986
b. 1985
c. 1988
d. 1990

Ans. (a) 1986

114. Institute of Microbial Technology related to

a. Plant tissue culture
b. Animal cell culture
c. Protein modelling
d. Nucleic acid sequencing

Ans. (c) Protein modelling

115. In which year plan recommended to set NBI under DBT

a. 10th
b. 9th
c. 5th
d. 6th

Ans. (c) 5th

116. Which institute provide distance learning program in bioinformatics in the country

a. BII
b. IIT
c. None of these
d. Both of these

Ans. (a) BII

117. In which year Switzerland Institute(SBI) of Bioinformatics is established

a. 30 March, 1998
b. 28 May, 1997
c. 14 April, 1994
d. 11 june, 1999

Ans. (a) 30 March, 1998

118. Which of these is not a protein sequence database

a. PDB
b. PIR
c. Gene bank
d. Swiss

Ans. (c) Gene bank

119. Global alignment uses algorithm

a. Needleman-wunsch algorithm
b. Dot Plots
c. DALI
d. PDB

Ans. (a) Needleman-wunsch algorithm

120. FASTA was first described by

a. Lipmann and Pearson
b. Kyte and Dolittle
c. None of these
d. Both of these

Ans. (a) Lipmann and Pearson

121. TAP tags are useful for

a. Proteome exploration
b. Protein resolution
c. Genome sequencing
d. Nucleotide sequencing

Ans. (a) Proteome exploration

122. Bioinformatics cannot analyse

a. Chemical analysis
b. Biomedical analysis
c. Statistical analysis
d. Mathematical analysis

Ans. (c) Statistical analysis

123. URL for NCBI is

a. www.ncbi.nlm.nih.gov
b. www.ncbi.gov
c. www.ncbi.nlm.gov
d. www.ncbi.nic.in

Ans. (a) www.ncbi.nlm.nih.gov

124. FASTA algorithm was published by

a. Altschul *et al*
b. F. Sangar
c. None
d. Both

Ans. (a) Altschul *et al*

125. BLAST's statistical theory was developed by

a. Samul Karim and Steven Altschul
b. Josheph Sambrook
c. None of these
d. F. Sangar

Ans. (a) Samul Karim and Steven Altschul

126. PDB is

a. Primary database for macromolecules
b. Composite database
c. None
d. Both of these

Ans. (a) Primary database for macromolecules

127. SCOP is

a. Structural database,which identify structural and evolutionary relationships
b. It is primary database
c. None
d. Both

Ans. (a) Structural database, which identify structural and evolutionary relationships

128. CLUSTA family of programs are

a. Multiple sequence analysis
b. Phylogenetic analysis
c. Both of these
d. None of these

Ans. (c) Both of these

129. In routine work which language is used in bio-informatics

a. Alphabet-nucleotide
b. Words-gene(pork)
c. Both of these
d. None of these

Ans. (c) Both of these

130. PRINTS are software used for

a. Identification of functional domains of proteins
b. Detection of tRNA gene
c. None of these
d. Both a and b

Ans. (a) Identification of functional domains of proteins

131. Gene Bank and SWISS PROT are examples of

a. Primary database
b. Composite database
c. Secondary database
d. None of these

Ans. (a) Primary database

132. Which is the model organism database

a. GOLD
b. SGD
c. SCOP
d. PAD

Ans. (b) SGD

133. BLAST and FASTA programs is used for

a. End free space alignment
b. Global similarity
c. Local similarity
d. Both a and b

Ans. (a) End free space alignment

134. BLASTX program is used for

a. Translate input sequence
b. Translate DNA database
c. None
d. Both of these

Ans. (a) Translate input sequence

135. BLOSUM matrices are used for

a. Pair wises equence alignment
b. Phylogenetic analysis
c. Protein analysis
d. Both a and b

Ans. (a) Pair wises equence alignment

136. One major difference between BLAST and FASTA is

a. If requires a preformatted search database
b. BLASTA is word based method
c. FASTA is word based method
d. None of these

Ans. (a) If requires a preformatted search database

137. To match protein quarry against translated nucleotide database you will use

a. TBLASTX
b. TBLASTY
c. TBLASTR
d. TBLASTZ

Ans. (a) TBLASTX

138. Full form of DDBJ

a. data Bank of Japan
b. DNA data Bank of Journal
c. DNA data bank of japan
d. None

Ans. (c) DNA data bank of japan

139. Full form of EBI

a. European Bioinformatics Institute
b. Egypt Bioinformatics Institute
c. None of these
d. Both a and b

Ans. (a) European Bioinformatics Institute

140. SRS is

a. Sequence retrival system
b. System retrival sequence
c. Sequence retro system
d. None

Ans. (a) Sequence retrival system

141. Database of enzymatic pathway, and biological chemicals is

a. COG's
b. KEGG
c. SEOP
d. SCOP

Ans. (b) KEGG

142. Which stain can be used for staining gel in proteomics experiment

a. Silver stain
b. Furoscent stain
c. Both
d. None of these

Ans. (b) Furoscent stain

143. CCMB Institute works in which discipline

a. Oncogenes
b. Cell transfer
c. Both
d. None of these

Ans. (c) Both

144. India has initiated genome sequencing project of which of the following?

a. Rice
b. Wheat
c. Pigeonpea
d. Tomato

Ans. (c) Pigeonpea

145. Sequence of the 24 human chromosomes was completed in which year?

a. 2002
b. 2003
c. 2006
d. 2009

Ans. (c) 2006

146. Which of the following is correct about genome annotation?

a. DAS is useful in indexing and visualization
b. GAME is a programmed for describing experimental evidence to support annotation
c. Bio Perl 2001 is used for storing-manipuating and visualizing the genome annotation.
d. All of the above

Ans. (d) All of the above

147. Which of the following approach can be used for gene identification?

a. C-DNA selection
b. C-DNA capture
c. Exon trapping
d. All of the above

Ans. (d) All of the above

148. The sequence of a human genome has now many nucleotide pairs?

a. 3.8×10^6
b. 3.0×10^6
c. 3.2×10^6
d. 3.5×10^6

Ans. (c) 3.2×10^6

149. Which of the following is concerned with the development and application of computer hardware and software for acquisition, storage, analysis and visualization of biological information?

a. Bioinformatics
b. Computer science
c. Biotechnology
d. Information technology

Ans. (a) Bioinformatics

150. Which of the following procedure can be used for the identification/discovery of SNPs?

a. Microarray
b. Analyzing the sequence data
c. DNA chip
d. All of the above

Ans. (d) All of the above

151. National biomedical research foundation serves as

a. Primary information data bank
b. Protein information system
c. Both a and b
d. None of these

Ans. (b) Protein information system

152. National biomedical research foundation was established in

a. 1983 b. 1984
c. 1985 d. 1986

Ans. (b) 1984

153. European molecular biology laboratory endeavours to

a. Collect, organise and distribute nucleotide sequence data
b. Primary information data bank
c. Protein information system
d. All of these

Ans. (a) Collect, organise and distribute nucleotide sequence data

154. The freeware commonly used for genome assembly is/are

a. Phred b. Phrap
c. Consed d. All of these

Ans. (d) All of these

155. National centre of bioinformation was established in

a. USA b. Japan
c. England d. China

Ans. (a) USA

156. Which of the following refers to next gen sequencing?

a. 454 pyro sequencing b. Illunina sequencing
c. Solid sequencing d. All of these

Ans. (d) All of these

157. National centre of Bioinformation serves as

a. Primary information data bank
b. Provides of information
c. Both a and b
d. None of these

Ans. (c) Both a and b

158. The sequencing data is recorded in the form of

a. PDF b. RTF
c. SCF d. DOC

Ans. (c) SCF

159. Whole genome sequencing can be done by

a. Whole genome shot gun method
b. Hierarchical clone by clone method
c. Both a and b
d. None of these

Ans. (c) Both a and b

160. In Sangers method of sequencing, which of the following is used in chain termination?

a. TAMRA b. RGG
c. GIIO d. dd NTP

Ans. (d) dd NTP

161. Bioinformatics encompasses which of the following

a. Biology
b. Computer science
c. Information technology
d. All of these

Ans. (d) All of these

162. Sequence retrival system developed by

a. PAM matrix
b. BLOSUM matrix
c. RNA sequences
d. Thure Etzold

Ans. (d) Thure Etzold

163. The scoring matrix for protein sequences is

a. PAM matrix b. BLOSUM matrix
c. RNA sequences d. Thure Etzold

Ans. (a) PAM matrix

164. Which is not correct about printed oligonucleotide chips?

a. These are produced by a light directed printing technology
b. These chips have double stranded oligonucleotides of 20–25 bases
c. Oligonucleotides are synthesized directly onto the chips
d. Each sequence is represented by a set of 20 non overlapping oligonucleotides to reduce false positive

Ans. (b) These chips have double stranded oligo-nucleotides of 20–25 bases

165. The programme is used to compare a nucleotide sequence with a nucleotide sequence database is;

a. BLASTn b. BLASTx
c. BLASTp d. Both a and b

Ans. (a) BLASTn

166. Sequencing of the 24 human chromosomes was completed in which year?

a. 2000 b. 2002
c. 2004 d. 2006

Ans. (d) 2006

167. It compare the submitted protein sequence against a protein database is

a. BALST n b. BLASTx
c. BLAST p d. tBLSTn

Ans. (c) BLAST p

168. Which is not correct about NIH guidelines?

a. The first NIH guidelines were prepared in 1975
b. NIH guidelines were more liberal than the recommendations of the Asilomar conference
c. The guidelines wrer revised after two year
d. In 1977, NIH prepared an Environmental Impact Statement

Ans. (b) NIH guidelines were more liberal than the recommendations of the Asilomar conference

169. Which approach can be used for gene identification?

a. Exon trapping b. c-DNA capture
c. c-DNA selection d. All of these

Ans. (d) All of these

170. shot gum sequencing was conceptualized by

a. Giovannoni b. Young
c. Michelmore d. Craig venter

Ans. (d) Craig venter

171. The strategy uses nucleic acid hybridization in colony hybridization or chromosome walking/ jumping or is based on PCR is

a. Sequence-dependent screening
b. Sequence-tagged microsatellites sites
c. Sequence-tagged cite
d. Single Locus Probe Analysis

Ans. (a) Sequence-dependent screening

172. Which is not correct?

a. In databases, base sequence of only one strand is listed
b. Base sequences runs from the 3′ to the 5′ direction
c. In single letter codes, R denoted guanine or adenine, while Y denotes thymine or cytosine
d. The nomenclature system adapted in bioinformatics is based on the recommendation of international Union of Pure and Applied chemistry

Ans. (b) Base sequences runs from the 3′ to the 5′ direction

173. First of all cDNA of the mRNA is produced using the enzymes reverse transcriptase; the cDNA single strand is then used for amplification to obtain cDNA deplexes

a. Random amplified polymorphic DNA
b. Pulsed field gel electrophoresis
c. Restriction fragment length Polymorphism
d. Reverse transcription PCR

Ans. (d) Reverse transcription PCR

174. India has initiated genome sequencing project of

a. Rice b. Tomato
c. Pigeon d. Human

Ans. (a) Rice

175. Which is not correct?

a. The public funded Human Genome project employed the clone by clone celera Genomics followed whole genome shot gun approach
b. Clone by clone approach is based on contigs
c. In the whole genome shot-gun approach, genome DNA is sheared to obtain 2 to 10 kb fragments, which are then cloned and sequenced from both the ends
d. Assigning biological functions to the DNA sequencens using a variety of tools and technology is described as structural genome

Ans. (d) Assigning biological functions to the DNA sequencens using a variety of tools and technology is described as structural genome

176. Sequencing of the 24 human chromosome was completed in which year?

a. 2006 b. 2000
c. 2004 d. 2010

Ans. (a) 2006

177. The first comprehensive collection of amino acid sequences was compiled in the Atlas of protein sequence and structure by

a. European Bioinformatics Institute
b. National Biomedical Research foundation
c. National Centre for Boinformatics Information
d. European Molecular Biology Laboratory

Ans. (b) National Biomedical Research foundation

178. Which is not correct?

a. RecA strains lack recombination
b. Transposon vectors lacking transposase gene are not able to transpose to other bacteria

c. Auxotrophic mutants can survive in nature
d. Transgenes integrated into plasmids may be transferred to other bacteria

Ans. (c) Auxotrophic mutants can survive in nature

179. The type of regulation necessary during field trials should depend on

a. Ability of the modified plants to survive in nature
b. Their ability for dispersal and reproduction
c. Their ability to hybridize with crop and weed plants
d. All of these

Ans. (d) All of these

180. Which is not correct about TaqMan Probes?

a. They are oligonucleotides longer than the primers
b. They contain a fluorescent dye usually on the 5′ base, and a quenching dye typically on the 3′ base
c. When Taq polymerase replicates a tempelate to which a Taq Man probe is paired, its 5′ exonuclease activity cleavage the TaqMan probe
d. The fluorescence decreases proportionately to PCR amplification

Ans. (d) The fluorescence decreases proportionately to PCR amplification

181. Which is correct about genome annotation?

a. GAME is a programme for describing experimental evidence to support annotation
b. DAS is useful in indexing and visualization
c. BioPerl 2001 is used for storing, manipulating and visualizing the genome annotation
d. All of these

Ans. (d) All of these

182. Which database is used by ENTREZ for bibliographic or citation search?

a. SWISS PROT
b. PDB
c. TrEMBL
d. PubMed

Ans. (d) PubMed

183. Which is not correct about NIH guidelines?

a. A major revision of the guidelines was effected in 1982
b. In the revision, the containment levels were made more stringent
c. Experiments that were previously prohibited, were changed to category requiring review and approval by NIH
d. In USA, the NIH guidelines are followed by all federal agencies that fund research on recombinant DNA

Ans. (b) In the revision, the containment levels were made more stringent

184. Database on DNA sequence contain which types of sequences?

a. EST and GST sequences
b. Genomic DNA and cDNA sequences
c. Organellar DNA sequences and sequences of other molecular such as tRNA, small RNAs
d. All of the above

Ans. (d) All of the above

185. India has not been involved in sequencing the genomes of which organisms as

a. Pigeon
b. Rat
c. Pigeonpea
d. Humans

Ans. (d) Humans

186. The rough draft of human genome was announced on

a. May 26, 2001
b. June 26, 2001
c. July 26, 2001
d. June 26, 2002

Ans. (b) June 26, 2001

187. Which programmes can be used for the identification on/detection of genes from genome sequence of prokaryotes?

a. Glimmer
b. Genmark
c. Genefinder
d. Both a and b

Ans. (d) Both a and b

188. Which is the example of major nucleotide sequence database?

a. DNA databank of JAPAN
b. Nucleotide sequence Database maintained by EMBL
c. Gene Bank Held by NCBI, USA
d. All of these

Ans. (d) All of these

189. Implements the sequential growing strategy of building up the molecular from a single starting block known as the seed by

a. Grow module
b. Lig Builder
c. POCKET module
d. Link module

Ans. (a) Grow module

190. The binding site of the target proteins and derives the key interaction site within this site is

a. Grow module
b. Lig Builder
c. POCKET module
d. Link module

Ans. (c) POCKET module

191. Lig Builder programme basically consists of

a. POCKET
b. GROW
c. LINK
d. None of these

Ans. (a) POCKET

192. Phylogeny usually described

a. Plant
b. Tree
c. Ferns
d. Algae

Ans. (b) Tree

193. A de novo ligand design program which build ligands from library of organic fragments taking into consideration the structural consist of the target proteins is

a. Lig Builder
b. POCKET module
c. GROW module
d. Link module

Ans. (a) Lig Builder

194. To introduce a mathematical formulation to determine the potential energy of a molecular called

a. Microarray
b. Molecular force field
c. Shot gun sequencing strategy
d. Shot gun approach of sequence

Ans. (b) Molecular force field

195. The search tool can be used to match a sequence against the PROSISTE database is

a. TBLASTN
b. TBLASTX
c. TBLASTE
d. PROMOT

Ans. (d) PROMOT

196. The programme is used to compare a nucleotide sequence with a nucleotide sequence database is

a. TBLASTN
b. TBLASTX
c. TBLASTE
d. PROMOT

Ans. (b) TBLASTX

197. The step in implementing the algorithm for alignment using dynamic programming is

a. Matrix initialization
b. Matrixfill
c. Trace back
d. All of these

Ans. (d) All of these

198. The sequence derived database are;

a. Protein
b. TrEMBL
c. Pfam
d. SWISS PORT

Ans. (c) Pfam

199. Secondary data base derived from PDB are the

a. SCOP
b. PAM
c. PDB
d. Pfam

Ans. (a) SCOP

200. The dot plot was first described by

a. Gibbs and McIntyre
b. Margaret Dayoff
c. Senger *et al*
d. None of these

Ans. (a) Gibbs and McIntyre

201. India has sequenced a part of chromosome 11; the other country sharing this chromosome was ……..

a. China
b. France
c. Taiwan
d. Japan

Ans. (b) France

202. 'Indian Initiative for Rice Genome Sequencing' (HRGS) as a part of international consortium for sequencing of the rice genome was launched by the Department of Biotechnology (DBT), New Delhi, in

a. 2001
b. 2000
c. 1998
d. 1999

Ans. (b) 2000

203. Which is the pathogenic strain of *E. coli* whose genome has been sequenced in 2001?

a. O157:H7
b. El T
c. K-12
d. MG1655

Ans. (a) O157H7

204. Whole genome of the first free-living organism was sequenced at

a. The Institute for Genomic Research (TIGR)
b. Bayer College of Medicine Human Genome Sequencing Center
c. The Washington University Genome Sequencing Center
d. University of Wisconsin-Madison

Ans. (a) The Institute for Genomic Research (TIGR)

205. In rice genome sequencing project, the maximum number of chromosomes has been sequenced by

a. China
b. France
c. USA
d. Japan

Ans. (d) Japan

206. Whole genome of the first free-living organism was sequenced in

a. 1998 b. 1995
c. 1985 d. 1977

Ans. (b) 1995

207. Among the diploid crops, the ……. possesses the smallest genome

a. Potato b. Tomato
c. Oat d. Eggplant

Ans. (b) Tomato

208. Among prokaryotes, the smallest genome is of

a. *Bacillus subtilis*
b. *Haemophylus influenza* KW20
c. *Salibacter (Acidobacteriausitatus Ellin6076)*
d. *Carsonella ruddii* PV

Ans. (d) *Carsonella ruddii* PV

209. The International Rice Genome Sequencing Project (IRGSP) was initiated by

a. UK b. India
c. USA d. Japan

Ans. (d) Japan

210. The genome of *Haemophilus influenza* is small and consists of ……. genes in the entire genome

a. 1840 genes b. 1740 genes
c. 1640 genes d. 1540 genes

Ans. (b) 1740 genes

211. The genome of Neurospora crussa is organized in …….. chromosomes

a. 9 b. 8
c. 7 d. 6

Ans. (c) 7

212. The maximum number of genome sequencing projects has been carried out at

a. Germany b. Canada
c. UK d. USA

Ans. (d) USA

213. *Rattus norvegicus* is commonly known as the

a. Norwegian rat
b. Common rat
c. Brown rat
d. All of these

Ans. (d) All of these

214. This international Human Genome Project started in

a. December, 1990 b. October, 1990
c. August, 1990 d. June, 1990

Ans. (b) October, 1990

215. Genomes of human and mice had been sequenced; both had revealed similarity in about ……. genes.

a. 3000 b. 1500
c. 300 d. 150

Ans. (c) 300

216. The Institute for Genomic Research (TIGR) is situated at

a. Houston b. Berkeley
c. Wisconsin d. Rockville

Ans. (d) Rockville

217. Human Genome Project was completed in 2003; the chromosome no. was sequenced in

a. 2006 b. 2003
c. 2000 d. 1997

Ans. (a) 2006

218. Initial sequencing of the human genome was published in 2001 in

a. Science b. Nature
c. Both d. None

Ans. (c) Both

219. The progress of HGP was greatly increased after the involvement of a private company … by J. Craig Venter

a. Syngenta
b. Strand Genomics
c. Celera Genomics
d. The Institute for Genomic Research

Ans. (c) Celera Genomics

220. Which among the following is the largest genome sequenced until now?

a. *Oryza sativa* b. *Homo sapiens*
c. *Caenorhabdtitis elegans* d. *Guillardia theta*

Ans. (b) *Homo sapiens*

221. Ethernet was described in thesis of ……. submitted to Harvard University.

a. P.H.O' Farrell b. Ray Tomlinson
c. Robert Metcalfe d. Paul Berg

Ans. (c) Robert Metcalfe

222. Transmission Control Protocol (TCP) was developed by

a. Tom Trustcott, Jim Ellis and Steve Bellovin
b. Allan Maxam, Walter Gilbert and Frederick Sanger
c. Vint Cerf and Robert Khan
d. Bill Gates and Paul Allen

Ans. (c) Vint Cerf and Robert Khan

223. The aspects of bioinformatics that are applied to drug discovery and drug designing are known as

a. Medical informatics
b. Biomedical informatics
c. Pharmacoinformatics
d. All of the above

Ans. (d) All of the above

224. Bioinformatics is a multidisciplinary subject and requires the knowledge of many subjects. Pick the odd one out from the following

a. Mathematics
b. Geography
c. Information technology
d. Biology

Ans. (b) Geography

225. Bioinformatics is

a. Searching and retrieval of data
b. The storage, annotation and analysis of data
c. A newly emerged inter-disciplinary scientific discipline that interfaces the developments of computer science and information technology with biological sciences
d. All of these

Ans. (d) All of these

226. The application of genomic approaches and technologies to the identification of drug targets is known as

a. Pharmacology
b. Pharmacogenetics
c. Pharmacogenomics
d. Pharmacoinformatics

Ans. (d) Pharmacoinformatics

227. The SWISS- PROT database was created by

a. European Molecular Biology Laboratory (EMBL)
b. Department of Medical Biochemistry, University of Geneva
c. None of the above
d. Both of these

Ans. (d) Both of these

228. The Compact Disk (CD) was launched in

a. 1984 b. 1983
c. 1982 d. 1981

Ans. (b) 1983

229. Which of the following is used for structure visualization?

a. MODELLER b. CLUSTAL
c. BLAST d. Cn3D

Ans. (d) Cn3D

230. A drug can act as a

a. Poison b. Medicine
c. Both a and b d. None of these

Ans. (c) Both a and b

231. A ligand is

a. A molecular group b. A molecule
c. An ion d. All of these

Ans. (d) All of these

232. Which serves as a drug?

a. Inorganic substances
b. Products from animal sources
c. Plant extracts
d. All of the above

Ans. (d) All of the above

233. Altered drug behavior is studied in

a. Molecular biology b. Genetics
c. Pharmacogenetics d. Biochemistry

Ans. (c) Pharmacogenetics

234. Which act as a drug target?

a. Nuclear receptors b. Enzymes
c. Ion channels d. All of these

Ans. (d) All of these

235. PCA stands for

a. Principal complementary analyzer
b. Principal component analyzer
c. Principal component analysis
d. Principal complementary analysis

Ans. (c) Principal component analysis

236. Who is considered to be the father of Microarray Technology?

a. Edwin M. Southern
b. Grunstein and Hogness

c. U. Maskos
d. Mark Schena

Ans. (d) Mark Schena

237. Which technique is not used for microarray fabrications?

a. Ink-Jet printing
b. Southern blotting
c. Electrochemical synthesis
d. Photolothography

Ans. (b) Southern blotting

238. Microarray has been used for the identifications of

a. Genetic and infectious diseases
b. Single nucleotide polymorphisms
c. Parallel analysis of gene expression
d. All of the above

Ans. (d) All of the above

239. Microarrays are fabricated on

a. Nylon substrate
b. Plastic substrate
c. Silicon glass
d. All of these

Ans. (d) All of these

240. The word microarray has been derived from

a. Greek and French
b. French
c. Greek
d. None

Ans. (a) Greek and French

241. Microarray has been prepared for

a. Proteins
b. DNA
c. Both a and b
d. None

Ans. (c) Both a and b

242. Which method is statically more robust for phylogenetic analysis?

a. Neighbor joining method
b. Maximum likelihood method
c. Maximum Parsimony
d. None of the above

Ans. (b) Maximum likelihood method

243. Phylogenetic analysis deals with the

a. Evolutionary relatedness
b. Genetics
c. Environmental biology
d. None of the above

Ans. (a) Evolutionary relatedness

244. UPGMA stands for

a. Unweighted pair group method with arithmetic mean
b. Unweighted paradigm method with arithmetic mean
c. Unweighted pair group matrix with arithmetic mean
d. Unweighted pair group method with average

Ans. (a) Unweighted pair group method with arithmetic mean

245. Terminal nodes are also known as

a. Internal points
b. Leaves
c. Root
d. All of these

Ans. (b) Leaves

246. Molecular Clock Theory had been proposed by

a. Michael Zuker
b. Carl Woese
c. Zuckerkandl and Pauling
d. Charles Darwin

Ans. (c) Zuckerkandl and Pauling

247. Homoplasies arise as a result of

a. Mutation
b. Speciation
c. Duplication
d. Convergent evolution

Ans. (d) Convergent evolution

248. Cladogram represents

a. Duplication
b. Exact number of changes
c. Scaled branch lengths
d. Arbitrary branch lengths

Ans. (d) Arbitrary branch lengths

249. The accuracy of phylogenetic trees has been affected by

a. Gene duplication
b. Complexity in organisms genome
c. Horizontal gene transfer
d. All of the above

Ans. (d) All of the above

250. Which among the following is not a metasearch engine?

a. http://www.webcrawler.com
b. http://www.aol.com
c. http://www.metacrawler.com
d. http://www.dogpile.com

Ans. (b) http://www.aol.com

251. PubMed includes over……. Million citations from MEDLINE and other life science journals for biomedical articles.

a. 25 b. 17
c. 12 d. 1.5

Ans. (b) 17

252. WebCrawler, a metasearch engine launched in 1994 was created by …… of the University of Washington.

a. Bill Gates b. Paul Allen
c. Sabeer Bhatia d. Brian Pinkerton

Ans. (d) Brian Pinkerton

253. Implied Boolean logic plus (+) works similar to Boolean operator "……..

a. NEAR b. NOT
c. OR d. AND

Ans. (d) AND

254. Which of the following is an example of Homology and similarity tool?

a. BLAST b. RasMol
c. EMBOSS d. PROSPECT

Ans. (a) BLAST

255. Nesting is also an effective searching approach. In this type of search.

a. Generally "OR" is used between the words
b. More than one operator and three or more keywords are used
c. Parenthesis are used to separate keywords
d. All of these

Ans. (d) All of these

256. The Boolean operator "……." Is used for widening of a search.

a. NEAR
b. NOT
c. OR
d. AND

Ans. (d) AND

257. Which among the following is not a key feature of a search engine?

a. The retrieved information is in evaluated and may contain the significant information but sometimes it is irrelevant
b. The documents retrieved contain full-text of the web pages
c. The entire database is organized into subject categories
d. The database is built by computer robot programs

Ans. (d) The database is built by computer robot programs

258. Which among the following is a search engine?

a. http:// www.looksmart.com
b. http:// www.infomine.ucr.educ/
c. http:// www.ask.com
d. http://www.dmoz.org

Ans. (c) http:// www.ask.com

259. AltaVista was launched in December……..

a. 1999 b. 1997
c. 1995 d. 1993

Ans. (d) 1993

260. Founder of Yahoo was ……

a. Sabeer Bhatia
b. Garrett Gruener and David Warthen
c. Larry Page and Sergey Brin
d. David Filo and Jerry Yang

Ans. (d) David Filo and Jerry Yang

261. Which among the following is the most used search engine on the web?

a. Google b. MSN
c. Ask d. Yahoo

Ans. (a) Google

262. The very first tool used for searching on the Internet, which was created by Alan Emtage in 1990, was ……

a. Aliweb b. Jughead
c. Archie d. Veronica

Ans. (c) Archie

263. Yahoo is using its own search technology since …….

a. 2004 b. 2002
c. 2000 d. 1998

Ans. (a) 2004

264. "Black rub" is the older name for

a. Yahoo
b. Aliweb
c. Google
d. Veronica

Ans. (c) Google

265. Goggle was founded by

a. Sabeer Bhatia
b. Garrett Gruener and David Warthen
c. Larry Page and Sergey Brin
d. David Filo and Jerry Yang

Ans. (c) Larry Page and Sergey Brin

266. Which among the following is the software is the software tool for peptide mass mapping and sequencing?

a. Peptide Search
b. SWISS-2DPAGE
c. SEAQUEST
d. FindMod

Ans. (a) Peptide Search

267. The term genomics was given by

a. Tim Berner Lee
b. Thomas H. Roderick
c. Leonard Kleinrock
d. J.C.R. Licklider

Ans. (b) Thomas H.Roderick

268. The term 'Proteomics' was coined by Wilkins, *et al* in ……

a. 1998
b. 1997
c. 1996
d. 1995

Ans. (d) 1995

269. The term genomics was coined in year ……..

a. 1986
b. 1977
c. 1963
d. 1951

Ans. (a) 1986

270. Comparative genomics is the comparing of genomes of different species which involves ……..

a. Length and number of exons within genes
b. Sequence similarity
c. Location of genes
d. All of these

Ans. (d) All of these

271. The complete set of DNA an organism is called ……..

a. Gene
b. Genetic code
c. Genomics
d. Genome

Ans. (d) Genome

272. Entire protein content produced by a cell or organisms is called ……..…

a. Genome
b. Metablome
c. Proteome
d. Transcriptone

Ans. (c) Proteome

273. Watson and Crick has given the molecular structure of nucleic acid in ……

a. 1957
b. 1955
c. 1953
d. 1951

Ans. (c) 1953

274. The complete set of mRNA in an organism is called ……..

a. Nucleome
b. Genome
c. Metablome
d. Transcriptone

Ans. (d) Transcriptone

275. The *E. coli* genome was sequenced in ……...

a. 1999
b. 1997
c. 1995
d. 1993

Ans. (c) 1995

276. Hierarchical Shotgun Sequencing is preferred in the sequencing of the genomes, which …….

a. Is the accuracy as there are less likely to make mistakes during the arrangements of contigs
b. Is slow, time consuming and takes several years to complete the sequencing of a genome
c. Contain more repetitive DNA
d. All of these

Ans. (d) All of these

277. In 1998, organization established in the field of genomics and bioinformatics

a. Swiss Institute of Bioinformatics
b. Celera Genomics
c. Both of these
d. None of these

Ans. (c) Both of these

278. DNA sequence data can be submitted by the scientists to the ……. Publicity accessible database.

a. European Bioinformatics Institute (EBI)
b. DNA Data Bank of Japan (DDBJ)
c. GenBank at NCBI
d. All of these

Ans. (d) All of these

279. DNA sequencing approaches had been evolved in …….

a. 1998
b. 1997
c. 1996
d. 1995

Ans. (b) 1997

280. The release 90 of EMBL contains 87.48 million sequence entries comprising ..... Billion nucleotides

a. 200.56 b. 162.43
c. 159.93 d. 146.59

Ans. (c) 159.93

281. Which among the following is not functional genomics?

a. Metabonomics b. Transcriptomics
c. Genome sequencing d. Proteomics

Ans. (c) Genome sequencing

282. Which among the following is not a gene finding tool?

a. GeneMark b. NetGene
c. FGENEH d. PHRAP

Ans. (d) PHRAP

283. Fred Sanger and his colleagues sequences the genome of ... in 1988 using dideoxynucleotide chain termination method

a. φX174 b. Rickettsia Prowazekii
c. Epstein-Barr virus d. Helicobacter pylori

284. The geome of φX174 contains ..... Bp nucleotides

a. 9976 b. 9873
c. 5386 d. 4567

Ans. (c) 5386

285. Each BAC inserts in isolated and mapped in order to determine the arrangement of each fragment to make physical map, this process is called the

a. Annotation of the Genome
b. Golden tiling Path
c. PHRAP and PHRED
d. Whole genome shotgun

Ans. (b) Golden tiling Path

286. Which tool is suitable for doing multiple sequence alignment?

a. T-COFFEE b. MUSCLE
c. CLUSTAL d. All of these

Ans. (d) All of these

287. In sequence analysis we do not align

a. Two gaps or blanks b. Mismatch characters
c. Match characters d. None of the above

Ans. (a) Two gaps or blanks

288. What does BLAST stand for?

a. Basic local alignment seek tool
b. Basic local alignment search tool
c. Basic local analysis seek tool
d. Basic local analysis search tool

Ans. (b) Basic local alignment search tool

289. In pair wise sequence alignment we compare

a. Only two sequences
b. More than two sequences
c. Both a and b are correct
d. None of the above

Ans. (a) Only two sequences

290. Which one is heuristic method for sequence similarity search?

a. Smith-waterman algorithm
b. Dynamic programming
c. Dot plot
d. FASTA

Ans. (d) FASTA

291. We can perform multiple sequence alignment for

a. Expressed sequence tags (ESTs)
b. Protein sequences
c. Nucleotide sequences
d. All of the above

Ans. (d) All of the above

292. PAM stands for

a. Point accepted matrix
b. Accepted point mutation
c. Point accepted mutations
d. Both a and b

Ans. (d) Both a and b

293. Paralogous sequence arise due to

a. Gene duplication
b. Speciation
c. Insertion
d. Deletion

Ans. (a) Gene duplication

294. Orthologous sequences arise due to

a. Gene duplication
b. Speciation
c. Insertion
d. Deletion

Ans. (b) Speciation

295. Nucleic acid database is abbreviated as

a. NADB
b. NDB
c. NAD
d. None of these

Ans. (b) NDB

296. Biological database contains

a. Structures
b. Proteins
c. DNA
d. All of these

Ans. (d) All of these

297. Which one is not a secondary database?

a. Pfam
b. NCBI
c. CATH
d. PROSITE

Ans. (b) NCBI

298. NCBI is a

a. Composite database
b. Secondary database
c. Primary database
d. None of the above

Ans. (c) Primary database

299. Which one is not a primary database?

a. SWISS-PROT
b. OWL
c. DDBI
d. EMBL

Ans. (b) OWL

300. SWISS-PROT is a

a. Database of protein sequences
b. Database of structures
c. Database of nucleic acid
d. None of the above

Ans. (a) Database of protein sequences

301. DDBJ is a repository of

a. Japan
b. India
c. Europe
d. USA

Ans. (a) Japan

302. NCBI stands for

a. National Center of Biotechnology Information
b. National Center for Biotechnology Information
c. National Center of Bioinformatics Information
d. National Center for Bioinformatics Information

Ans. (b) National Center for Biotechnology Information

303. Which of the following is untrue about DNA sequencing methods?

a. Purified fragments of DNA cut from plasmid/phage clones or amplified by polymerase chain reaction (PCR)
b. Clones of DNA fragments are denatured to single strands, and one of the strands is hybridized to an oligonucleotide primer
c. Taq polymerase is quite heat sensitive
d. New strands of DNA are synthesized from the end of the primer

Ans. (c) Taq polymerase is quite heat sensitive

304. Which of the following is not one of the requirements for implementing algorithms for sequence database searching?

a. Size of the dataset
b. Sensitivity
c. Specificity
d. Speed

Ans. (a) Size of the dataset

CHECK YOUR GRASP

1. The universal genetic code was discovered in

a. 1953 b. 1966
c. 1991 d. 1997

2. PDBeCIF generates

a. CIF from PDB
b. mmCIF from PDB
c. Pseudo-PDB from PDB
d. All of these

3. The first protein to be sequenced is

a. Insulin b. haemoglobin
c. Myosin d. Tannin

4. PMC is

a. A digital archive of peer reviewed journals in life sciences
b. A protein Modelling center available at DDBJ
c. A secondary structure prediction tool
d. Aphylogeny method based on Maximum parsimony method

5. Uniport stands for

a. Uniform protein database
b. Universal protein database
c. Universal polypeptide database
d. Unique protein database

6. BLASTX program is used for

a. Translate input sequence
b. Translate DNA database
c. None
d. Both of these

7. BLOSUM matrices are used for

a. Pair wise sequence alignment
b. Phylogenetic analysis
c. Protein analysis
d. Both a and b

8. In homology medelling the most suitable BLAST is

a. PSI-BLAST b. PHI-BLAST
c. GEO-BLAST d. RP BLAST

9. Bioinformatics can not analyse

a. Chemical analysis b. Biomedical analysis
c. Statistical analysis d. Mathematical analysis

10. URL for NCBI is

a. www.ncbi.nlm.nih.gov b. www.ncbi.gov
c. www.ncbi.nlm.gov d. www.ncbi.nic.in

11. India has sequenced a part of chromosome 11; the other country sharing this chromosome was ……..

a. China b. France
c. Taiwan d. Japan

12. 'Indian Initiative for Rice Genome Sequencing' (HRGS) as a part of international consortium for sequencing of the rice genome was launched by the Department of Biotechnology (DBT), New Delhi, in

a. 2001 b. 2000
c. 1998 d. 1999

13. In 1998, organization established in the field of genomics and bioinformatics

a. Swiss Institute of Bioinformatics
b. Celera Genomics
c. Both of these
d. None of these

14. Comparative genomics is the comparing of genomes of different species which involves ……..

a. Length and number of exons within genes
b. Sequence similarity
c. Location of genes
d. All of these

15. Institute of Microbial Technology related to

a. Plant tissue culture
b. Animal cell culture
c. Protein modelling
d. Nucleic acid sequencing

16. The term genomics was coined in year ……..

a. 1986 b. 1977
c. 1963 d. 1951

In case of less than 80% score, go through brief review and glance once again from chapter

Key: 1-b 2-b 3-a 4-a 5-b 6-a 7-a 8-a 9-c 10-a 11-b 12-b 13-c 14-d 15-c 16-a

12

Principle of Genetics and Plant Breeding

1. Mendel's law of segregation, as applied to the behavior of chromosome in meiosis, means that

a. Paring of homologs will convert one allele into the other, leading to separation of the types
b. Allels of a gene separate from each other when homologs separate in meiosis I
c. Genes on the same chromosome will show 50% recombination
d. Alleles of a gene will be linked and passed on together through meiaosis

Ans. (a) Paring of homologs will convert one allele into the other, leading to separation of the types

2. The phenomenon of independent assortment refers to

a. Expression at the same stage of development
b. Unlinked transmission of genes in crosses resulting from being located on different chromosomes
c. Association of an RNA and a protein implying related function
d. Independent location of genes from each in an interphase cell

Ans. (b) Unlinked transmission of genes in crosses resulting from being located on different chromosomes

3. One of Mendel's pure strains of pea plants had green peas. How many different kinds of egg could such a plant produce with regard to pea colour?

a. One b. Two
c. Three d. Four

Ans. (a) One

4. List all the different gametes produced by the following individuals AA BB Cc aa Bb Cc

a. 1. ABC, ABc ; 2. aBC, aBc , abC , abc
b. 1. AbC, ABc ; 2. ABC, aBc, abC, aBC
c. 1. ABC, ABC ; 2. aBC, aBc, abc, aBC
d. 1. ABC, ABc ; 2. aBC, ABc, abc, abC

Ans. (a) 1. ABC, ABc ; 2. aBC, aBc , abC , abc

5. If a diploid cell contains six chromosomes, how many possible random arrangements of homologous could occur during Metaphasse-I?

a. 4 b. 8
c. 6 d. 64

Ans. (b) 8

6. Determine the frequency of only one genotype, BBLI, in the offspring of dihybrid parents (BbLI)

a. 1/4 b. 1/8
c. 1/16 d. 1/2

Ans. (b) 1/8

7. If an individual of genotypes AaBbCcDd is test crossed, how many different phenotypes can appear in the progeny?

a. 16 b. 8
c. 32 d. 64

Ans. (a) 16

8. If individuals of genotypes AaBbCc are intercrossed, how many different phenotypes can appear their offspring?

a. 16 b. 27
c. 32 d. 64

Ans. (b) 8

9. If a color blind female marries a man whose mother was also colour blind, what are the chances of the progeny having color blindness

a. 100% b. 25%
c. 50% d. 75

Ans. (a) 100%

10. If individual of genotypes AaBbCc are intercrossed, how many different F_2 phenotypes can appear assuming complete codominance at all loci?

a. 8 b. 64
c. 27 d. 9

Ans. (c) 27

11. A man is heterozygous B/b for one autosomal gene, and he carries a recessive X-linked allele d. What proportion of his sperm will be bd?

a. 1/4
b. 1/8
c. 1/16
d. 1/2

Ans. (d) 1/2

12. A trihybrid cross is made between two yeast, both with genotype A/a, B/b, C/c. What proportion of the offspring will be of genotype a/a, b/b, c/c?

a. 1/8 b. 1/32
c. 1/64 d. 1 /74

Ans. (c) 1/64

13. When heterozygous black pigs are intercrossed then what is the chance of the first two offspring being black?

a. 46 b. 1/32
c. 1/64 d. 1/74

Ans. (b) 1/32

14. Medical geneticists usually abbreviate the normal beta- globin gene as b, and the abnormal gene (in this case) as b^0. Neither of your patient's parents has beta-thalassemia. Which of these described the most likely genotypes of both parents?

a. none is b^0 and one in b
b. One is b^0 b^0 and one is bb
c. Both are b^0b^0
d. Both are bb^0

Ans. (d) Both are bb^0

15. If a man of blood group AB marries a woman of blood group A whose father was of blood group O, to what different blood group can this man and woman expect their children to belong?

a. A, AB, B
b. A, AB
c. AB, O
d. A, O, B

Ans. (a) A, AB, B

16. In the human ABO blood system, the alleles A and B are dominant to O, what will be the number of different possible genotype?

a. 4
b. 8
c. 6
d. 12

Ans. (c) 6

17. A brown mouse is mated with two female blackmice. when each female has produced several litters of young, the first female has had 48 black and the second female has 14 black and 11 brown young. deduce the pattern of inheritance coat colour and the genotype of all the parents (B- Black; b - brown)

a. Male Bb; female 1, BB; female 2 Bb
b. Male BB; female 1, BB; female 2 Bb
c. Male Bb; female 1, BB; female 2 bb
d. None of the above

Ans. (d) None of the above

18. Three genes (P, Q and R) are found of three different chromosome. For the following diploid genotypes, describe all of the possible gamete combinations and their predicted ratios

P. AABbCC Q. AaBBCc R. Aabbcc

a. P. 1ABC: 1AbC Q. 1ABC: 1ABc: 1aBC: 1aBc R. 1Abc: 1abc
b. P. 1ABC: 1Abc Q. 1abc : 1Abc: 1aBC: 1aBc R. 1abc: 1abc
c. P. 1ABC: 1Abc Q. 1ABC: 1aBc: 1aBC: R. 1Abc: 1abc
d. P. 1ABC: 1Abc Q. 1ABC: 1Abc: 1aBC: R. 1Abc: 1Abc

Ans. (a) P. 1ABC: 1AbC Q. 1ABC: 1ABc: 1aBC: 1aBc R. 1Abc: 1abc

19. A true-breeding pea plant with round and green seeds is correct is crossed to a true -breeding plant with wrinkled and yellow seeds .Round and yellow seeds are the dominant traits .The F_1 plants are allowed to self-fertilize. What are the following probabilities for the F2 generation?
P. An F2 plant with wrinkled, yellow seeds
Q. An F2 plant with round, yellow seeds

a. P. 2/16 Q. 9/16
b. P. 3/16 Q. 7/16
c. P. 3/16 Q. 9/16
d. Cannot be determined from the information

Ans. (c) P. 3/16 Q. 9/16

20. In Guinea pig, black coat colour is a dominant trait and white is recessive trait .A black female is test crossed, producing six black offspring. The probability that heterozygous black would do this by chance alone is approximately

a. 50% b. 25%
c. 1%
d. Cannot be determined from the information

Ans. (a) 50%

21. What are the minimum progeny population sizes allowing for random union of all kinds of gametes from AaBbCc parent?

a. 64
b. 32
c. 16
d. 8

Ans. (a) 64

22. A red -flowered tall parent plant (PI) was crossed to a true breeding red-flowered dwarf plant (P2) and half of the progenies obtained was red and tall and the other half red and dwarf. In the next generation, half of all these progenies segregated only for flower colour and the other half segregated only for height . The genotype of the P1 is

a. Heterozygous for colour and heterozygous for height
b. Homozygous for colour and heterozygous for height
c. Heterozygous for colour and homozygous for height
d. Homozygous for colour and homozygous for height

Ans. (a) Heterozygous for colour and heterozygous for height

23. According to classical genetics, Which of the following statements is true?

a. Recessive alleles are detected by the phenotype of the F_1 generation
b. The closer two genes are, the more frequently they recombine
c. Genes on different autosomes segregate independently
d. Gene on sex chromosomes segregate with the same pattern as autosomal genes

Ans. (c) Genes on different autosomes segregate independently

24. Assuming the comparable chromosomes in different individuals are genetically dissimilar because of different alleles. How many unique zygotic combinations are possible following fertilization in an organism where n = 3 (Assuming that no crossing over occurs)?

a. 8
b. 16
c. 64
d. 216

Ans. (c) 64

25. The colour of flowers of an annual species of plants is controlled by a single locus with two alleles R and r, and the genotypes RR, Rr and rr and red, pink and white respectively. A large number of seeds from individuals with pink flowers were collected and planted on an island, Where because of absence of pollinators, only self-pollination is possible. What will be the most likely outcome after 25 years?

a. About 50% plants with red flowers 50 % with white flowers
b. Almost 100% plants with pink flowers
c. Red, pink, and white flowered plants in a ratio of 1:2:1
d. Red, pink and white flowered plants in equal proportion

Ans. (c) Red, pink, and white flowered plants in a ratio of 1:2:1

26. Coat colour of dogs depend upon the action of at least two genes. At one locus a dominant epistatic inhibitor of colour pigment (A–) prevents the expression of colour at another independently assorting locus, producing white coat colour. when the recessive condition exists at the inhibitor locus (aa) the alleles of the hypostatic locus may be expressed, aaB-producing black and aabb producing brown. When dihybrid white dogs are together, determine the phenotypic proportions expected in the progeny

a. 9 : 7
b. 9 : 3 : 4
c. 12 : 3 : 1
d. 13 : 3

Ans. (c) 12 : 3 : 1

27. Short hair in rabbits is governed by a dominant gene L and long hair by its recessive allele I. black hair results from the action of the dominant genotype B- and brown from the recessive genotype bb

a. In crosses between dihybrid short-haired, black and homozygous short-haired, brown rabbits, genotypic ratio will be 1 : 1 : 1 : 1
b. In crosses between dihybrid short-haired, black and homozygous short-haired, brown rabbits, phenotypic ratio will be 1 : 1
c. Expected phenotypic ratio from the cross LIBb x LIbb will be 3 : 3 : 1 : 1
d. Expected genotypic ratio of LIBb will be ¼

Ans. a, b, c, and d

28. In a cross between two individuals with the genotypes AaBbccDdEeFf and AaBbCCDDeeff, the probability that an offspring will be heterozygous at all these loci is

a. 0
b. 1/16

c. 1/32
d. 1/64

Ans. (c) 1/32

29. Two pink-flowered four-o'clocks are crossed to each other. Flower colour is incompletely dominant and giving phenotypic ratio if 1 red : 2 pink : 1 white. What are the following probabilities?
P. The first three plants with while flower
Q. A plant with either white or pink flower

a. P. 1/64 Q. 3/4
b. P.3/16 Q. 1/64
c. P.3/64 Q.9/16
d. P. 1/64 Q.1/64

Ans. (a) P. 1/64 Q. 3/4

30. Which of the following is a mismatch?

a. Phenotypic F_2 ratio of 1 : 4 : 6 : 4 : 1-polygenic inheritance
b. Phenotypic F_2 ratio of 9 : 3 : 4-recessive epistasis
c. Phenotypic F_2 ratio of 1 : 2 : 1-codominance
d. Phenotypic F_2 ratio of 3 : 1-partial dominance

Ans. (d) Phenotypic F_2 ratio of 3 : 1-partial dominance

31. Why would you predict that half of the human babies born will be maies and half will be femaies?

a. Because of the segregation of the X and Y chromosomes during male meiosis
b. Because of the segregation of the X chromosomes during female meiosis
c. Because all eggs contain an X chromosome
d. Because, on average, one- half of all eggs produce females

Ans. (a) Because of the segregation of the X and Y chromosomes during male meiosis

32. Asymmetry between reciprocal crosses is seen in

a. Pleiotropy
b. Sex-linked inheritance
c. Interaction of genes
d. Autosomal inheritance

Ans. (b) Sex-linked inheritance

33. Which of the following is not true autosomal dominant traits?

a. Every affected person should have at least one affected parent
b. Males and females should be equally often affected
c. An affected person has a 50% chance of transmitting the dominant allele to each offspring
d. All the daughters of an affected male will be affected but none of the sons

Ans. (d) All the daughters of an affected male will be affected but none of the sons

34. Albinism is a recessive human trait. If a normal couple produces an albino child, what is the probability that their next child will be albino?

a. 1/4
b. 1/8
c. 1/16
d. 1/64

Ans. (a) 1/4

35. When a man with hypertrichosis marries a normal woman, what % of their sons would be expected to have hairy ears?

a. 50%
b. 100%
c. 0%
d. 25%

Ans. (b) 100%

36. A man with a certain disease marries a normal woman. They have 8 children (4 boys and 4 girls); all of the girls have their father's disease, but none of the boys do. What inheritance is suggested?

a. Autosomal recessive
b. Autosomal dominant
c. Y-linked
d. X-linked

Ans. (d) X-linked

37. Cystic fibrosis is a hereditary disease that affects the respiratory and digestive systems. Cystic fibrosis occurs when two recessive genes (cc) are present. A person with one allele for Cystic fibrosis is called a carrier (Cc) of the disease. If the mother is a carrier of the disease and the father is homozygous dominant, what are chances that their child will be carrier of Cystic fibrosis?

a. 25%
b. 50%
c. 75%
d. 100%

Ans. (b) 50%

38. Which of the following is/are correct about sex – linked recessive inheritance?

a. Most affected individuals are male
b. Affected females come from affected father and affected or carrier mothers
c. The sons of affected females should be affected
d. The trait does not skip generations

Ans. a, b, and c

39. Which of the following is/are not feature (s) of quantitative trait?

a. Characters of degree
b. Continuous variation
c. Polygenic control
d. Discontinuous variation

Ans. (d) Discontinuous variation

40. Which of the following are correct?

a. Classical Mendelian traits are qualitative in nature
b. Qualitative traits show discontinuous variations
c. Qualitative traits are polygenic traits
d. Qualitative traits are referred to as metric traits

Ans. a and b.

41. Wheat grain colour is controlled by four loci and following qualitative inheritance

P. Calculate the number of different F_2 phenotypes in a certain stock of wheat

Q. Calculate the number of F_2 as extreme as one parent or the other

a. P-9, Q-1/16
b. P-16, Q-1/256
c. P-8, Q-1/32
d. P-9, Q-1/256

Ans. (d) P-9, Q-1/256

42. Two pure lines of corn have mean cob lengths of 9 and 3 inches, respectively. The polygenes involved in this trait all exhibit additive gene action. Crossing these two lines is expected to produce a progeny with mean cob length (in inches) of

a. 12.0
b. 7.5
c. 6.0
d. 2.75

Ans. (c) 6.0

43. In a plant, height varies from 6 to 36 cm. When 6 cm and 36 cm plants were crossed all F1plants were 21 cm. In the F2 generation, a continuous range of heights was observed. Most were around 21 cm, and 3 of 200 were 6 cm. Find out how many gene pairs are involved in this mode of inheritance?

a. 3
b. 4
c 2
d. 5

Ans. (a) 3

44. If four chromosomes synapse into a cross-shaped configuration during meiotic prophase, the organism is heterozygous for a

a. Pericentric inversion
b. Delection
c Translocation
d. Paracentric inversion

Ans. (c) Translocation

45. Philadelphia chromosome is generated by translocation between

a. Chromosome 18 and chromosome 6
b. Chromosome 22 and chromosome 9
c Chromosome 22 and chromosome 3
d. Chromosome 16 and chromosome 4

Ans. (b) Chromosome 22 and chromosome 9

46. Retinoblastoma is caused by loss of both copies of the RB gene in the chromosome band

a. 13p11
b. 13q11
c. 3q14
d. 21q14

Ans. (c) 3q14

47. Position effect is the result of

a. Mutations
b. Deletions
c Inversions
d. Transversions

Ans. (c) Inversions

48. The bridge-fragment configuration at anaphase-1 is characteristic of

a. Translocation heterozygote
b. Paracentric inversion heterozygote
c Pericentric inversion heterozygote
d. Duplication heterozygote

Ans. (b) Paracentric inversion heterozygote

49. A mechanism that can cause a gene to move from one linkage group to another is

a. Translocation
b. Inversion
c. Crossing over
d. Duplication

Ans. (a) Translocation

50. Pseudodominance may be observed in heterozygotes for

a. A deletion
b. A duplication
c. A reciprocal translocation
d. More than one of the above

Ans. (a) A deletion

51. Which of the following chromosomal changes is usually the most damaging when in the homozygous condition?

a. Deletion
b. Duplication
c. Translocation
d. Inversion

Ans. (a) Deletion

52. In a trisomic individual the number of chromosome is

a. 2n-1
b. 2n+2
c. 2n+3
d. 2n+1

Ans. (d) 2n+1

53. A person with Klinefelter syndrome is considered a

a. Monosomic
b. Triploid
c. Trisomic
d. Delection heterozygote

Ans. (c) Trisomic

54. IF the garden pea has 14 chromosomes in its diploid complement, how many double trisomics could theoretically exist?

a. 6 b. 9
c. 16 d. 21

Ans. (d) 21

55. The condition in which there is too many or one too few chromosomes is called

a. Aneuploidy b. Polytene
c. Polyploidy d. Monoploidy

Ans. (a) Aneuploidy

56. Most cases of Down syndrome are caused by the presence of a third copy chromosome 21 associated with the chromosome 21 pair. This genetic condition, known as trisomy 21, is caused by

a. A frame-shift mutation
b. Chromosome nondisjunction
c. Fragile X syndrome
d. Chromosome transloction

Ans. (b) Chromosome transloction

57. Which statement about Downn's syndrome are correct?

a. The frequency increases dramatically in mothers over the age of 40
b. The cause is a non-disjunction when chromosomes do not separate during the first meiotic division
c. The long time lag between onset of meiosis in ovarian tissue and its completion (at ovulation) is most likely the reason for increased incidence in older mothers
d. All the above

Ans. (d) All the above

58. People with klinefelter syndrome have 47 chromosome, including three sex chromosome (XXY).What is the term to describe the aberration that occurs during meiosis that results in abnormal chromosome number

a. Crossing over
b. Non-disjunction
c. Independent assortment
d. Pairing of homologous chromosome

Ans. (b) Non-disjunction

59. The genes abcde are determined to be closely linked on the *E. coli* chromosome. Three random short deletions are created in the region, resulting in the removal of various genes are shown below. Which of the following gene orders is possible based on the deletion analysis?

Deletion 1: genes bde are lost
Deletion 1: genes ac are lost
Deletion 1: genes abd are lost

a. abcde b. acded
c. bdeac d. cabde

Ans. (d) cabde

60. Datura plants have been regenerated from anther cultures, endosperm culture and embryo culture. Their respective ploidy levels will be

a. n,2n and 2n b. n,3n and 2n
c. n,2n and 3nn d. 2n, 2n and 2n

Ans. (b) n,3n and 2n

61. Diagnosis of chromosome aneuploidy of unborn children is normally done by a combination of amniocentesis, cell culture, and

a. Enzyme assay
b. RRLP analysis
c. Pedigree analysis
d. Karyotyping

Ans. (d) Karyotyping

62. The Hardy- Weinberg law describes

a. Genotype frequencies of a population when evolutionary forces are not acting
b. How sexual reproduction would change the relative gene frequencies in a population
c. How mutations occur and balance each other
d. Genotype frequencies of a population when evolutionary forces are acting

Ans. (a) Genotype frequencies of a population when evolutionary forces are not acting

63. What are the assumptions of Hardy-Weinberg equilibrium?

a. Small population size, random mating, no selection, no migration, no mutation
b. Large population size, random mating, no selection, no migration, no mutation
c. Large population size, random mating, heterozygotes survive the best, no migration, no mutation
d. Large population size, random mating, no migrants enter from other populations,no mutation

Ans. (b) Large population size, random mating, no selection, no migration, no mutation

64. Genetic diversity is required for natural selection to act, but natural selection can reduce or eliminate diversity. What process can restore genetic diversity to a population?

a. Genetic drift
b. Mutation
c. Sexual selection
d. Stabilizing selection

Ans. (b) Mutation

65. Deviation from the Hardy-Weinberg assumption of infinitely large population size results in

a. Genetic lethal
b. Hetrozygote advantage
c. Consanguinity
d. Genetic drift

Ans. (d) Genetic drift

66. If to population are merged, each with different frequencies of an allele at a locus, and randomly mating occurs immediately, how long will it take to achieve a hardy-Weinberg equilibrium in the new population?

a. One generation
b. Ten generations
c. Variable-depends on allele frequencies
d. The population will never achieve equilibrium

Ans. (a) One generation

67. In a population that is in equilibrium, the proportion of individuals showing the domain trait at a given locus having two alleles is 84%. The frequency of the recessive allele in the population is

a. 0.4
b. 0.3
c. 0.2
d. 0.16

Ans. (a) 0.4

68. How many A and a alleles are present in a sample of organisms consisting of 10 AA, 15Aa and 4aa individuals? What are the allele frequencies in the sample?

a. A = 0.6; a = 0.40
b. A = 0.4; a = 0.60
c. A = 0.6; a = 0.6
d. A = 0.4; a = 0.4

Ans. (a) A = 0.6; a = 0.40

69. In a diploid organism, what is the maximum number of alleles that can exist in a population for any given gene?

a. 1
b. 2
c. 4
d. Unlimited

Ans. (d) Unlimited

70. Cystic fibrosis is an autosomal recessive inherited disease. ITS frequency in newborns is 1 in 1700. One of the following indicates the frequency of the disease carriers

a. 0.024
b. 0.047
c. 0.976
d. 0.148

Ans. (b) 0.047

71. Which statement about allele frequencies in not true?

a. The sum of any set of allele frequency is always 1
b. If there are two alleles at a locus and we know the frequency of one of them, we can obtain the frequency of the other by subtraction
c. If an allele is missing from a population, its frequency is 0
d. If two populations have the same gene pool for a locus, they will have the same proportion of homozygotes at that locus

Ans. (d) If two populations have the same gene pool for a locus, they will have the same proportion of homozygotes at that locus

72. The ratio of phenotypes in F_2 of a monohybrid cross is

a. 3:1
b. 1:2:1
c. 9:3:3:1
d. 2:1

Ans. (a) 3:1

73. A pure tall Pea was crossed with a pure dwarf Pea. All the plants of F_1 were found to be tall. This is due to

a. Dominance
b. Disappearance of factor for dwarfness in F_1 generation
c. Segregation of factors
d. Coordination

Ans. (a) Dominance

74. The monohybrid genotypic ratio 1:2:1 in F_2 generation indicates

a. Segregation
b. Independent assortment
c. Dominance
d. Incomplete dominance

Ans. (a) Segregation

75. A monohybrid cross is the one in which

a. Only a single plant is involved for the experiment
b. A single pair of contrasting characters is considered for the genetic results

c. A hybrid is crossed to a homozygous
d. None of the above

Ans. (b) A single pair of contrasting characters is considered for the genetic results

76. The F_2 generation of a cross produced identical phenotypic and genotypic ratio. It is not an excepted Mendelian result, and can be attributed to

a. Independent assortment b. Linkage
c. Incomplete dominance d. None of the above

Ans. (c) Incomplete dominance

77. The law of independent assortment can be related to one of the following

a. Both homologous chromosomes of each pair are received by a single gamete
b. The genes present on the same chromosome get randomly redistributed
c. The non-homologous chromosomes show random distribution during anaphase-1 of meiosis
d. The exchange of segments between the non-homologous chromosomes

Ans. (c) The non-homologous chromosomes show random distribution during anaphase-1 of meiosis

78. The law of segregation of characters postulated by Mendel can be related to

a. The presence of two genes for each character in a somatic cell
b. A gamete receiving only one of the two homologous chromosomes during meiosis
c. Presence of both genes on the same chromosome
d. None of the above

Ans. (b) A gamete receiving only one of the two homologous chromosomes during meiosis

79. The factors which represents the contrasting pairs of characters are called

a. Dominant and recessive
b. Alleles
c. Homologous pairs
d. Determinants

Ans. (b) Alleles

80. The back cross is

a. A cross between F_1 individual and F_2 individual
b. A cross between an F_1 individual with another F_1 individual
c. Cross between F_1 and one of the two parents
d. Cross between F_2 with one of the parents

Ans. (c) Cross between F_1 and one of the two parents

81. Mendel selected Pea as material for his experiments because

a. It is an annual with comparatively short life cycle
b. The flowers are self-pollinated
c. The number of seeds produced is quite large
d. All the above

Ans. (d) All the above

82. One of the following did not constitute the seven contrasting pairs of characters noticed by G.J. Mendel in Pea

a. Height of the plants b. Shape of the leaves
c. Shape of pod d. Colour of pod

Ans. (b) Shape of the leaves

83. In genetics the term test cross means

a. The crossing of F_1 individual with homozygous recessive
b. Crossing an F_1 individual with either of the two parents
c. Crossing an F_1 individual with another F_1 individual
d. Crossing F_1 individual with that of F_2

Ans. (a) The crossing of F_1 individual with homozygous recessive

84. The first work on genetics was done by

a. Lamarck b. Hugo de Vries
c. Mendel d. Darwin

Ans. (c) Mendel

85. According to the law of Independent Assortment in a dihybrid was done by

a. There are four genotypes in F_2
b. F_2 contains 16 phenotypes
c. There is a single individual which is homozygous recessive for both the characters
d. It is not possible to forecast the different phenotypes

Ans. (c) There is a single individual which is homozygous recessive for both the characters

86. The discipline which deals with the study of inheritance of characters is

a. Darwinism b. Cytology
c. Genetics d. Evolution

Ans. (c) Genetics

87. Who is regarded as the 'Father of Genetics'?

a. Gregor Johann Mendel b. Morgan
c. Lamarck d. Hugo de Vries

Ans. (a) Gregor Johann Mendel

88. The number of different type of gametes produced from a plant with genotype Aa Bb Cc is

a. 2 b. 8
c. 4 d. 16

Ans. (b) 8

89. How many types of gametes are excepted from the organism with genotype AABBCC?

a. One b. Two
c. Four d. Eight

Ans. (a) One

90. How many types of gametes are expected from the plants with genotypes AA, BB, aa, bb?

a. 7 b. 4
c. 8 d. 16

Ans. (a) 7

91. A haploid set of all the genes present in a gamete is called

a. Genotype b. Phenotype
c. Genome d. Linkage group

Ans. (c) Genome

92. A plant with a genotype Aa Bb is crossed with a plant having the genotype aa bb. The genotype of F_1 would be

a. AaBb, AABB
b. aabb, aaBb
c. aaBB, AAbb
d. AaBb, Aabb, aaBb, abab

Ans. (d) AaBb, Aabb, aaBb, abab

93. Mendel was born in

a. Australia b. Heizendorf
c. Maravia d. Brunn

Ans. (b) Heizendorf

94. How many types of gametes are expected from a plant with genotype Pp Qq, provided there occurs independent assortment?

a. 4 b. 8
c. 2 d. 1

Ans. (a) 4

95. How would you test a Pea plant whether it is a pure or hybrid for tallness?

a. Cross it with another tall Pea plant of unknown genotype
b. Cross it with a pure tall Pea plant
c. Cross with a homozygous dwarf Pea
d. Cross it with any Pea plant

Ans. (c) Cross with a homozygous dwarf Pea

96. The Mendelian principle which has always stood true is

a. The law of independent assortment
b. The law of segregation
c. The law of dominance
d. All the above

Ans. (b) The law of segregation

97. Which of the following crosses would produce a genotypic ratio of 1:2:1 in F_2?

a. AB × AB b. Ab × ab
c. Ab × Ab d. Ab × ab

Ans. (c) Ab × Ab

98. In *Mirabilis jalapa* when two F_1 pink flowered plants were crossed with each other, the F_2 generation produced 40 red, 80 pink and 40 white flowering plants. This is a case of

a. Duplicate genes
b. Lethal genes
c. Incomplete dominance
d. Epistasis

Ans. (c) Incomplete dominance

99. The term genetics was coined by

a. Mendel b. Bateson
c. Muller d. Morgan

Ans. (b) Bateson

100. Genotype-phenotype concept was first proposed by

a. Bateson
b. Johannsen
c. Sutton and Boveri
d. Punnet

Ans. (b) Johannsen

101. At which stage is the fate of genetic constitution of gametes finally decided?

a. Metaphase – I b. Anaphase – I
c. Anaphase – II d. Interkinesis

Ans. (b) Anaphase – I

102. The phenomenon which defies the independent assortment is

a. Segregation b. Crossing over
c. Dominance d. Linkage

Ans. (d) Linkage

103. A tobacco plant heterozygous for albinism (a recessive character) is self pollinated and 1200 seeds are subsequently germinated. How many seedlings would have the parental phenotype?

a. 900 b. 600
c. 1200 d. 300

Ans. (b) 600

104. Mendel's law were rediscovered by

a. Lamarck, de Vries and Correns
b. Hugo de Vries, Correns and Tschermak
c. Morgan, Beadle and Tatum
d. Hugo de Vries, Morgan and Correns

Ans. (b) Hugo de Vries, Correns and Tschermak

105. When a yellow mouse was crossed to another yellow mouse, the F_1 generation produces yellow and brown-black mice in the ratio 2:1. The yellow mice are never homozygous. The reason is

a. Homozygous yellow cannot survive due to lethal effect of genes
b. Yellow mice are not very suitable to live
c. There is no formation of zygotes with homozygous yellow constitution
d. None of the above

Ans. (a) Homozygous yellow cannot survive due to lethal effect of genes

106. A pea with white flowers was crossed to another pea which is also white flower plant. When selfed the F_2 generation produced purple and white in the ratio 9:7. The reason for the result is that

a. It is typical monohybrid Mendelian ratio
b. Purple flower colour is dominant over the white
c. It is a complementary factor
d. None of the above

Ans. (c) It is a complementary factor

107. Multiple alleles are present

a. At different loci in the same chromosome
b. In different chromosomes
c. At the same locus in one type of chromosomes
d. None of the above

Ans. (c) At the same locus in one type of chromosomes

108. An example of the quantitative trait in man is

a. Hair colour
b. Colour of eye
c. Skin colour
d. Shape of nose

Ans. (c) Skin colour

109. The law of segregation of characters is also called the law of purity of gametes because

a. Gametes have only one of the two alleles for each character
b. Gametes cannot be contaminated
c. Gametes are very different type of cells
d. It was just another name adopted accidentally

Ans. (a) Gametes have only one of the two alleles for each character

110. A dwarf pea plant was treated with G A. The plant became tall. The treated plant was then crossed with a homozygous tall pe a. The results in F_2 are expected to be

a. All tall
b. Tall and dwarf in 3:1 ratio
c. 50% tall
d. All dwarf

Ans. (b) Tall and dwarf in 3:1 ratio

111. Number of characters studies by Mendel in Pea was

a. 5 b. 7
c. 6 d. 4

Ans. (b) 7

112. The genes for same trait present on nonhomologous chromosomes are

a. Alleles b. Linked genes
c. Multiple alleles d. None of these

Ans. (a) Alleles

113. Mendel observed red flowers in F_1 when he crossed red and white because of

a. Dominance
b. Recessive gene
c. Law of independent assortment
d. Law of segregation

Ans. (a) Dominance

114. The genotypic ratio of a monohybrid cross will be

a. 3:1 b. 1:1
c. 1:2:1 d. 2:1

Ans. (c) 1:2:1

115. Mendel formulated the laws of heredity considering seven pairs of contrasting characters in the pea plant. If he had studied an eighth pair, the law which would have been altered is

a. Law of segregation
b. Law of dominance

c. Law of independent assortment
d. Law of unit characters

Ans. (c) Law of independent assortment

116. Mendel was successful in formulating the laws of inheritance whereas his predecessors were not because

a. He studied one clear-cut character at a time
b. The characters studied by him were present on separate chromosomes
c. Of the right choice of material
d. He kept accurate records of his experiments

Ans. (a) He studied one clear-cut character at a time

117. Appearance of hidden character in some progeny of F_2 population indicates

a. Law of purity of gametes
b. Law of independent assortment
c. Law of dominance
d. None of the above

Ans. (a) Law of purity of gametes

118. Mendel's law of segregation is based upon the F_2 ratio of

a. 1:2 b. 9:3:3:1
c. 1:2:1 d. 3:1

Ans. (d) 3:1

119. Mendel is popular for postulating

a. Origin of species b. Cell theory
c. Linkage theory d. Laws of inheritance

Ans. (d) Laws of inheritance

120. 'Like begets like' an important and universal phenomenon of life, is due to

a. Eugenics b. Inheritance
c. Dominance d. Crossing over

Ans. (b) Inheritance

121. Why were pea plants more suitable than dogs for Mendelian experiments?

a. Pea plants can be self-pollinated
b. All pea plants are diploid
c. There were no pedigree records of dogs
d. Dogs have many genetics traits

Ans. (a) Pea plants can be self-pollinated

122. A cross between unlike, organisms is called

a. Test-cross b. Back-cross
c. Heterosis d. Hybrid

Ans. (d) Hybrid

123. Genes do not occur in pairs in

a. Zygote b. Somatic cell
c. Endosperm cells d. Gametes

Ans. (d) Gametes

124. If dwarf pea plant was treated with GA_3 it grew as tall as the pure tall pea plant. If this treated plant is crossed with a pure tall plant the phenotypic ratio F_1 is likely to be

a. All tall
b. All dwarf
c. 50% tall and 50% dwarf
d. 75% tall and 25% dwarf

Ans. (a) All tall

125. A modified dihybrid mendelian ratio of 9:3:4 indicates

a. Supplementary genes
b. Complementary genes
c. Lethal genes
d. Epstatic genes

Ans. (a) Supplementary genes

126. Segregation of genes take place during

a. Metaphase
b. Anaphase
c. Prophase
d. Embryo formation

Ans. (b) Anaphase

127. A cross between hybrid and a parent is known as

a. Test cross b. Back cross
c. Monohybrid cross d. Reciprocal cross

Ans. (b) Back cross

128. A cross between offspring and recessive parent is

a. Monohybrid cross b. Back cross
c. Test cross d. Reciprocal cross

Ans. (c) Test cross

129. In an experiment on pea plant, pure plants with yellow round seeds (YYRR) were crossed with plants producing green wrinkled seeds (yyrr). What will be phenotypic ratio of F_1 progeny?

a. 9 yellow round : 3 round green : 3 wrinkled yellow: 1 green wrinkled
b. All yellow round
c. 1 round yellow : 1 round green : 1 wrinkled yellow: 1 wrinkled green
d. All wrinkled green

Ans. (b) All yellow round

130. Genetics deals with

a. Heredity and variations
b. Heredity
c. Mutations
d. Nuclear and cytoplasmic inheritance

Ans. (a) Heredity and variations

131. When a wheat variety of red kernels (homozygous for two nonallelic and independent dominant genes) is crossed with white kenelled wheat (homozygous for two recessive nonallelic independent genes), the phenotypic ratio in F_2 generation would be

a. 9 : 7
b. 1 : 10 : 4 : 1
c. 1 : 4 : 6 : 4 : 1
d. 1 : 2 : 4 : 2 : 4 : 2 : 1

Ans. (c) 1 : 4 : 6 : 4 : 1

132. ABO blood grouping in humans is an example of

a. Polygenic inheritance
b. Multifactor inheritance
c. Pleiotropic gene
d. Multiple alleles

Ans. (d) Multiple alleles

133. In multiple allele system a gamete possesses

a. Two alleles
b. Three alleles
c. One allele
d. Several allele

Ans. (c) One allele

134. ABO blood grouping shows

a. Codominant genes
b. Polygenes
c. Dominant-recessive genes
d. Both codominant and dominant recessive genes

Ans. (d) Both codominant and dominant recessive genes

135. A pleiotropic gene is one which

a. Affects one character
b. Affects more than one character
c. Supplements the effect of another gene
d. Requires another gene for expression

Ans. (b) Affects more than one character

136. Sum total of all the genetic information in the breeding members of a population at a given time is known as

a. Gene pool
b. Genetic clone
c. Genome
d. Genetic drift

Ans. (a) Gene pool

137. The spread of genes from one breeding population to another by migration which may result in changes in gene frequency is called

a. Genetic drift
b. Gene flow
c. Gene frequency
d. None of the above

Ans. (b) Gene flow

138. Hb^A and Hb^S alleles of normal and sickle celled RBC are

a. Dominant-recessive alleles
b. Polygenic alleles
c. Codominant alleles
d. Multiple alleles

Ans. (c) Codominant alleles

139. A genetic clone is

a. Plants produced by asexual means
b. Hybrid produced by sexual means
c. Homozygous plant produced by sexual means
d. Heterozygous plant produced by sexual means

Ans. (a) Plants produced by asexual means

140. A pure tall plant is reared in a soil poor in nutrition and reached the size of dwarf plant. If this plant is selfed, the phenotype in the F_1 generation is most likely to be

a. All tall plants
b. 50% tall and 50% dwarf
c. All dwarf
d. Data insufficient

Ans. (a) All tall plants

141. A pleiotropic gene is

a. I^A
b. Hb^S
c. Hb^A
d. I^B

Ans. (b) Hb^S

142. Dominant gene for tallness is T and for yellow colour is Y. A plant heterozygous for both the traits is selfed, then the ratio of pure homozygous dwarf and green offspring would be

a. 1/4
b. 4/16
c. 3/16
d. 1/16

Ans. (d) 1/16

143. A gene that shows its effect on more than one character is

a. Polygene
b. Pleiotropic gene
c. Multifactor gene
d. Multiple gene

Ans. (b) Pleiotropic gene

144. A dihybrid ratio of 1:4:6:4:1 is obtained instead of 9:3:3:1. This is an example of

a. Complementary genes
b. Supplementary genes
c. Polygenic inheritance
d. Pleiotropic genes

Ans. (c) Polygenic inheritance

145. In a dihybrid cross, F_2 phenotypic ratio is 13:3. It is case of

a. Complementary genes
b. Epistatic genes
c. Multigenic inheritance
d. Incomplete dominance

Ans. (b) Epistatic genes

146. Epistatic gene differs from dominant gene in

a. Epistatic gene is nonallelic
b. Epistatic gene never expresses itself independently
c. Epistatic and hypostatic genes are present at different loci
d. All the above

Ans. (d) All the above

147. Medel was

a. Plant breeder
b. Cytologist
c. Physiologist
d. Taxonomist

Ans. (a) Plant breeder

148. Mendel published his research under the title of

a. Laws of heredity
b. Experiments in plant hybridization
c. Hybridization experiments on Pea
d. My experiments on particulate inheritance

Ans. (b) Experiments in plant hybridization

149. The scientist who proposed particulate concept of inheritance was

a. Darwin
b. Galton
c. Mendel
d. Garrod

Ans. (c) Mendel

150. Hugo de Vries, a rediscoverer of Mendel's work belonged to

a. Holland
b. Austria
c. Germany
d. England

Ans. (a) Holland

151. Tschermak-Seysenegg, a rediscoverer of Mendel's work belonged to

a. USA
b. Spain
c. Austria
d. Australia

Ans. (c) Austria

152. Carl Correns, a rediscoverer of Mendel's work, was

a. American
b. German
c. Austrian
d. Spanish

Ans. (b) German

153. Siblings are

a. Sons and daughters of same parents
b. Individuals formed through asexual means
c. Individuals from interspecific cross
d. Mutants

Ans. (a) Sons and daughters of same parents

154. Offspring are individuals developed as a result of

a. Vegetative multiplication
b. Asexual reproduction
c. Sexual reproduction
d. All the above

Ans. (c) Sexual reproduction

155. Checkerboard method of calculations was developed by

a. Mendel
b. Bateson
c. Punnet
d. Morgan

Ans. (c) Punnet

156. An individual having similar unit factors of a character is

a. Heterozygote
b. Homozygote
c. Dominant
d. Recessive

Ans. (b) Homozygote

157. Punnet square is used to know

a. Outcome of a cross
b. Probable result of a cross
c. Types of gametes
d. Result of meiosis

Ans. (b) Probable result of a cross

158. Allele is

a. Segment of gene
b. Form of a gene
c. Special kind of gene
d. A muton

Ans. (b) Form of a gene

159. Repeated selfing produces

a. Heterozygosity
b. Homozygosity
c. Homozygosity in some and heterozygosity in other traits
d. Pure hybrids

Ans. (b) Homozygosity

160. YyRR is crossed with yyRR. The progeny will be

a. 1 YyRR : 1 yyRR
b. 3 YyRR : 1 yyRR
c. 1 YyRR : 3 yyRR
d. YyRR only

Ans. (a) 1 YyRR : 1 yyRR

161. AaBb individual produces 2 million gametes. How many of them would carry both the recessive alleles (ab)

a. 1.5 million
b. 1.0 million
c. 0.5 million
d. 0.25 million

Ans. (c) 0.5 million

162. A double homozygous yellow round plant of Pea is crossed with green wrinkled plant. The offspring shall be of

a. One type
b. Two types
c. Four types
d. Several types

Ans. (a) One type

163. A dihybrid cross is made between YYrr and yyRR. In F_2 generation the ratio of parental to recombinant phenotype is

a. 9 : 7 b. 6 : 10
c. 10 : 6 d. 7 : 9

Ans. (c) 10 : 6

164. Percentage of pure breeding F_2 individuals of a monohybrid cross would be

a. 75% b. 50%
c. 25% d. 12.5%

Ans. (b) 50%

165. Double homozygous individuals in F_2 generation of a dihybrid cross would be

a. 1/16 b. 2/16
c. 6/16 d. 9/16

Ans. (b) 2/16

166. Ratio between completely homozygous dominant and homozygous recessive individuals of a dihybrid cross is

a. 1 : 1 b. 2 : 2
c. 6 : 10 d. 10 : 6

Ans. (b) 2 : 2

167. Ratio of parental and recombinant phenotypes in a dihybrid cross would be

a. 8 : 8 b. 6 : 10
c. 10 : 6 d. 9 : 7

Ans. (c) 10 : 6

168. Which mendelian principle will not operate if two genes under study are close together

a. Paired unit factors
b. Dominance
c. Segregation
d. Independent assortment

Ans. (d) Independent assortment

169. In a monohybrid cross the ratio of F_2 true breeding dominant and true breeding recessive would be

a. 50 : 50 b. 25 : 25
c. 75 : 25 d. 25 : 75

Ans. (b) 25 : 25

170. A single heterozygous yellow wrinkled seeded Pea plant shall produce gametes

a. YR only b. yr only
c. Yr and yr d. YR and yR

Ans. (c) Yr and yr

171. A couple with curly haired husband and straight haired wife have all their children curly haired because

a. Both are heterozygous
b. Husband is homozygous and wife is heterozygous
c. Husband is heterozygous while wife is homozygous
d. Both are homozygous

Ans. (d) Both are homozygous

172. Genes P and Q are both required in dominant state for normal hearing. A deaf couple has all children with normal hearing. The probable genotype for the couple is

a. PPqq x ppQQ
b. PPqq x PPqq
c. PpQq x ppqq
d. PPqq x ppQq

Ans. (a) PPqq x ppQQ

173. Name the scientist who converted Mendel's conclusions into principles of heredity

a. De Vries
b. Tschermak-seysenegg
c. Carl Correns
d. T.H. Morgan

Ans. (c) Carl Correns

174. Pure tall pea plant can be differentiated from hybrid tall pea plant by

a. Selfing and finding the progeny tall
b. Test cross with dwarf plant and finding the progeny tall
c. Selfing and test crossing to find the progeny of both tall and dwarf plants
d. Both a and b

Ans. (d) Both a and b

175. F_1 plants crossed with dominant individuals will yield a progeny of

a. All recessive
b. All dominants
c. Dominant and recessive in the ratio of 1 : 1
d. Dominant and recessive in the ratio of 3 : 1

Ans. (b) All dominants

176. Round seed trait (R) is dominant over wrinkled (r) seed trait in Pea. Heterozygous round seeded plant (Rr) is crossed with wrinkled seeded plant (rr). What is the possibly progeny?

a. 302 round : 102 wrinkled
b. 210 round : 95 wrinkled
c. 105 round : 99 wrinkled
d. 103 round : 315 wrinkled

Ans. (c) 105 round : 99 wrinkled

177. A dihybrid yellow round seeded plant (YyRr) is crossed to another yellow round seeded plant. The progeny is also yellow round seeded plant. What is the genotype of the second plant?

a. YyRr
b. YYRR
c. YyRR
d. yyRr

Ans. (b) YYRR

178. A yellow round seeded pea plant is crossed with green wrinkled seeded pea plant. Four phenotypes appeared in the progeny in the ratio of 1 : 1 : 1 : 1. The genotype of the two are

a. YyRr and yyrr
b. YYRR and yyrr
c. YYRr and yyrr
d. YyRR and yyrr

Ans. (a) YyRr and yyrr

179. The ratio of 1 : 1 : 1 : 1 is obtained in case of

a. Monohybrid cross
b. Monohybrid test cross
c. Dihybrid cross
d. Dihybrid test cross

Ans. (d) Dihybrid test cross

180. Position of a gene on chromosome is called

a. Locus
b. Factor
c. Cistron
d. Nucleosome

Ans. (a) Locus

181. A recessive character in Pea is

a. Red flower
b. Round seed
c. Green cotyledons
d. Tall plant

Ans. (c) Green cotyledons

182. Mendel was lucky and could discover a law of heredity because he selected traits which

a. Possessed linkage
b. Crossed independently
c. Had complete dominance
d. Had incomplete dominance

Ans. (b) Crossed independently

183. Phenotype is influenced by

a. Environment
b. Development
c. Ageing
d. All the above

Ans. (d) All the above

184. Some gene loci on two homologous chromosomes produce different phenotypes. They bear

a. Homozygous alleles
b. Heterozygous alleles
c. Two different genes
d. Pleiotropic genes

Ans. (d) Pleiotropic genes

185. In a dihybrid test cross, the proportion of individuals showing recessive phenotypes would be

a. 1/16
b. 7/16
c. 1/4
d. 3/4

Ans. (d) 1/16

186. The number of genotypes produced by gametes Y and y would be

a. 1
b. 12
c. 3
d. 4

Ans. (c) 3

187. A phenotypic ratio not obtained by Mendel was

a. 3 : 1 b. 1 : 2 : 1
c. 1 : 1 : 1 : 1 d. 9 : 3 : 3 : 1

Ans. (b) 1 : 2 : 1

188. Pea plant with double hybrid yellow round seeds (YyRr) is crossed with plant having single hybrid green round seeds (yyRr). The progeny shall be

a. 3 : 3 : 1 : 1
b. 1 : 1 : 1 : 1
c. 9 : 3 : 3 : 1
d. 3 : 1 : 3 : 1

Ans. (d) 3 : 1 : 3 : 1

189. Trihybrid ratio is

a. 27 : 9 : 9 : 9 : 3 : 3 : 3 : 1
b. 27 : 9 : 9 : 6 : 6 : 3 : 3 : 1
c. 1 : 6 : 15 : 20 : 15 : 6 : 1
d. 36 : 6 : 6 : 6 : 3 : 3 : 3 : 1

Ans. (a) 27 : 9 : 9 : 9 : 3 : 3 : 3 : 1

190. Number of gamete types produced by genotype Aa Bb Cc Dd will be

a. 4
b. 8
c. 16
d. 32

Ans. (c) 16

191. First generation after a cross is

a. First filial generation
b. F_1 generation
c. Second filial generation
d. Both a and b

Ans. (d) Both a and b

192. F_2 generation is produced as a result of

a. Crossing F_1 individuals with dominant individuals
b. Crossing F_1 individuals with recessive individuals
c. Crossing F_1 individuals amongst themselves
d. All the above

Ans. (c) Crossing F_1 individuals amongst themselves

193. Which is incorrect in Mendelian characters?

	Character	*Dominant*	*Recessive*
a.	Pod colour	Green	Yellow
b.	Seed shape	Round	Wrinkled
c.	Flower position	Terminal	Axillary
d.	Shape of pod	Full	Constricted

Ans. (c) Flower position Terminal Axillary

194. F_2 generation of a dihybrid cross possesses one or both the dominant traits in proportion of

a. 1/16 b. 6/16
c. 9/16 d. 15/16

Ans. (d) 15/16

195. What is incorrect in the following Mendelian traits

a.	Height	Tall	Dwarf
b.	Seed colour	Green	Yellow
c.	Flower position	Axillary	Terminal
d.	Flower colour	Violet	White

Ans. (b) Seed colour Green Yellow

196. In Shepherd's Purse, the fruit shape is controlled by

a. Supplementary genes
b. Complementary genes
c. Duplicate genes
d. Polymeric genes

Ans. (c) Duplicate genes

197. A pure breeding triangular fruit bearing plant of shepherd's Purse is crossed with ovoid fruit bearing plant. The ratio of two types of plants in F_2 generation would be

a. 3 : 1 b. 1 : 2 : 1
c. 13 : 3 d. 15 : 1

Ans. (d) 15 : 1

198. 9 : 6 : 1 F_2 generation ratio is obtained in case of

a. Polymeric genes
b. Pleiotropic genes
c. Supplementrary genes
d. Recessive epistasis

Ans. (a) Polymeric genes

199. Two plants of Summer Squash both having circular fruits are crossed. F_1 plants had discoid fruits. F_2 generation has 3 types of fruits, discoid, circular and long in the ratio of

a. 9 : 3 : 4
b. 9 : 6 : 1
c. 12 : 3 : 1
d. 7 : 6 : 3

Ans. (b) 9 : 6 : 1

200. Recessive epistasis is shown by

a. Flower colour in Sweat Pea
b. Fruit colour of Summer Singh
c. Coat colour Mice
d. Shape of comb in poultry

Ans. (c) Coat colour Mice

201. The ratio of 2 : 1 is observed in case of

a. Suppressor gene
b. Dominant-recessive epistasis
c. Complementary gene
d. Lethal gene

Ans. (d) Lethal gene

202. Mendel's law of segregation, as applied to the behavior of chromosome in meiosis, means that

a. Paring of homologs will convert one allele into the other, leading to separation of the types
b. Allels of a gene separate from each other when homologs separate in meiosis I
c. Genes on the same chromosome will show 50% recombination
d. Alleles of a gene will be linked and passed on together through meiaosis

Ans. (b) Allels of a gene separate from each other when homologs separate in meiosis I

203. The phenomenon of independent assortment refers to

a. Expression at the same stage of development
b. Unlinked transmission of genes in crosses resulting from being located on different chromosomes
c. Association of an RNA and a protein implying related function
d. Independent location of genes from each in an interphase cell

Ans. (b) Unlinked transmission of genes in crosses resulting from being located on different chromosomes

204. One of Mendel's pure strains of pea plants had green peas. How many different kinds of egg could such a plant produce with regard to pea colour?

a. One
b. Two
c. Three
d. Four

Ans. (a) One

205. List all the different gametes produced by the following individuals

1. AA BB Cc
2. aa Bb Cc

a. 1. ABC, ABc ; 2. aBC, aBc , abC , abc
b. 1. AbC, ABc ; 2. ABC, aBc, abC, aBC
c. 1. ABC, ABC ; 2. aBC, aBc, abc, aBC
d. 1. ABC, ABc ; 2. aBC, ABc, abc, abC

Ans. (a) 1. ABC, ABc ; 2. aBC, aBc , abC , abc

206. If a diploid cell contains six chromosomes, how many possible random arrangements of homologous could occur during Metaphasse-I?

a. 4 b. 8
c. 6 d. 64

Ans. (b) 8

207. Determine the frequency of only one genotype, BBLI ,in the offspring of dihybrid parents (BbLI).

a. 1/4 b. 1/8
c. 1/16 d. 1/2

Ans. (a) 1/4

208. If an individual of genotypes AaBbCcDd is test crossed, how many different phenotypes can appear in the progeny?

a. 16 b. 8
c. 32 d. 64

Ans. (a) 16

209. If individuals of genotypes AaBbCc are intercrossed, how many different phenotypes can appear their offspring?

a. 16 b. 8
c. 32 d. 64

Ans. (b) 8

210. If individual of genotypes AaBbCc are intercrossed, how many different genotypes can occur in their progeny?

a. 8 b. 64
c. 27 d. 9

Ans. (c) 27

211. If individual of genotypes AaBbCc are intercrossed, how many different F_2 phenotypes can appear assuming complete codominance at all loci?

a. 8
b. 64
c. 27
d. 9

Ans. (c) 27

212. A man is heterozygous B/b for one autosomal gene, and he carries a recessive X-linked allele d. What proportion of his sperm will be bd?

a. 1/4
b. 1/8
c. 1/16
d. 1/2

Ans. (a) 1/4

213. A trihybrid cross is made between two yeast, both with genotype A/a, B/b, C/c. What proportion of the offspring will be of genotype a/a, b/b, c/c?

a. 1/8
b. 1/32
c. 1/64
d. 1 /74

Ans. (c) 1/64

214. When heterozygous black pigs are intercrossed then what is the chance of the first two offspring being black?

a. 46 b. 1/32
c. 1/64 d. 1/74

Ans. (b) 1/32

215. Medical geneticists usually abbreviate the normal beta- globin gene as b, and the abnormal gene (in this case) as b^0 .Neither of your patient's parents has beta–thalassemi a Which of these described the most likely genotypes of both parents?

a. One is b^0 and one in b
b. One is b^0 b^0 and one is bb
c. Both are b^0b^0
d. Both are bb^0

Ans. (d) Both are bb^0

216. If a man of blood group AB marries a woman of blood group A whose father was of blood group O, to what different blood group can this man and woman expect their children to belong?

a. A, AB, B b. A, AB
c. AB, O d. A, O, B

Ans. (a) A, AB, B

217. In the human ABO blood system, the alleles A and B are dominant to O, what will be the number of different possible genotype?

a. 4 b. 8
c. 6 d. 12

Ans. (c) 6

218. A brown mouse is mated with two female blackmice. When each female has produced several litters of young, the first female has had 48 black and the second female has 14 black and 11 brown young. Deduce the pattern of inheritance coat colour and the genotype of all the parents (B-Black ; b - brown)

a. Male Bb; female 1, BB; female 2 Bb
b. Male BB; female 1, BB; female 2 Bb
c. Male Bb; female 1, BB; female 2 bb
d. None of the above

Ans. (d) None of the above

219. Three genes (P, Q and R) are found of three different chromosome .For the following diploid genotypes, describe all of the possible gamete combinations and their predicted ratios

P. AABbCC Q. AaBBCc R. Aabbcc

a. P. 1ABC: 1AbC Q. 1ABC: 1ABc: 1aBC: 1aBc R. 1Abc: 1abc
b. P. 1ABC: 1Abc Q. 1abc : 1Abc: 1aBC: 1aBc R. 1abc: 1abc
c. P. 1ABC: 1Abc Q. 1ABC: 1aBc: 1aBC: R. 1Abc: 1abc
d. P. 1ABC: 1Abc Q. 1ABC: 1Abc: 1aBC: R. 1Abc: 1Abc

Ans. (a) P. 1ABC: 1AbC Q. 1ABC: 1ABc: 1aBC: 1aBc R. 1Abc: 1abc

220. A true -breeding pea plant with round and green seeds is correct is crossed to a true -breeding plant with wrinkled and yellow seeds. Round and yellow seeds are the dominant traits. The F_1 plants are allowed to self-fertilize. What are the following probabilities for the F2 generation?

P. An F2 plant with wrinkled, yellow seeds
Q. An F2 plant with round, yellow seeds

a. P. 2/16 Q. 9/16
b. P. 3/16 Q. 7/16
c. P. 3/16 Q. 9/16
d. Cannot be determined from the information

Ans. (c) P. 3/16 Q. 9/16

221. In Guinea pig, black coat colour is a dominant trait and white is recessive trait. A black female is test crossed, producing six black offspring. The probability that heterozygous black would do this by chance alone is approximately

a. 50%
b. 25%
c. 1%
d. Cannot be determined from the information

Ans. (a) 50%

222. What are the minimum progeny population sizes allowing for random union of all kinds of gametes from AaBbCc parent?

a. 64 b. 32
c. 16 d. 8

Ans. (a) 64

223. A red -flowered tall parent plant (PI) was crossed to a true breeding red-flowered dwarf plant (P2) and half of the progenies obtained was red and tall and the other half red and dwarf. In the next generation, half of all these progenies segregated only for flower colour and the other half segregated only for height. The genotype of the P1 is

a. Heterozygous for colour and heterozygous for height
b. Homozygous for colour and heterozygous for height
c. Heterozygous for colour and homozygous for height
d. Homozygous for colour and homozygous for height

Ans. (a) Heterozygous for colour and heterozygous for height

224. According to classical genetics, Which of the following statements is true?

a. Recessive alleles are detected by the phenotype of the F_1 generation
b. The closer two genes are, the more frequently they recombine
c. Genes on different autosomes segregate independently
d. Gene on sex chromosomes segregate with the same pattern as autosomal genes

Ans. (c) Genes on different autosomes segregate independently

225. Assuming the comparable chromosomes in different individuals are genetically dissimilar because of different alleles. How many unique zygotic combinations are possible following fertilization in an organism where n = 3 (Assuming that no crossing over occurs)?

a. 8 b. 16
c. 64 d. 216

Ans. (c) 64

226. The colour of flowers of an annual species of plants is controlled by a single locus with two alleles R and r, and the genotypes RR, Rr and rr and red, pink and white respectively. A large number of seeds from individuals with pink flowers were collected and planted on an island. Where because of absence of pollinators, only self -pollination is possible. What will be the most likely outcome after 25 years?

a. About 50% plants with red flowers 50% with white flowers
b. Almost 100% plants with pink flowers
c. Red, pink, and white flowered plants in a ratio of 1:2:1
d. Red, pink and white flowered plants in equal proportion

Ans. (c) Red, pink, and white flowered plants in a ratio of 1:2:1

227. Coat colour of dogs depend upon the action of at least two genes. At one locus a dominant epistatic inhibitor of colour pigment (A-) prevents the expression of colour at another independently assorting locus, producing white coat colour. When the recessive condition exists at the inhibitor locus (aa) the alleles of the hypostatic locus may be expressed, aaB-producing black and aabb producing brown. When dihybrid white dogs are together, determine the phenotypic proportions expected in the progeny

a. 9 : 7 b. 9 : 3 : 4
c. 12 : 3 : 1 d. 13 : 3

Ans. (c) 12 : 3 : 1

228. Short hair in rabbits is governed by a dominant gene L and long hair by its recessive allele I. black hair results from the action of the dominant genotype B- and brown from the recessive genotype bb

a. In crosses between dihybrid short-haired, black and homozygous short-haired, brown rabbits, genotypic ratio will be 1 : 1 : 1 : 1
b. In crosses between dihybrid short-haired, black and homozygous short-haired, brown rabbits, phenotypic ratio will be 1 : 1
c. Expected phenotypic ratio from the cross LIBb x LIbb will be 3 : 3 : 1 : 1
d. Expected genotypic ratio of LIBb will be ¼

Ans. a, b, c, and d

229. In a cross between two individuals with the genotypes AaBbccDdEeFf and AaBbCCDDeeff, the probability that an offspring will be heterozygous at all these loci is

a. 0 b. 1/16
c. 1/32 d. 1/64

Ans. (c) 1/32

230. Two pink-flowered four-o'clocks are crossed to each other. Flower colour is incompletely dominant and giving phenotypic ratio if 1 red : 2 pink: 1 white. What are the following probabilities?

P. The first three plants with while flower
Q. A plant with either white or pink flower

a. P. 1/64 Q. 3/4
b. P.3/16 Q. 1/64

c. P.3/64 Q.9/16
d. P. 1/64 Q.1/64

Ans. (a) P. 1/64 Q. 3/4

231. Which of the following is a mismatch?

a. Phenotypic F_2 ratio of 1 : 4 : 6 : 4 : 1-polygenic inheritance
b. Phenotypic F_2 ratio of 9 : 3 : 4-recessive epistasis
c. Phenotypic F_2 ratio of 1 : 2 : 1-codominance
d. Phenotypic F_2 ratio of 3 : 1-partial dominance

Ans. (d) Phenotypic F_2 ratio of 3 : 1-partial dominance

232. Why would you predict that half of the human babies born will be males and half will be females?

a. Because of the segregation of the X and Y chromosomes during male meiosis
b. Because of the segregation of the X chromosomes during female meiosis
c. Because all eggs contain an X chromosome
d. Because, on average, one- half of all eggs produce females

Ans. (a) Because of the segregation of the X and Y chromosomes during male meiosis

233. Asymmetry between reciprocal crosses is seen in

a. Pleiotropy
b. Sex-linked inheritance
c. Interaction of genes
d. Autosomal inheritance

Ans. (b) Sex-linked inheritance

234. Which of the following is not true autosomal dominant traits?

a. Every affected person should have at least one affected parent
b. Males and females should be equally often affected
c. An affected person has a 50% chance of transmitting the dominant allele to each offspring
d. All the daughters of an affected male will be affected but none of the sons

Ans. (d) All the daughters of an affected male will be affected but none of the sons

235. Albinism is a recessive human trait. If a normal couple produces an albino child, what is the probability that their next child will be albino?

a. 1/4 b. 1/8
c. 1/16 d.1/64

Ans. (a) 1/4

236. When a man with hypertrichosis marries a normal woman, what %of their sons would be expected to have hairy ears?

a. 50% b. 100%
c. 0% d. 25%

Ans. (b) 100%

237. A man with a certain disease marries a normal woman. They have 8 children (4 boys and 4 girls); all of the girls have their father's disease, but none of the boys do. What inheritance is suggested?

a. Autosomal recessive
b. Autosomal dominant
c. Y-linked
d. X-linked

Ans. (d) X-linked

238. Cystic fibrosis is a hereditary disease that affects the respiratory and digestive systems. Cystic fibrosis occurs when two recessive genes (cc) are present. A person with one allele for Cystic fibrosis is called a carrier (Cc) of the disease. If the mother is a carrier of the disease and the father is homozygous dominant, what are chances that their child will be carrier of Cystic fibrosis?

a. 25% b. 50%
c. 75% d. 100%

Ans. (b) 50%

239. Which of the following is/are correct about sex – linked recessive inheritance?

a. Most affected individuals are male
b. Affected females come from affected father and affected or carrier mothers
c. The sons of affected females should be affected
d. The trait does not skip generations

Ans. a, b, and c

240. Which of the following is/are not feature (s) of quantitative trait?

a. Characters of degree
b. Continuous variation
c. Polygenic control
d. Discontinuous variation

Ans. (d) Discontinuous variation

241. Which of the following are correct?

a. Classical Mendelian traits are qualitative in nature
b. Qualitative traits show discontinuous variations
c. Qualitative traits are polygenic traits
d. Qualitative traits are referred to as metric traits

Ans. (a and b)

242. Wheat grain colour is controlled by four loci and following qualitative inheritance

P. Calculate the number of different F_2 phenotypes in a certain stock of wheat

Q. Calculate the number of F_2 as extreme as one parent or the other

a. P-9, Q-1/16 b. P-16, Q-1/256
c. P-8, Q-1/32 d. P-9, Q-1/256

Ans. (d) P-9, Q-1/256

243. Two pure lines of corn have mean cob lengths of 9 and 3 inches, respectively. The polygenes involved in this trait all exhibit additive gene action. Crossing these two lines is expected to produce a progeny with mean cob length (in inches) of

a. 12.0 b. 7.5
c. 6.0 d. 2.75

Ans. (c) 6.0

244. In a plant, height varies from 6 to 36 cm. When 6 cm and 36 cm plants were crossed all F1plants were 21 cm. In the F2 generation, a continuous range of heights was observed. Most were around 21 cm, and 3 of 200 were 6 cm. Find out how many gene pairs are involved in this mode of inheritance?

a. 3 b. 4
c. 2 d. 5

Ans. (a) 3

245. If four chromosomes synapse into a cross-shaped configuration during meiotic prophase, the organism is heterozygous for a

a. Pericentric inversion b. Delection
c. Translocation d. Paracentric inversion

Ans. (c) Translocation

246. Philadelphia chromosome is generated by translocation between

a. Chromosome 18 and chromosome 6
b. Chromosome 22 and chromosome 9
c. Chromosome 22 and chromosome 3
d. Chromosome 16 and chromosome 4

Ans. (b) Chromosome 22 and chromosome 9

247. Retinoblastoma is caused by loss of both copies of the RB gene in the chromosome band

a. 13p11
b. 13q11
c. 13q14
d. 21q14

Ans. (c) 13q14

248. Position effect is the result of

a. Mutations b. Deletions
c. Inversions d. Transversions

Ans. (c) Inversions

249. The bridge-fragment configuration at anaphase-1 is characteristic of

a. Translocation heterozygote
b. Paracentric inversion heterozygote
c. Pericentric inversion heterozygote
d. Duplication heterozygote

Ans. (b) Paracentric inversion heterozygote

250. A mechanism that can cause a gene to move from one linkage group to another is

a. Translocation
b. Inversion
c. Crossing over
d. Duplication

Ans. (a) Translocation

251. Pseudo-dominance may be observed in heterozygotes for

a. A deletion
b. A duplication
c. A reciprocal translocation
d. More than one of the above

Ans. (a) A deletion

252. Which of the following chromosomal changes is usually the most damaging when in the homozygous condition?

a. Deletion
b. Duplication
c. Translocation
d. Inversion

Ans. (a) Deletion

253. In a trisomic individual the number of chromosome is

a. 2n-1 b. 2n+2
c. 2n+3 d. 2n+1

Ans. (d) 2n+1

254. A person with Klinefelter syndrome is considered a

a. Monosomic
b. Triploid
c. Trisomic
d. Delection heterozygote

Ans. (c) Trisomic

255. IF the garden pea has 14 chromosomes in its diploid complement, how many double trisomics could theoretically exist?

a. 6
b. 9
c. 16
d. 21

Ans. (d) 21

256. The condition in which there is too many or one too few chromosomes is called

a. Aneuploidy
b. Polytene
c. Polyploidy
d. Monoploidy

Ans. (a) Aneuploidy

257. Most cases of Down syndrome are caused by the presence of a third copy chromosome 21 associated with the chromosome 21 pair. This genetic condition, known as trisomy 21, is caused by

a. A frame-shift mutation
b. Chromosome nondisjunction
c. Fragile X syndrome
d. Chromosome transloction

Ans. (b) Chromosome nondisjunction

258. Which statement about Downn's syndrome are correct?

a. The frequency increases dramatically in mothers over the age of 40
b. The cause is a non-disjunction when chromosomes do not separate during the first meiotic division
c. Affected individuals have an extra autosome
d. The long time lag between onset of meiosis in ovarian tissue and its completion (at ovulation) is most likely the reason for increased incidence in older mothers

Ans. (All)

259. People with klinefelter syndrome have 47 chromosome, including three sex chromosome (XXY).What is the term to describe the aberration that occurs during meiosis that results in abnormal chromosome number

a. Crossing over
b. Non-disjunction
c. Independent assortment
d. Pairing of homologous chromosome

Ans. (b) Non-disjunction

260. The genes abcde are determined to be closely linked on the *E. coli* chromosome. Three random short deletions are created in the region, resulting in the removal of various genes are shown below. Which of the following gene orders is possible based on the deletion analysis?

Deletion 1: genes bde are lost
Deletion 1: genes ac are lost
Deletion 1: genes abd are lost

a. abcde
b. acded
c. bdeac
d. cabde

Ans. (d) cabde

261. Datura plants have been regenerated from anther cultures, endosperm culture and embryo culture. Their respective ploidy levels will be

a. n,2n and 2n
b. n,3n and 2n
c. n,2n and 3nn
d. 2n, 2n and 2n

Ans. (b) n,3n and 2n

262. Diagnosis of chromosome aneuploidy of unborn children is normally done by a combination of amniocentesis, cell culture, and

a. Enzyme assay
b. RRLP analysis
c. Pedigree analysis
d. Karyotyping

Ans. (d) Karyotyping

263. The Hardy-Weinberg law describes

a. Genotype frequencies of a population when evolutionary forces are not acting
b. How sexual reproduction would change the relative gene frequencies in a population
c. How mutations occur and balance each other
d. Genotype frequencies of a population when evolutionary forces are acting

Ans. (a) Genotype frequencies of a population when evolutionary forces are not acting

264. What are the assumptions of Hardy-Weinberg equilibrium?

a. Small population size, random mating, no selection, no migration, no mutation
b. Large population size, random mating, no selection, no migration, no mutation
c. Large population size, random mating, heterozygotes survive the best, no migration, no mutation
d. Large population size, random mating, no migrants enter from other populations,no mutation

Ans. (b) Large population size, random mating, no selection, no migration, no mutation

265. Genetic diversity is required for natural selection to act, but natural selection can reduce or eliminate diversity. What process can restore genetic diversity to a population?

a. Genetic drift
b. Mutation
c. Sexual selection
d. Stabilizing selection

Ans. (b) Mutation

266. Deviation from the Hardy-Weinberg assumption of infinitely large population size results in

a. Genetic lethal
b. Hetrozygote advantage
c. Consanguinity
d. Genetic drift

Ans. (d) Genetic drift

267. If to population are merged, each with different frequencies of an allele at a locus, and randomly mating occurs immediately, how long will it take to achieve a hardy–Weinberg equilibrium in the new population?

a. One generation
b. Ten generations
c. Variable-depends on allele frequencies
d. The population will never achieve equilibrium

Ans. (a) One generation

268. In a population that is in equilibrium, the proportion of individuals showing the domain trait at a given locus having two alleles is 84%. The frequency of the recessive allele in the population is

a. 0.4
b. 0.3
c. 0.2
d. 0.16

Ans. (a) 0.4

269. How many A and a alleles are present in a sample of organisms consisting of 10 AA, 15Aa and 4aa individuals? What are the allele frequencies in the sample?

a. A = 0.6; a = 0.40
b. A = 0.4; a = 0.60
c. A = 0.6; a = 0.6
d. A = 0.4; a = 0.4

Ans. (a) A = 0.6; a = 0.40

270. In a diploid organism, what is the maximum number of alleles that can exist in a population for any given gene?

a. 1 b. 2
c. 4 d. Unlimited

Ans. (d) Unlimited

271. Cystic fibrosis is an autosomal recessive inherited disease. ITS frequency in newborns is 1 in 1700. One of the following indicates the frequency of the disease carriers

a. 0.024 b. 0.047
c. 0.976 d. 0.148

Ans. (b) 0.047

272. Which statement about allele frequencies in not true?

a. The sum of any set of allele frequency is always 1
b. If there are two alleles at a locus and we know the frequency of one of them, we can obtain the frequency of the other by subtraction
c. If an allele is missing from a population, its frequency is 0
d. If two populations have the same gene pool for a locus, they will have the same proportion of homozygotes at that locus

Ans. (d) If two populations have the same gene pool for a locus, they will have the same proportion of homozygotes at that locus

273. During DNA replication the synthesis of the leading strand of DNA results in fragments known as

a. Okazaki fragments
b. Satellite segments
c. Kornberg segment
d. Double-helix segment

Ans. (a) Okazaki fragments

274. The genotypic ratio of a monohybrid cross is

a. 1:2:1 b. 3:1
c. 2:1:1 d. 9:3:3:1

Ans. (a) 1:2:1

275. A small amount of lethal mutation is always present in the population due to

a. Positive selection
b. Negative selection
c. Frequency-dependent selection
d. Mutation-selection balance

Ans. (d) Mutation-selection balance

CHECK YOUR GRASP

1. Mendel's law of segregation is based upon the F_2 ratio of

a. 1:2 b. 9:3:3:1
c. 1:2:1 d. 3:1

2. Mendel is popular for postulating

a. Origin of species b. Cell theory
c. Linkage theory d. Laws of inheritance

3. The monohybrid genotypic ratio 1:2:1 in F_2 generation indicates

a. Segregation
b. Independent assortment
c. Dominance
d. Incomplete dominance

4. A monohybrid cross is the one in which

a. Only a single plant is involved for the experiment
b. A single pair of contrasting characters is considered for the genetic results
c. A hybrid is crossed to a homozygous
d. None of the above

5. In a trisomic individual the number of chromosome is

a. 2n-1 b. 2n+2
c. 2n+3 d. 2n+1

6. A person with Klinefelter syndrome is considered a

a. Monosomic
b. Triploid
c. Trisomic
d. Delection heterozygote

7. Mendel's law were rediscovered by

a. Lamarck, de Vries and Correns
b. Hugo de Vries, Correns and Tschermak
c. Morgan, Beadle and Tatum
d. Hugo de Vries, Morgan and Correns

8. Ratio of parental and recombinant phenotypes in a dihybrid cross would be

a. 8 : 8 b. 6 : 10
c. 10 : 6 d. 9 : 7

9. Which mendelian principle will not operate if two genes under study are close together

a. Paired unit factors
b. Dominance
c. Segregation
d. Independent assortment

10. How many types of gametes are excepted from the organism with genotype AABBCC?

a. One b. Two
c. Four d. Eight

11. Repeated selfing produces

a. Heterozygosity
b. Homozygosity
c. Homozygosity in some and heterozygosity in other traits
d. Pure hybrids

12. YyRR is crossed with yyRR. The progeny will be

a. 1 YyRR : 1 yyRR
b. 3 YyRR : 1 yyRR
c. 1 YyRR : 3 yyRR
d. YyRR only

13. Genotype-phenotype concept was first proposed by

a. Bateson b. Johannsen
c. Sutton and Boveri d. Punnet

14. Number of characters studies by Mendel in Pea was

a. 5 b. 7
c. 6 d. 4

15. The condition in which there is too many or one too few chromosomes is called

a. Aneuploidy b. Polytene
c. Polyploidy d. Monoploidy

16. AaBb individual produces 2 million gametes. How many of them would carry both the recessive alleles (ab)

a. 1.5 million b. 1.0 million
c. 0.5 million d. 0.25 million

In case of less than 80% score, go through brief review and glance once again from chapter

Key: 1-d 2-d 3-a 4-b 5-d 6-c 7-b 8-c 9-d 10-a 11-b 12-a 13-b 14-b 15-a 16-c

13

Animal Biotechnology

1. AIDS transmission from one person to other is impossible through

a. Blood transfusion
b. Sexual contact
c. Mosquito bites
d. Placental contact

Ans. (c) Mosquito bites

2. Antibodies are produced against self RBC membrane proteins in

a. Myocardial infections
b. Addison's disease
c. Leukemia
d. Autoimmune haemolytic anaemia

Ans. (d) Autoimmune haemolytic anaemia

3. The anti AIDS drug launched by 'Merck' pharmaceutical company in 1996 is

a. Crisivan
b. AZT
c. Gossypol
d. Dideoxyinosine

Ans. (a) Crisivan

4. Monoclonal antibodies can be used for detection of

a. Bacterial and viral pathogenicity
b. Heart damages
c. Infectious protozoans
d. All of the above

Ans. (d) All of the above

5. Which of the following immunoglobulin is most abundant in serum and constitutes 80% of total immunoglobulins?

a. IgA
b. IgM
c. IgG
d. IgD

Ans. (c) IgG

6. Which of the following is the reason for production of antibodies of a single specificity by a hybridoma clone?

a. Fusion with a single B cell
b. Production of antibodies of a single specificity by a single B cell
c. Production of no antibodies by the other fusion partner of the hybridoma clone
d. All of the above

Ans. (d) All of the above

7. Cell fusion is enhanced by which of the following?

a. Polyethylene glycol
b. Ultraviolet inactivated sendai virus
c. Colchicines
d. Both a and b

Ans. (d) Both a and b

8. Among the given biological fluids used as culture medium, which one is the most commonly used in animal cell cultures?

a. Serum
b. Amniotic fluid
c. Insect haemolymph
d. Aqueous humour from eye

Ans. (a) Serum

9. Among the given tissue extracts, which one is the most commonly used as culture medium?

a. Liver extract
b. Chick embryo extract
c. Plasma
d. Bone marrow

Ans. (b) Chick embryo extract

10. Serum can be obtained from which of the following?

a. Placental cord blood
b. Adult human blood
c. Horse blood
d. All of the above

Ans. (d) All of the above

11. Which of the following is a pentameric immunoglobulin and produce first in a primary response to an antigen?

a. IgA
b. IgM
c. IgG
d. IgE

Ans. (b) IgM

12. The immunoglobulin present in breast milk and give strong defence and protection for newly born baby against various infections and can pass through placenta, is

a. IgM b. IgG
c. IgA d. IgE

Ans. (b) IgG

13. Antibody present in tears, saliva as well as secretion of lungs and intestine is

a. IgF b. IgG
c. IgA d. IgE

Ans. (c) IgA

14. HIV causes a complete breakdown of immune system by

a. Binding B-cells
b. Binding T-cells
c. Binding to T_4 lymphocytes through CD_4 antigen and destroying them
d. Destroying B-cells and T-cells

Ans. (c) Binding to T_4 lymphocytes through CD_4 antigen and destroying them

15. The first case of AIDS was recognized by

a. George Kohler (1975)
b. Robert Gallo (1978)
c. Luc Montangnier (1980)
d. Ceaser Milstein (1970)

Ans. (c) Luc Montangnier (1980)

16. Among the given serums, which one is the most commonly used in animal cell culture media?

a. Young calf serum b. Cattle serum
c. Foetal calf serum d. Horse serum

Ans. (c) Foetal calf serum

17. Which of the following is commonly used for promoting cell growth in animal cell culture?

a. Ethanolamine
b. Insulin
c. Transferring
d. All of the above

Ans. (d) All of the above

18. Which of the following is not provided by serum?

a. Carbohydrates and lipids
b. Plasma protein
c. Alkaloids
d. Some enzymes

Ans. (c) Alkaloids

19. Which of the following is not heat labile?

a. Growth factors and serum
b. Trypsin and protein
c. Peptone and salts
d. Both a and b

Ans. (c) Peptone and salts

20. Serum free media provide, which of the following advantage over serum containing media?

a. Selective culture of differentiated and producing cell type
b. Easier downstream processing
c. Toxic effect of serum are avoided
d. There is no danger of degradation of sensitive proteins by proteases
e. All of the above

Ans. (e) All of the above

21. CD_4 a surface antigen commonly found in T-helper cells is a

a. Nucleoprotein b. Glycoprotein
c. Phospholipid d. Polysaccharide

Ans. (b) Glycoprotein

22. 'Selective theory' for production of antibodies was proposed by

a. Lederberg and Tatum
b. Flemming
c. N. jerne
d. M. Burnet, N. jerne, D. Talmage and j. Lederberg

Ans. (d) M. Burnet, N. jerne, D. Talmage and j. Lederberg

23. 'Instructive theory' of antibody production was proposed by

a. Rodney Porter (1959)
b. J. Lederberg (1950)
c. Linus Pauling (1940)
d. Micheal Green (1970)

Ans. (c) Linus Pauling (1940)

24. Who among the following gave structure of IgG first time?

a. Rodney Porter and Gerald Edelman
b. Robin Valentine and Micheal Green
c. M. Burnet and N. Jerne
d. D. Talmage

Ans. (b) Robin Valentine and Micheal Green

25. Detailed chemical structure of IgG was given by

a. Henry Bence and jones
b. Rodney Porter and Gerald Edelman

c. Robin Valentine and Micheal Green
d. M. Burnet and N. Jerne

Ans. (b) Rodney Porter and Gerald Edelman

26. Which of the following functions are performed by serum?

a. It provides nutrients for cells
b. It provides several hormones essential for growth of nearly all cells
c. It provides proteins, e.g. fibronectin, which promotes attachment of cell to the substrate
d. All of the above

Ans. (d) All of the above

27. Serum contains which of the following growth factors?

a. Epidermal and fibroblast growth factor
b. Transforming growth factor beta
c. Endothelial and platelet-derived growth factors
d. All of the above

Ans. (d) All of the above

28. Serum free media suffer from which of the following disadvantages?

a. Most serum free media are specifies to one cell type
b. Growth rate and the maximum cell density attained are lower than those with serum containing media
c. Cells tend to become fragile during prolonged agitated culture unless biopolymers or synthetic polymer are added
d. All of the above

Ans. (d) All of the above

29. Albumin carries which of the following molecules into cells?

a. Vitamins
b. Hormones
c. Lipids
d. All of the above

Ans. (d) All of the above

30. Which of the following disadvantages are associated with serum when used in culture media?

a. It interferes with downstream processing
b. It may inhibit growth of some cell type, e.g. epidermal keratinocytes
c. Some growth factors may be inadequate for specific cell types
d. All of the above

Ans. (d) All of the above

31. IgG is 150 kilodalton (kd) entity which can be proteolytically cleaved into two subunits of?

a. 100 and 50 kd
b. 100 and 90 kd
c. 100 and 100 kd
d. 50 and 50 kd

Ans. (a) 100 and 50 kd

32. Immunoglobulins have been named so because of the presence of

a. β-globulins
b. γ-globulins
c. α-globulins
d. δ-globulins

Ans. (b) γ-globulins

33. The more accurate and advance theory for antibody production is

a. Selective theory
b. Constructive theory
c. Instructive theory
d. Destructive theory

Ans. (a) Selective theory

34. Immunologist, who studied the composition and amino acid sequence of heavy (H) and light (L) chains, is

a. Rodney Portar
b. G. Edelman
c. Henery Bence Jones
d. Robin Valentine

Ans. (c) Henery Bence Jones

35. The number of constant domains in light and heavy chain are in the order of

a. 2 : 3
b. 2 : 2
c. 1 : 1
d. 1 : 3

Ans. (d) 1 : 3

36. Development of serum free formulation of culture media are based on which of the following approaches?

a. Limiting factor
b. Analytical
c. Synthetic
d. All of the above

Ans. (d) All of the above

37. Which of the following enzyme is the most commonly used for disaggregation of explants.

a. Elastase and pappain
b. Mucase and elastase
c. Trypsin and collagenase
d. None of the above

Ans. (c) Trypsin and collagenase

38. Cell line having specific cell types may be obtained by which of the following method?

a. Selective culture
b. Cloning
c. Physical cell separation
d. All of the above

Ans. (d) All of the above

39. Contamination may be checked By looking for which of the following?

a. Granular appearances outside the cells
b. A rapid change in pH
c. Cloudiness of the medium
d. All of the above

Ans. (d) All of the above

40. *In vitro* transformation of animal cells may occur due to which of the following?

a. Spontaneously
b. Chemically induced
c. Induced by virus
d. All of the above

Ans. (d) All of the above

41. In human beings

a. 40% of L-chains are Kappa type
b. 60% of L-chains are Kappa type
c. 60% of L-chains are λ type
d. 40% of H-chains are Kappa type

Ans. (b) 60% of L-chains are Kappa type

42. The hyper variable regions responsible for antigen binding is contributed by

a. Heavy chains only
b. A part of light and heavy chains both
c. Light chains only
d. Light chains and disulphide hinge

Ans. (b) A part of light and heavy chains both

43. The main function of immune system is

I. Activation of phagocytic cells
II. To trigger pathway that will destroy pathogen
III. To recognize invading pathogens
IV. Destruction of main organs

a. I, II and IV
b. III and IV only
c. I and IV only
d. I, II and III

Ans. (d) I, II and III

44. Humoral immune response relies on the production of immune globulines (soluble protein) by

a. Killer T-cells
b. Cytotoxic T-lymphocytes
c. B-lymphocyles
d. Helper T-cells

Ans. (c) B-lymphocyles

45. The cellular immune response is mediated by

a. Phagocytes
b. T-lymophocytes
c. B-lymphocytes
d. Ptyalin

Ans. (b) T-lymophocytes

46. Most of the cell lines will grow for a period of about how many week?

a. 10
b. 12
c. 14
d. 16

Ans. (b) 12

47. Continuous cell lines provide which of the following advantage?

a. Lower serum requirement
b. Ability to grow in suspension
c. Faster rate of growth
d. All of the above

Ans. (d) All of the above

48. Which of the following normal cells do not give rise to continuous cell lines?

a. Human glia cells
b. Human fibroblast cells
c. Chick fibroblasts
d. All of the above

Ans. (d) All of the above

49. Cell culture are used for obtaining which of the following?

a. Interleukins and interferons
b. Hormones, enzyme and antibodies
c. Viral vaccines
d. All of the above

Ans. (d) All of the above

50. Cell culture are used for obtaining which of the following viral vaccines?

a. Polio and mups
b. Mouth and hand disease
c. Both a and b
d. Non of the above

Ans. (a) Polio and mups

51. The immune response occurs on initial contact with a foreign antigen and produce IgM and IgG is termed

a. Antibody synthesis
b. Primary immune response
c. Secondary immune response
d. Antibody structure

Ans. (b) Primary immune response

52. Secondary immune response is mediated by long lived

a. Killer T-lymphocytes
b. Killer T-cells
c. Helper T-cells
d. Cytotoxic T-cells and memory B-cells

Ans. (d) Cytotoxic T-cells and memory B-cells

53. Antibodies or immunoglobulin are made up of

a. Nucleoproteins
b. Phospholipids
c. Lipoproteins
d. Glycoproteins

Ans. (d) Glycoproteins

54. The basic structure common to all immunoglobulins is the presence of heavy and light chains in the order of

a. L_3H_4
b. L_2H_3
c. L_2H_2
d. $L_2H_2S_2$

Ans. (c) L_2H_2

55. Which of the following resemble with the structure of antibody?

a. T
b. D
c. H
d. Y

Ans. (d) Y

56. In animal cell suspension culture, damage to cells can be reduced by which of the following?

a. Adding non nutritional supplements like pluronic F-68 and sodium carboxy methyl cellulose
b. Higher gassing rate
c. Higher bubbles
d. All of the above

Ans. (a) Adding non nutritional supplements like pluronic F-68 and sodium carboxy methyl cellulose

57. Culture systems based on immobilized cells offer which of the following advantage?

a. Lower cell densities
b. Suitability for both suspension and monolayer culture
c. Both a and b
d. None of the above

Ans. (c) Both a and b

58. Which of the following are common features of continuous cell lines?

a. Ability to grow up to higher cell densities
b. Reduced dependence on substrate adhesion
c. Aneuploid chromosome numbers
d. Smaller, more rounded cells with a higher nucleus/cytoplasm ratio
e. All of the above

Ans. (e) All of the above

59. Cell cloning is used for which of the following purposes?

a. To obtain homogeneous cell lines from heterogeneous cell culture
b. To develop hybridoma clones
c. Both a and b
d. None of these

Ans. (c) Both a and b

60. Which of the following approach can be used to enhance the plating efficiency of cell lines?

a. Use of conditioned medium
b. Providing intermediate metabolites like keto acids, nucleosides, etc.
c. Use of feeder layer
d. All of the above

Ans. (d) All of the above

61. The cells of immune system are

I. Lymphocytes and erythrocytes
II. B-lymphocytes and T-lymphocytes
III. Lymphocytes and antigen presenting cells
IV. Leucocytes and thrombocytes

Choose the correct answer

a. II and III
b. I and II
c. III and IV
d. II, III and IV

Ans. (b) I and II

62. The primary lymphoid organs are

I. Bone marrow
II. Liver
III. Thymus
IV. Spleen

Choose the correct answer

a. III, IV
b. II, III
c. I, II
d. I, III

Ans. (d) I, III

63. The hyper variable regions responsible for antigen binding is contributed by

a. Heavy chains only
b. A part of light and heavy chains both
c. Light chains only
d. Light chains and disulphide hinge

Ans. (b) A part of light and heavy chains both

64. The total number of amino acids found in H and L chains are

a. 200 and 400
b. 250 and 500
c. 214 and 446
d. 191 and 214

Ans. (c) 214 and 446

65. Kappa chain can be distinguished on the basis of

a. Leucine or valine in place of lysine or arginine at allotypic site
b. Arginine in place of leucine
c. Lysine in place of valine
d. Lysine or arginine in place of leucine or valine

Ans. (a) Leucine or valine in place of lysine or arginine at allotypic site

66. Which of the following is not correct?

a. Planting efficiency of continuous cell line is generally 10% or higher
b. Cells derived from a single cell through meiosis constitute a clone
c. A feeder layer is a layer of cells, which has been treated to prevent their growth
d. None of the above

Ans. (b) Cells derived from a single cell through meiosis constitute a clone

67. Which of the following feature is not correct about animal organ culture?

a. They can be maintained only for few month
b. Hormone dependent organs remain hormone – dependent
c. Results from them are comparable to those from whole animals
d. To development of foetal organs *in vitro* is comparable to that *in vivo*

Ans. (c) Results from them are comparable to those from whole animals

68. Which of the following statements is not correct about production of artificial skin?

a. Cell division occur in keratinocytes.
b. Intact skin explant is cultured on a suitable medium
c. Irradiated 3T3 fibroblast cells are used as feeder layer
d. None of the above

Ans. (b) Intact skin explant is cultured on a suitable medium

69. Which of the following cells types present in heterogeneous animal cell culture are the least likely to divide?

a. Differentiated cell
b. Stem cells
c. Precursor cells
d. All of the above

Ans. (a) Differentiated cell

70. Plastic ware can be made wettable and negatively charged by which of the following treatments?

a. Oxidizing agents
b. UV irradiation
c. Strong acid
d. All of the above

Ans. (d) All of the above

71. Complement cascade is related to

a. Fab part of the antibody
b. Complete antibody molecule
c. Fc part of antibody
d. No relation

Ans. (c) Fc part of antibody

72. Which of the following is determined by CDR?

a. Antibody structure
b. Antibody specificity
c. Shape of antigen
d. No relation

Ans. (b) Antibody specificity

73. The major difference between MHC- 1 an MHC-II is

a. MHC-1 is related with immune system whereas MHC-II related with digestion
b. MHC-I is glycoprotein whereas MHC-II is nucleoprotein
c. MHC-I molecules contain a large α-chain associated with a much smaller β_2 microglobulin molecule whereas MHC-II contain α and β polypeptide chains
d. None of these

Ans. (c) MHC-I molecules contain a large α-chain associated with a much smaller β_2 microglobulin molecule whereas MHC-II contain α and β polypeptide chains

74. Fc-receptors are present

a. On the surface of macrophases
b. On the surface of neutrophiles
c. On the surface of erythrocytes
d. Both b and c

Ans. (d) Both b and c

75. TCR are transmembrane proteins found on T-cells and consisting of

a. Four polypeptide chain (2α + 2β)
b. Four polypeptide chain (3α + 1β)
c. Two polypeptide chain (1α + 1β)
d. Two polypeptide chain (2α)

Ans. (c) Two polypeptide chain (1α + 1β)

76. Which of the following is the preferred enzyme for disaggregation of animal tissues?

a. Elastase
b. Mucase
c. Trypsin
d. Collagenase

Ans. (c) Trypsin

77. Trypsin is preferred over other enzymes for tissue disaggregation because of which of the following?

a. Effective for many tissues
b. Tolerated by most cells
c. Neutralized by serum
d. All of the above

Ans. (d) All of the above

78. EDTA readily disaggregates which of the following tissues?

a. Epithelium
b. Fibrous tissues
c. Skin
d. Muscles

Ans. (a) Epithelium

79. Animal cell cultures may be contaminated by which of the following?

a. Fungi
b. Virus
c. Both a and b
d. None of these

Ans. (b) Virus

80. Which of the following culture vessels are used for large scale culture of anchorage dependent cells?

a. Opticell culture system
b. Hollow fibre cartridge
c. Heli-cell vessels
d. All of the above

Ans. (d) All of the above

81. The monoclonal antibody technique was developed by 'Milstein'. These are characterised by

i. Low productivity
ii. High degree of specificity
iii. Homogenecity
iv. High productivity

Choose the correct answer

a. iii, iv
b. i, ii, iii
c. i, ii, iv
d. iii, iv, i

Ans. (b) i, ii, iii

82. Peptides that binds to MHC proteins are called

a. Epitopes
b. Cytotoxic cells
c. Isotopes
d. Aggretopes

Ans. (d) Aggretopes

83. DNA staining is done by

a. Crystal violet
b. Giemsa staining
c. Methylen staining
d. Feulgen staining

Ans. (d) Feulgen staining

84. B-cells represents

a. 20–30% of lymphoid pool
b. 5–15% of lymphoid pool
c. 10–20% of lymphoid pool
d. 30–40% of lymphoid pool

Ans. (b) 5–15% of lymphoid pool

85. Lymphoid tissue represents

a. 15%
b. 2%
c. 5–10%
d. 5% of total body weight

Ans. (b) 2%

86. Cell fusion leads to the production of which of the following?

a. Homokaryos
b. Heterokaryons
c. Hybrid cells
d. All of the above

Ans. (d) All of the above

87. A hybrid cell obtained by cell fusion has which of the following ?

a. A single nucleus obtained by fusion of two genetically different nuclei
b. Cytoplasm derived from the two fusion partners
c. Both a and b
d. None of the above

Ans. (c) Both a and b

88. Which of the following techniques was used for development of 'Dolly'?

a. Nucleus removal
b. Cell culture
c. Cell fusion
d. All of the above

Ans. (d) All of the above

89. Which of the following event(s) occurs during inflammatory response?

a. An increase in blood vessel diameter
b. An increase in capillary permeability
c. Both a and b
d. None of these

Ans. (c) Both a and b

90. Which of the following is correct about B-cell and T-cell?

a. B-cell mature in bone marrow, while T-cell mature in thymus gland
b. B-cell express unique membrane-bound antibodies, while T-cells express on their surface unique antigen binding receptors, called T-cell receptors
c. Both T- and B-cells are types of lymphocytes
d. All of the above

Ans. (d) All of the above

91. 'Gall body' is a

a. Group of primary lysozymes associated with lipid
b. Group of E.R. present in lymphocytes
c. Group of ribosome
d. Group of nucleosomes

Ans. (a) Group of primary lysozymes associated with lipid

92. What is the difference between B and T lymphocytes?

a. There is no difference
b. Differ in maturation and storage
c. Differ in origin
d. Differ in location in the lymphoid pool

Ans. (b) Differ in maturation and storage

93. CDR determines the

a. Antibody structure
b. Antibody specificity
c. Shape of antigen
d. None of these

Ans. (b) Antibody specificity

94. Gall bodies are characteristic cytoplasmic structures of

a. T_H and T_C cells
b. Plasma cells
c. B-cells
d. Erythrocytes

Ans. (a) T_H and T_C cells

95. Lymphocytes show

a. Self and non-self recognition
b. Specificity
c. Memory
d. All of the above

Ans. (d) All of the above

96. Lymph nodes are located abundantly in which of the following?

a. Groin
b. Armpit
c. Neck
d. All of the above

Ans. (d) All of the above

97. Which of the following is not correct about T cells?

a. Lymphoid stem cells that migrate into thymus ultimately mature into T cells
b. During T cells maturation, rearrangement of the genes encoding T cell receptor takes place
c. T lymphocytes originate from myeloid stem cells
d. All of the above

Ans. (c) T lymphocytes originate from myeloid stem cells

98. The lymphocytes protect from which of the following?

a. Fungal pathogen
b. Viral pathogen
c. Insect
d. All of the above

Ans. (b) Viral pathogen

99. Antibodies fight against which of the following?

a. Starvation
b. Infection
c. ageing
d. All of the above

Ans. (b) Infection

100. Which of the following work is performed by lymph nodes?

a. Preparation of blood
b. Destruction of bacteria
c. Elimination of CO_2
d. None of these

Ans. (b) Destruction of bacteria

101. T-cell mediator to immunity is attributed to

a. Lymphokines
b. Protein kinase
c. Interferons
d. Cytokines

Ans. (d) Cytokines

102. Which of the following subclass of B-cells is responsible for secretion of immunoglobulins?

a. Plasma cells
b. Memory cells
c. Lymphocytes
d. Haemopoietic cell

Ans. (a) Plasma cells

103. 'Selective theory' for production of antibodies was proposed by

a. Lederberg and Tatum
b. Flemming
c. N. jerne
d. M. Burnet, N. Jerne, D. Talmage and J. Lederberg

Ans. (d) M. Burnet, N. Jerne, D. Talmage and J. Lederberg

104. Which of the following is called serum hepatitis?

a. HCV
b. HAV
c. HBV
d. HIV

Ans. (c) HBV

105. Which of the following was a non-neural vaccine for rabies?

a. HEPV
b. Card vaccine
c. BPL
d. Simple

Ans. (a) HEPV

106. Which type of antibodies will associate in blood cell coagulation?

a. IgE
b. IgA
c. IgM
d. IgG

Ans. (c) IgM

107. In a antigen haptens are

a. Immunogenic
b. Non-immunogenic
c. Antigenic
d. None of these

Ans. (b) Non-immunogenic

108. The antibody that is first formed after infection is

a. IgG
b. IgM
c. IgD
d. IgE

Ans. (b) IgM

109. Antibodies in our body are produced by

a. B-lymphocytes
b. T-lymphocytes
c. Monocytes
d. RBC's

Ans. (a) B-lymphocytes

110. Which of the following are limitation of retroviral infection?

a. Additional steps needed for construction of recombinant retroviruses
b. Mosaicism of the recovered animals
c. Limits on the size of DNA insert
d. All of the above

Ans. (d) All of the above

111. Which of the following properties of retroviruses are not useful in their use as vector?

a. Presence of weak promoters
b. Regulation of promoter action in case of some viruses, *viz*, Murine Mammary Tumour Virus
c. They have a wide host range, *viz*, birds, mammals and other animals
d. None of these

Ans. (b) Regulation of promoter action in case of some viruses, *viz*, Murine Mammary Tumour Virus

112. Retroviral vectors have which of the following feature?

a. The vectors and the recombinant DNAs are packaged into virions and used as transducing viruses
b. DNA copies of the retroviral genomes are, generally used as shuttle vectors
c. Vectors have viral sequences for replication, gene expression and packaging
d. All of the above

Ans. (d) All of the above

113. Which of the following statements are not correct about adenovirus vectors?

a. In recombinant DNA, DNA insert replaces genes EIA/EIB.
b. Adenoviruses are RNA viruses
c. The maximum insert size for such vectors is –6–8 kb
d. None of these

Ans. (b) Adenoviruses are RNA viruses

114. The first animal vector was devised from which of the following?

a. Primate papova virus
b. Simian virus 40
c. Both a and b
d. None of these

Ans. (c) Both a and b

115. Which of the following is correct about SV 40 vector?

a. Large T is essential for viral replication.
b. VP1 (Viron protein 1), VP2 and VP3 from viral capsid
c. It is a spherical virus with circular double stranded 5, 243 bp chromosomes, which encodes 5 proteins.
d. All of the above

Ans. (d) All of the above

116. Among the given gene transfer techniques, which of the following is the most commonly used in case of mice embryos?

a. Microinjection
b. Retroviral infection
c. Embryonic stem cell technology
d. Electroporation

Ans. (a) Microinjection

117. Late region replacement vector contain which of the following feature?

a. Region at which spicing and polyadenylation occur.
b. This vector is used for infection of host cells without a helper virus
c. Origin of replication
d. Entire early region of SV 40

Ans. (b) This vector is used for infection of host cells without a helper virus

118. If inducible gene expression is driven by metallothionein promoter, transcription is induced by which of the following metal ions?

a. Cadmium
b. Zinc
c. Both a and b
d. Iron

Ans. (c) Both a and b

119. Which of the following is the chief advantages of both late and early region replacement SV40 vector?

a. The recombinant DNA replicates to a high copy number
b. The recombinant DNA is packaged into virions
c. Both a and b
d. The maximum Size of DNA insert is –2.5 kb

Ans. (c) Both a and b

120. Which of the following is not correct about SV 40 plasmid vector?

a. Plasmid vector have been mainly used to investigate sequences involved in transcriptional and post transcriptional regulation
b. Plasmid vector are generally used for stable transfection
c. They integrate into the host genome with a frequency of 10^{-5} to 10^{-3}
d. None of these

Ans. (b) Plasmid vector are generally used for stable transfection

121. Which of the following information is not obtained by southern hybridization?

a. Number of sites of transgene integration
b. Presence of mRNA/protein produced by transgene
c. Both a and b
d. Confirmation of integration of tansgene

Ans. (c) Both a and b

122. Which of the following techniques is used to obtain information on the relative levels of mRNA present in the tissue of different transgenic individuals?

a. Reverse transcription PCR
b. Nuclease protection assay
c. *In situ* hybridization
d. All of the above

Ans. (d) All of the above

123. The points at which crossing over has taken place between homologus chromosomes are called

a. Chiasmata
b. Synaptonemal complex
c. Centromeres
d. Protein axes

Ans. (a) Chiasmata

124. How much of globulin is present in human serum?

a. 8%
b. 12%
c. 16%
d. 4%

Ans. (a) 8%

125. The substance which acts as antimetabolites are called

a. Activators
b. Substrates
c. Inhibitor
d. Cofactor

Ans. (c) Inhibitor

126. Enzymes are chemically

a. Lipids
b. Proteins
c. Carbohydrates
d. None of these

Ans. (b) Proteins

127. Monoclonal antibodies are produced by

a. Hybridoma technology
b. Biotechnology
c. Fermentation technology
d. None of these

Ans. (a) Hybridoma technology

128. First line of body defence is

a. Antibody molecules
b. Unbroken skin
c. Antigen molecules
d. Phagocytic cells

Ans. (b) Unbroken skin

129. What is the strength of the bond between antigen and antibody?

a. Affinity
b. Avidity
c. Covalent
d. None of these

Ans. (b) Avidity

130. Tears contain…

a. IgA
b. IgG
c. Lysozyme
d. None of the above
e. All of the above

Ans. (a) IgA and (c) Lysozyme

131. Macrophages…

a. Circulate in the bloodstream
b. Produce nitric oxide
c. Have receptors for IgM
d. Are the first leucocytes to arrive at the site of a skin infection are the main immune cells for dealing with viruses

Ans. (a) Circulate in the bloodstream

132. Phagocytosis…

a. Is carried out by cells of the adaptive immune system
b. Is restricted to macrophages
c. Is important in bacterial infections
d. Is a process that does not involve energy results in division of the cell

Ans. (b) Is restricted to macrophages

133. Opsonins include…

a. Perforin
b. Magainins
c. C9
d. IFNγ

Ans. (c) C9

134. Both mast cells and basophils…

a. Are phagocytic
b. Circulate in the bloodstream
c. Are found primarily in lymph nodes
d. Release histamine

Ans. (d) Release histamine

135. Viral replication within cells is inhibited by…

a. IL-13
b. IL-1
c. IL-4
d. TNFα

Ans. (c) IL-4

136. Cytotoxic T cells generally recognise antigen in association with…

a. Class II MHC determinants
b. Class I MHC determinants
c. Class III MHC determinants
d. HLA-DR determinants

Ans. (e) All the above

137. CD8 positive cells…

a. Can be classified into Th1 and Th2 subgroups based on their biological function
b. Do not produce IFNγ
c. Can recognise and kill virus-infected cells
d. Can bind free virus

Ans. (c) Can recognise and kill virus-infected cells

138. Immediate hypersensitivity usually involves…

a. Mast cells
b. Antibodies to mast cells
c. Platelets
d. IgG

Ans. (c) Platelets

139. Haemolytic disease of the newborn due to Rhesus incompatibility depends upon the…

a. Mother possessing Rh antigens not present on the baby's red cells
b. Inability of the baby to react against the mother's red cells
c. Transplacental passage of IgM anti-Rh antibodies
d. Transplacental passage of IgG anti-Rh antibodies

Ans. (d) Transplacental passage of IgG anti-Rh antibodies

140. Lymphoid stem cells give rise to which of the following cell?

a. Lymphocyte progenitor cells
b. Pre B and pre T cell
c. Pro B and Pro T cells
d. All of the above

Ans. (d) All of the above

141. Which of the following techniques is used for the separation of X and Y chromosome bearing sperms?

a. Gel electrophoresis
b. Zoobloting
c. Sephadex gel column
d. None of these

Ans. (c) Sephadex gel column

142. Which of the following is not correct about T cell?

a. During T cell maturation rearrangement of genes encoding T cell receptor takes place
b. TCR gene rearrangements follow the same general scheme as that for antibody genes
c. Each T cell express TCR of a single antigenic specificity
d. All of the above

Ans. (b) TCR gene rearrangements follow the same general scheme as that for antibody genes

143. Animal cloning allows which of the following?

a. This technique should make it feasiable to target transgenes in livestock by nuclear transfer from transgenic cell population developed *in vitro* into enucleated oocytes to recover non chimacric transgenic animals
b. The technique holds a great promise in genetic research, specially in understanding ageing and curing of genetic diseases

c. Indefinite multiplication of an elite desirable genotype without the risk of segregation and recombination
d. All of the above

Ans. (d) All of the above

144. Which of the following is not correct about chromosome walking?

a. This technique is used for characterizing small, say few Kb, regions of chromosome
b. In this technique, one can begin with a DNA fragment that contains a known gene/genetic marker
c. Generally, a cosmid library is used for chromosome walking
d. All of the above

Ans. (a) This technique is used for characterizing small, say few Kb, regions of chromosome

145. Conventional linkage maps sufer from which of the following?

a. Their mapping is tedious and time taking
b. The number of genes producting distinct morphological effects is rather not limited
c. Gene governed quantitative trait can be mapped
d. None of these

Ans. (a) Their mapping is tedious and time taking

146. Which of the following is not correct?

a. In general, antigens are immunogenic
b. Antibodies belong to a special category of proteins, called immunoglobulins
c. Monoclonal antibodies are produced from hybrid cells obtained by fusing a memory B cell with a myeloma cell
d. Protein produced by genes transferred by genetic engineering into selected hosts are called recombinant proteins

Ans. (c) Monoclonal antibodies are produced from hybrid cells obtained by fusing a memory B cell with a myeloma cell

147. Peripheral lymphoid organs include which of the following?

a. Spleen and numerous lymph nodes in various part of body
b. Tonsils and appendix
c. Lymphoid nodules in the gut and blood
d. All of the above

Ans. (d) All of the above

148. Which of the following statement are not correct?

a. T cells mature in bone marrow
b. An animal does not ordinarily produce antibodies against self antigens
c. Most T cells express TCR2, while –5% of T cells in adult mice express TCR
d. None of the above

Ans. (a) T cells mature in bone marrow

149. Memory cells lack which of the following?

a. IgM
b. IgD
c. IgA
d. IgE

Ans. (b) IgD

150. An antibody molecule consist of which of the following?

a. Two identical heavy chain
b. Two α and 2δ chain
c. Two identical light chain
d. Both a and c

Ans. (d) Both a and c

151. Light chain of antibody consists of about how many amino acids?

a. 220
b. 330
c. 440
d. 550

Ans. (a) 220

152. Which of the following is not correct?

a. A prolonged administration of human chorionic gonadotrophin (hMG) for stimulation of ovulation produces some side effects like abdominal discomfort and pleural effusion
b. Laproscopy is usually done after ovulation
c. The time of natural ovulation is determined by monitoring the rise in the level of LH either in urine or in blood
d. All of the above

Ans. (b) Laproscopy is usually done after ovulation

153. In human, the time of ovulation is estimated on the basis of which of the following?

a. Change in cervical mucous score
b. Oestrogen level in blood or urine
c. Level of luteinizing hormone in blood or urine
d. All of the above

Ans. (d) All of the above

154. Cell cultures contain which of the following type of cells?

I. Precursor cells
II. Stem cells
III. Differentiated cells
IV. Dedifferentiated cells

a. I, II, III
b. II, III, IV
c. I, II, III, IV
d. I, III, IV

Ans. (a) I, II, III

155. Which of the following are examples of artificial tissue/cell culture medium?

I. Chemically defined media
II. Serum containing media
III. Serum free media
IV. Protein free media

a. I, II, III
b. II, III, IV
c. I, II, III, IV
d. I, III, IV

Ans. (c) I, II, III, IV

156. In animal cell culture, differentiation and cell proliferation are affected by wchih of the following?

a. Cell density and serum
b. Ca^{2+} ions and hormones
c. Cell to cell interaction
d. All of the above

Ans. (d) All of the above

157. Generally, cell proliferation is promoted by which of the following?

a. Low ca^{2+} ion
b. High growth factor levels
c. Low cell density
d. All of the above

Ans. (d) All of the above

158. Which of the following statement are correct about substance (culture vessels)?

I. Glass is the most commonly ued substrate in the form of slides. Flasks, test tubes.
II. Glass and metal surfaces are naturally negatively charged.
III. Organic surfaces, e.g. plastics, must be made wettable and negatively charged.
IV. In some cases, the substrate surface is made positively charged by coating with collagen, gelatine or polylysine.

a. I, II, III, IV
b. II, III, IV
c. I, III, IV
d. I, IV

Ans. (a) I, II, III, IV

159. Differentiation in animal cell culture is promoted by which of the following?

I. Cortisone growth factor
II. Low cell density
III. High Ca^{2+} ions
IV. Nerve growth factor

a. I, II, III, IV
b. II, III, IV
c. I, III, IV
d. III, IV

Ans. (c) I, III, IV

160. Which of the following is not correct about plastic substrate?

a. Most plastics ware are nonautoclavable, and are suppli sterile for a single use
b. Polystyrene is the most commonly used, but polyethylene, Perspex, PVC, Polycarbonate, Teflon, cellophane and cellulose acetate are all suitable substrate
c. All the organic substrates must be suitable treated to make them wettable and positively charged
d. Thin Teflon films are available as Petri dishes or as membranes to be used as rafts: these films are permeable to O_2 and CO_2

Ans. (c) All the organic substrates must be suitable treated to make them wettable and positively charged

161. Which of the following is not correct about suspension culture?

a. Cells of certain type are grown in liquid media as suspension culture
b. Cells harvested from late log phase culture are inoculated into fresh liquid medium maintained at 20°C
c. The initial cell density is usually between 5×10^4 and 2×10^5 cells/ml.
d. The cultures are stirred at 200–350 rpm

Ans. (b) Cells harvested from late log phase culture are inoculated in to fresh liquid medium maintained at 20°C

162. Monoclonal antibodies produced for carcinoembryonic antigen and some tumour associated antigens can be used in histochemical assays that permit the identification of which of the following?

a. Benign and malignant nature of tumours
b. Non tumour cell type
c. Late cases of metastasis
d. None of these

Ans. (a) Benign and malignant nature of tumours

163. The objective of gene transfers in animals is the study of which of the following ?

a. Promoter function
b. Repressor function
c. Regulation of gene expression
d. Both a and c

And. (d) Both a and c

164. Which of the following is not correct about fish vector?

a. An enhancer/promoter sequence from CaMV
b. A typical fish vector is a plasmid
c. The origin of replication from *E. coli* plasmid pBR 322
d. None of these

Ans. (a) An enhancer/promoter sequence from CaMV

165. The term transfection is used to denote which of the following?

a. Delivery of recombinant DNA into plant cell via a virus
b. Genetic transformation of bacteria via fungus infection
c. Genetic transformation of animal cells
d. All of the above

Ans. (c) Genetic transformation of animal cells

166. Early region replacement and late region replacement vectors of SV 40 have which of the following?

a. Mammalian cells are hosts of SV40 derived vector
b. Transient expression
c. Both a and b
d. None of these

Ans. (c) Both a and b

167. Which of the following is not correct about a retrovirus vector?

a. It produces protein
b. It is a shuttle vector
c. It integrates as provirus into mammalian genome
d. It is used in gene therapy

Ans. (a) It produces protein

168. Anti freeze protein promoter was isolated from which of the following?

a. Fish
b. Cow
c. Dog
d. Cat

Ans. (a) Fish

169. Transgenic have been produced in which of the following animals?

a. Cow and goat
b. Dog and rabbits
c. Rat and deer
d. All of the above

Ans. (a) Cow and goat

170. Which of the following is not correct about transgenic fish?

a. Thre rate of survival of microinjected embryos varies from 35 to 80% of which 10–70% may be transgenic
b. Transfected ova are cultured in nutrient medium
c. Transfection is achieved either by microinjection or by electroporation
d. All of the above

Ans. (b) Transfected ova are cultured in nutrient medium

171. Mammalian artificial chromosomes and human artificial chromosomes are linear vectors that contain which of the following?

a. Origin of replication recognition sequences
b. Transcriptionally active chromosomal domain
c. Centromeres and telomeres
d. All of the above

Ans. (d) All of the above

172. Which of the following is not correct about P elements?

a. These elements are transposons of 2.9 kb
b. P element vectors are derived from flour mouth
c. Helper p element are needed to enable recombinant p vector integration into the host genome
d. None of these

Ans. (b) P element vectors are derived from flour mouth

173. Which of the following is not correct?

a. Transgenes are always present in homozygous condition
b. In general transgenes integrate at random sites in any of the chromosomes of the genome of host animals cells
c. Transgenes are expected to show
d. Homologous recombination has been exploited to produce knockout mice

Ans. (a) Transgenes are always present in homozygous condition

174. A suitable expression vector ordinarily contains which of the following?

a. Promoter
b. Usually, a polyadenylation site

c. Transcription termination sequence
d. All of the above

Ans. (d) All of the above

175. Which of the following is not correct about promoter/enhancer?

a. Promoter must be located at the 5′ end of the antisense strand of the gene
b. The promoter sequence determines the level of transcription of the gene and tissue or cell type where the gene will be expressed
c. A promoter sequence is the site to which RNA polymerase first binds during the initiation of transcription
d. All of the above

Ans. (a) Promoter must be located at the 5′ end of the antisense strand of the gene

176. Cells take in calcium phosphate DNA precipitate particles by which of the following?

a. Pincocytosis
b. Lipofection
c. Phagocytosis
d. All of the above

Ans. (c) Phagocytosis

177. All the transfection technique are applicable to cultured animal cells, but microinjection is ordinarily not used due to which of the following?

a. Limited number of cells can be handled
b. Availability of less demanding alternative technique
c. Tediousness of the technique
d. All of the above

Ans. (d) All of the above

178. DEAE-dextran brins about DNA uptake by which of the following mechanisms?

a. Endocytosis
b. Pinocytosis
c. Active transport
d. Osmosis

Ans. (a) Endocytosis

179. Mouse is the most prefreed mammal for studies on gene transfer due to which of the following?

a. Production and maintenance of ES cell lines
b. Short generation time and successful culture of embryos *in vitro* at least for a period of time
c. Short oestrous cycle and gestation period
d. All of the above

Ans. (d) All of the above

180. The technique of gene transfer and transgenic animal production were developed using which of the following animals as models?

a. Cat
b. Mice
c. Pig
d. Goat

Ans. (b) Mice

181. Which of the following factor contribute to low level transgene expression?

a. Presence of AU-rich sequences in the coding region of the gene
b. Lack of secondary structure within the 5′ untranslated region of the m-RNA
c. Lack of an initiation codon in the 5′- untranslated region
d. All of the above

Ans. (a) Presence of AU-rich sequences in the coding region of the gene

182. Which of the following is not correct?

a. Rabbits are quite promosing for molecular farming
b. More recently, rats and rabbits are being increasingly used for gene transfer research.
c. Transgenic sheep have not been produced it achieve better growth and meat production
d. None of these

Ans. (c) Transgenic sheep have not been produced it achieve better growth and meat production

183. Which of the following is correct?

a. F-virosomes deliver the DNA directly into the cytoplasm via fusion with cell plasma membrane
b. In case of fish embryos, microinjection and electroporation are routinely employed
c. Many cell lines do not like the calcium phosphates precipitate adhering to their substrate
d. All of the above

Ans. (d) All of the above

184. Which of the following are correct?

a. Dominant selectable markers are ordinarily used for the selection of transfected/transgenic embryos of mammals
b. Thymidine kinase gene can be used as a selectable marker only when TK host cells are used for transfection
c. Selectable reporter genes are frequently used for the selection of transgenic fish
d. Both b and c

Ans. (d) Both b and c

185. The bacterial XGPRT gene serves as dominant selectable marker on a culture medium containing which of the following?

a. Tryptophan and guanine
b. Xanthine and adenine
c. Acetic acid
d. None of the above

Ans. (b) Xanthine and adenine

186. Which of the following may serve as edible vaccine for humans?

a. Honey
b. Apple
c. Banana
d. All of the above

Ans. (d) All of the above

187. Which of the following is not correct?

a. In case of electroporation, circular super coiled DNA is far more efficient in transfection than linearized DNA
b. The use of cationic lipid for construction of liposomes offers a distinct advantage
c. Recombinant retroviruses produce virions
d. None of these

Ans. (a) In case of electroporation, circular super coiled DNA is far more efficient in transfection than linearized DNA

188. Which of the following is not correct about xenopus oocytes?

a. Oocyte nucleus is arrested at first meiotic metaphase
b. Oocytes serve as a valuable expression system for a wide varity of genes from both animals and plants
c. Nucleus is located in the darkly pigmented hemisphere of the oocytes
d. Each mature oocytes has a large nucleus called germinal vesicle

Ans. (a) Oocyte nucleus is arrested at first meiotic metaphase

189. Among the given tests which one is the most rapid and convenient?

a. Immunoblotting
b. Radioimmunoprecipitation
c. ELISA
d. Immunohistochemical staining of tissue sections

Ans. (c) ELISA

190. Which of the following is correct about insertional mutagenesis?

a. It occurs by chance and cannot be controlled
b. It often produces aberrant phenotypes
c. Occurrence of insertional mutagenesis leads to accidental discovery of unsuspected gene and gene function
d. All of the above

Ans. (d) All of the above

191. Which of the following is not correct about transgene integration in animal genomes?

a. When multiple copies are integrated, they are mostly integrated at one site joined to each other head to tail
b. Transgene integrations frequently leads to various from of rearrangements
c. In general, multiple copies are integrated when small amounts of DNA are used for transfection
d. Usually, in a given cell, integration occurs at a single location

Ans. (c) In general, multiple copies are integrated when small amounts of DNA are used for transfection

192. Which of the following is not correct about methotrexate?

a. Enzyme DHFR is involved in endogenous synthesis of nucleotides
b. It is a week inhibitor of dihydrofolate reductase
c. Normal nonmutant cultured cells are very sensitive to Mix
d. All of the above

Ans. (b) It is a week inhibitor of dihydrofolate reductase

193. In mouse cell lines, plasmid vector having which of the following replicons yield stable episomal transformation?

a. BPV replicons
b. SV 40 replicon
c. Murine polyomavirus
d. EBV replicons

Ans. (a) BPV replicons

194. Production of recombinant human protein in insect larvae poses which of the following problems?

a. Protein folding
b. Glycosylation
c. Downstream processing
d. Upstream processing

Ans. (b) Glycosylation

195. The chromatography column used to separate recombinant protein having polyhistidine tags has which of the following?

a. Ca^{2+}
b. K^{+}
c. Divalent nickel
d. None of the above

Ans. (c) Divalent nickel

196. The 'intein' sequence functions in which of the following?

a. RNA splicing
b. Protein folding
c. Protein splicing
d. Recombination

Ans. (c) Protein splicing

197. Which of the following is required for the function of modified intein used in recombinant protein production?

a. High (40°C) temperature
b. Low (4°C) temperature
c. Beta mercaptoethanol
d. Both b and c

Ans. (d) Both b and c

198. Intein sequence facilitates which of the following steps in recombinant protein production?

a. Removal of tag
b. Overexpression of the protein
c. Separation from other proteins
d. All of the above

Ans. (a) Removal of tag

199. Which of the following scientists showed that leucocytes can divide outside the body?

a. Meyers
b. Walker
c. Arnold
d. Adams

Ans. (c) Arnold

200. Which of the following cell cultures is an example of continuous cell lines?

a. Hela cell line
b. MDCK dog kidney
c. 3T3 fibroblasts
d. All of the above

Ans. (d) All of the above

201. Which of the following is not correct about animal organ cultures?

a. The first attempt was made by Loeb in 1887
b. Loeb maintained adult rabbit liver, kidney, thyroid and ovary on small plasma clots in test tubes
c. Loeb noted that cultured organs retained their histological features for 13 days
d. In 1919, Loeb and Fleischer reported that culture tubes must be filled with O_2 to prevent central necrosis of explants

Ans. (c) Loeb noted that cultured organs retained their histological features for 13 days

202. Which of the following techniques are used for animal organ culture?

I. Agar gel
II. Grid method
III. Maximow's single slide technique
IV. Watchglass method

a. I, II, III, IV
b. II, III, IV
c. I, III, IV
d. III, IV

Ans. (a) I, II, III, IV

203. Which of the following is a example of natural medium?

a. Tissue extract
b. Plasma clot
c. Biological fluids
d. All of the above

Ans. (d) All of the above

204. Organ culture and be used for which of the following purposes?

A. Production of tissues for implantation in patients
B. Regeneration of whole organisms
C. Studies on the pattern of growth, differentiation and development of organ rudiments
D. Studies of action of drugs, carcinogenic agents on the animal organs

a. I, II, III, IV
b. I, III, IV
c. II, III, IV
d. I, II, III

Ans. (b) I, III, IV

205. The technique of cyclic exposure to medium and gas phase is successful in long-term cultures of which of the following human adult tissues?

a. Mammary epithelium
b. Oesophagus
c. Uterine endocervix
d. All of the above

Ans. (d) All of the above

206. The surface available for the attachment of culture cells is called which of the following?

a. Surface attachment site
b. Platform
c. Substrate
d. Both a and b

Ans. (c) Substrate

207. Which of the following is not correct about artificial skin?

a. The skin explants used for obtaining artificial skin may be either obtained from the patient concerned or from the foreskin of newborn babies

b. Skin cells of newborns grow fast as those from adult skin
c. Use of PGA allows the newborn skin to grow without scars
d. Artificial skin from newborn skin explants is used to cover the wound till artificial skin is obtained from patient own skin

Ans. (b) Skin cells of newborns grow fast as those from adult skin

208. Milk pasteurization can be detected by

a. Boudevine test b. Nickel test
c. Phosphate test d. All of these

Ans. (c) Phosphate test

209. Alezarine test is used for detection of

a. Milk fat b. Milk flavor
c. Milk pH d. All of these

Ans. (c) Milk pH

210. Which of the following is the oldest cell line

a. Hela cell line
b. Vero cell line
c. CHO cell line
d. BHK cell line

Ans. (a) Hela cell line

211. Red colour formation after mixing the milk and resorcinol indicates the adulteration of milk with

a. Sucrose b. Starch
c. Water d. All of these

Ans. (a) Sucrose

212. Pearson method is used for

a. Judging the quality of cheese
b. Standardization of fat in the milk and cream
c. Milk adulteration
d. All of the above

Ans. (b) Standardization of fat in the milk and cream

213. The statement, which is not correct about animal organ cultures

a. In 1919, Loeb and Fleischer reported that cultures tubes must be filled with O_2 to prevent central necrosis of explants
b. The first attempt was made by Loeb in 1887
c. Loeb maintained adult rabbit liver, kidney, thyroid and ovary on small plasma retained their
d. Loeb that cultured organs retained their histological features for 13 days

Ans. (d) Loeb that cultured organs retained their histological features for 13 days

214. Rancidity in cheese is caused by

a. Low salt per cent b. Lipolytic organisms
c. High acidity d. None of these

Ans. (b) Lipolytic organisms

215. Bitterness in cheese is caused by

a. Poor quality of the milk
b. Sugar free milk
c. Both a and b
d. None of these

Ans. (c) Both a and b

216. Evaporated milk may be made of

a. Sweet milk b. Sugar free milk
c. Both a and b d. None of these

Ans. (b) Sugar free milk

217. Condensed milk may be prepared from

a. Separator milk b. Normal milk
c. Both a and b d. None of these

Ans. (c) Both a and b

218. Milk powder may be prepared from

a. Cream b. Milk
c. Separator d. All of these

Ans. (d) All of these

219. Vieth ratio may be used for

a. Fat estimation in the milk
b. Adulteration of the milk
c. Urea in the milk
d. None of these

Ans. (b) Adulteration of the milk

220. Which of the following can be mixed in the ghee?

a. Safflower oil b. Vegetable ghee
c. Lard and tallow d. All of these

Ans. (c) Lard and tallow

221. Brine solution is used as

a. Heating agent b. Cleaning agent
c. Refrigerant d. None of these

Ans. (c) Refrigerant

222. Nitrate test is used for the detection of

a. Nitrate in milk
b. Formalin in milk
c. Borex in milk
d. None of these

Ans. (a) Nitrate in milk

223. Which of the following is used as milk preservation?

a. Boric acid and borex acid
b. Salicylic acid
c. Formalin
d. All of these

Ans. (d) Allof these

224. Commonly used for promoting cell growth in animal cell cultures

a. Insulin
b. Transferrin
c. Ethanolamine
d. All of these

Ans. (d) All of these

225. Bomer's phytosterol test is used to detect

a. Adulteration of tallow in the ghee
b. Adulteration of vegetable oil in the pure ghee
c. Adulteration of butter in pure ghee
d. None of the above

Ans. (b) Adulteration of vegetable oil in the pure ghee

226. Nitric acid test detects the milk adulteration with

a. Separator
b. Milk powder
c. Starch
d. All of these

Ans. (b) Milk powder

227. Valenta test is used to detect

a. Adulteration of animal fat in ghee
b. Adulteration of vegetable oil in pure ghee
c. Adulteration of butter in pure ghee
d. None of the above

Ans. (a) Adulteration of animal fat in ghee

228. Iodine test is used to detect the milk adulteration with

a. Water
b. Starch
c. Sucrose
d. All of these

Ans. (b) Starch

229. The virus commonly used to infect cell cultures for the production of interferon is

a. Corona virus
b. Sendai virus
c. Polio virus
d. Small pox virus

Ans. (b) Sendai virus

230. Halphen test is used to detect

a. Adulteration of cotton oil in ghee
b. Adulteration of vegetable oil in ghee
c. Adulteration of animal fat in ghee
d. All of the above

Ans. (d) All of the above

231. Pure Ghee should have Reichert Meissal value

a. >15
b. >28
c. <24
d. None of these

Ans. (b) >28

232. Hansa test is famous for

a. Detection of lactobacillus lactis in cream
b. Detection for antiserum in cow milk
c. Detection of buffalo milk in mixture
d. None of the above

Ans. (c) Detection of buffalo milk in mixture

233. Which of the following are tested under organolaptic tests?

a. Milk taste
b. Milk flavour
c. Milk appearance
d. All of these

Ans. (d) All of these

234. Milk fat can be tested with the help of

a. Lactometer
b. Butyrometer
c. Thermometer
d. All of these

Ans. (b) Butyrometer

235. Which of the following is used for colour development in butter?

a. Red
b. Blue
c. Yellow
d. Annatto

Ans. (d) Annatto

236. Which is not provided by serum?

a. Some enzymes
b. Alkaloids
c. Plasma proteins
d. Carbohydrated and lipids

Ans. (b) Alkaloids

237. The breaking stage of cream churning

a. Churning glass become clear
b. Separation of fat globules from lassi/butter
c. Formation of fat globules like sorghum seed size
d. All of the above

Ans. (b) Separation of fat globules from lassi/butter

238. Why cream pasteurization is required?

a. To get the homogenous butter
b. To get the higher fat per cent in butter
c. To improve taste, texture and flavour of butter
d. All of the above

Ans. (d) All of the above

239. The suitable temperature for cream pasteurization

a. 70°C for 20 minutes
b. 62°C for 30 minutes
c. 58°C for 30 minutes
d. 44°C for 30 minutes

Ans. (b) 62°C for 30 minutes

240. Which of the following has higher mineral matters?

a. Milk
b. Butter milk
c. Separator
d. Ghee

Ans. (c) Separator

241. Which of the following has higher SNF?

a. Separator
b. Butter milk
c. Milk
d. Whey

Ans. (a) Separator

242. Who showed that leucocytes can divide outside the body?

a. Adams
b. Arnold
c. Walker
d. Meyers

Ans. (b) Arnold

243. Whey refers to

a. Part of milk left after separating the cream
b. Part of milk after separating butter
c. Part of the milk left after separating paneer
d. None of the above

Ans. (c) Part of the milk left after separating paneer

244. Butter milk refers to

a. Part of milk left after separating the butter
b. The part of milk and cream that left after separating the butter
c. Milk without the cream
d. All of the above

Ans. (b) The part of milk and cream that left after separating the butter

245. Separator refers to

a. Milk with cream
b. Milk after separated the butter
c. Milk without the cream
d. All of the above

Ans. (c) Milk without the cream

246. Which of the following is responsible for butter flavor in cream?

a. Acidic and propionic acid
b. Acetyl methyl carbinol
c. Diacetyl
d. All of these

Ans. (d) All of these

247. Bottle pasteurization refers to

a. The filled bottle may be heated in hot air chamber at 64°C for 30 minutes
b. Hot milk is filled in hot bottles before pasteurization
c. The bottles are then heated in hot water at 62.8 to 65.6°C for 30 minutes
d. All of the above

Ans. (d) All of the above

248. The pathogenic and non-pathogenic bacteria may be killed if the milk is heated at the temperature of

a. 80°C for 45 minutes
b. 62.8°C for 15 minutes
c. 62.8°C for 30 minutes
d. 60°C for 15 minutes

Ans. (c) 62.8°C for 30 minutes

249. Food poisoning is caused by

a. *Streptococcus lactis*
b. Bacillus spp.
c. *Staphylococcus aureus*
d. All of the above

Ans. (c) *Staphylococcus aureus*

250. Cream has more dark yellow colour than the milk is due to

a. Milk has higher density than cream
b. Cream has higher density than milk
c. Higher carotene and xanthophylls in cream
d. Lower carotene and xanthophylls in milk

Ans. (c) Higher carotene and xanthophylls in cream

251. Cream is a

a. It is collected from milk through gravity or centrifugal forces
b. Part of milk which has higher fat per cent than milk
c. Generally it has >25% fat
d. All of the above

Ans. (d) All of the above

252. The cooling agents which are used for cooling the milk

a. Ice
b. Salt solution
c. Ammonia solution
d. All of these

Ans. (d) All of these

253. During heat period, the fat per cent of the milk will

a. Decrease
b. Increase
c. Remain same
d. None of these

Ans. (b) Increase

254. Homogenization of the milk requires

a. 60–65.5°C temperature and 1500 lbs per square inch pressure
b. 40°C temperature and 2000 lbs per square inch pressure
c. 60–65.5°C temperature and 2000–2500 lbs per square inch pressure
d. All of the above

Ans. (c) 60–65.5°C temperature and 2000–2500 lbs per square inch pressure

255. Homogenization of the milk refers to

a. To breaks fat globules and allow to deposit at the surface
b. To break fat globules and mix uniformely to the milk
c. To avoid the deposition of creamy layer at the surface
d. All of the above

Ans. (b) To break fat globules and mix uniformely to the milk

256. Which of the following is the main benefit of sterilization of the milk?

a. Increase the digestibility
b. Increase keeping the quality
c. Free from all bacteria
d. All of the above

Ans. (d) All of the above

257. Bottle milk sterilized at

a. 100°C for 20 minutes
b. 100–110°C for 60 minutes
c. 98°C for 40 minutes
d. All of the above

Ans. (b) 100–110°C for 60 minutes

258. Sterilization of milk is refers to

a. Milk is heated at 90°C for 20 minutes
b. Milk is heated at 93.3 to 99.4°C for 30 minutes
c. Milk is heated at 80°C for 20 minutes
d. All of the above

Ans. (b) Milk is heated at 93.3 to 99.4°C for 30 minutes

259. Pasteurized milk may be infected with

a. Thermoduric bacteria b. Mesophilic bacteria
c. Psychrophylic bacteria d. Thermophilic bacteria

Ans. (d) Thermophilic bacteria

260. Which of the thermophilic bacteria is found in the pasteurized milk?

a. *Streptococcus lactis*
b. *Micrococcus epidermidis*
c. *Lactobacillus thermophilus*
d. All of the above

Ans. (c) *Lactobacillus thermophilus*

261. Which of the thermoduric bacteria is found in pasteurized milk?

a. *Streptococcus faecalis*
b. *Micrococcus epidermidis*
c. *Microbacterium liquefaciens*
d. All of the above

Ans. (d) All of the above

262. The benefit of bactofugation of the milk

a. Higher keeping quality than pasteurization milk
b. Bacteria killed up to 99.99%
c. Milk flavour remain just like fresh milk
d. All of the above

Ans. (d) All of the above

263. Bactofugation refers to

a. Milk is run under speed centrifuge section to remove 99.99% bacteria
b. A method developed by Prof. S. Monart to remove bacteria from milk instead of killing the bacteria
c. Milk is heated at 75°C
d. All of the above

Ans. (d) All of the above

264. The benefit of uperization of milk

a. Bad flavour is removed
b. The milk is completely sterilized
c. There is no effect on the quality of the milk
d. All of the above

Ans. (d) All of the above

265. Uperizatin of milk means that

a. Milk is serrated just to avoid loss of vitamins and vitamin C
b. Milk is heated at 148.8°C for one second
c. Milk is depressed to remove the bad flavour
d. All of the above

Ans. (d) All of the above

266. Stassanization refers to

a. Milk is cooled at 15°C temperature
b. Discovered by Dr. Stassano for milk pasteurization
c. Milk is heated at 74°C for 15–16 seconds
d. All of the above

Ans. (d) All of the above

267. Vacuum pasteurization refers to

a. It is a continuous process
b. Milk is heated at 72.8°C for few seconds
c. Milk is cooled at 43.5°C
d. All of the above

Ans. (d) All of the above

268. High temperature short time (HTST) method refers to

a. Heating milk at 71.7°C for 15 minutes
b. Continuous pasteurization
c. Flash method
d. All of these

Ans. (d) All of these

269. The benefits of bottle pasteurization

a. Free from Bacillus coli
b. High keeping quality
c. Free from pathogenic bacteria
d. All of the above

Ans. (a) Free from Bacillus coli

270. Antibodies fight against

a. Ageing
b. Infections
c. Starvation
d. All of these

Ans. (b) Infections

271. Batch pasteurization method refers to

a. Milk is filled in the big containers
b. Milk is heated at 65.6°C for 30 minutes
c. Milk is heated with the help of either stream or hot water
d. All of the above

Ans. (d) All of the above

272. Bearing of bees is

a. Poultry
b. Apiculture
c. Apiary
d. Horticulture

Ans. (b) Apiculture

273. At which temperature the milk is heated for pasteurization at temperature long time (I. T. I. T.) method

a. 70°C for 30 minutes
b. 62.8°C for 15 minutes
c. 62.8°C for 30 minutes
d. 60°C for 15 minutes

Ans. (c) 62.8°C for 30 minutes

274. The work, which is performed by lymph nodes

a. Destruction of the bacteria
b. Preparation of the blood
c. Elimination of CO_2
d. All of the above

Ans. (a) Destruction of the bacteria

275. Milking pot may be sterilized by

a. Keep the pot in clorine water for 15 minutes
b. Keep the pot in water at 82°C for 15 minutes
c. Keep the pot in water at 101.6°C for 15 minutes
d. None of the above

Ans. (b) Keep the pot in water at 82°C for 15 minutes

276. Milking pot cleaned with

a. Hot water
b. Soda water
c. Clorine water
d. All of these

Ans. (d) All of these

277. The lymphocytes protect from

a. Bacterial pathogens
b. Cancer
c. Viral pathogens
d. All of these

Ans. (d) All of these

278. Germicidal property of milk is due to the presence of

a. Fatty acids
b. Amino acids
c. Lactenin
d. All of these

Ans. (c) Lactenin

279. The bacteria, which acts first on the milk

a. *Streptococcus lactis*
b. *Bacillus subtilis*
c. Lactobacilus
d. None of these

Ans. (a) *Streptococcus lactis*

280. Roquefort and Gorgeonzola paneer are made with the help of

a. Yeast
b. Fungi
c. Bacteria
d. All of these

Ans. (b) Fungi

281. Which of the following fungus involved in the milk industry?

a. *Penicillium glauucum* b. *Penicillium rogueforti*
c. *Odium* spp. d. All of these

Ans. (d) All of these

282. Which of the following yeast is found in the milk?

a. *Torula spherical* b. *Torula lactis*
c. *Torula cremortis* d. All of these

Ans. (d) All of these

283. Yellow colour of the milk is developed due to

a. *Streptococcus marcescens*
b. *Pseudomonas syncyanea*
c. *Streptococcus lutea*
d. All of these

Ans. (c) *Streptococcus lutea*

284. Red colour of milk is developed due to

a. *Streptococcus marcescens*
b. *Pseudomonas syncyanea*
c. *Streptococcus lutea*
d. All of these

Ans. (b) *Pseudomonas syncyanea*

285. Blue colour of milk is developed due to

a. *Streptococcus marcescens*
b. *Pseudomonas syncyanea*
c. *Streptococcus lutea*
d. All of these

Ans. (d) All of these

286. Frothiness in milk is caused due to

a. *Torula cremortis* b. *Torula spherical*
c. *Aerobacter oerogens* d. All of these

Ans. (d) All of these

287. Sliminess or ropy fermentation is caused by

a. *Alkaligenes viscoeus*
b. *Achronobacter aerogans*
c. *Bacterium cloceae*
d. All of these

Ans. (d) All of these

288. Rancid flavour in milk is caused due to

a. Fermentation of ash
b. Fermentation of fat
c. Fermentation of lactose
d. Fermentation of protein

Ans. (b) Fermentation of fat

289. Normal fermentation of milk is caused by

a. *Streptococcus liqefaciens*
b. *Streptococcus lactis*
c. *Bacillus subtilis*
d. All of these

Ans. (b) *Streptococcus lactis*

290. Sweet curdling is caused mainly due to

a. Fermentation of fat
b. Fermentation of ash
c. Fermentation of casein
d. Fermentation of protein

Ans. (c) Fermentation of casein

291. Oiliness of milk is caused mainly due to

a. Fermentation of lactose
b. Oxidation of fat
c. Reduction of fat
d. Fermentation of fat

Ans. (b) Oxidation of fat

292. The oiliness or cardboard flavour of sourness in milk is caused by

a. *Pseudomonas flourescens*
b. *Streptococcus liquefaciens*
c. *Micrococcus pitiutoporus*
d. All of the above

Ans. (d) All of the above

293. Sweet curdling of the milk is caused by

a. *Bacillus mycoides* b. *B. cereus*
c. *Streptococcus subtilis* d. All of these

Ans. (d) All of these

294. Lactobacillus, thermophilus and Bacillus calidolactis are the names of

a. Thermophilic bacteria
b. Thermoduric bacteria
c. Mesophilic bacteria
d. Psychrophilic bacteria

Ans. (a) Thermophilic bacteria

295. Which of the following are the thermophilic bacteria?

a. *Streptococcus thermophilus*
b. *Micrococcus luteus*
c. *Micrococcus thermophilus*
d. All of the above

Ans. (d) All of the above

296. *S. lactis* and *S. cremoris* belong to which of the following group?

a. Thermoduric bacteria
b. Termophilic bacteria
c. Mesophilic bacteria
d. Psychrophilic bacteria

Ans. (c) Mesophilic bacteria

297. Sliminess is caused due to

a. Fermentation of protein
b. Fermentation of milk cream
c. Fermentation of lactose
d. None of the above

Ans. (b) Fermentation of milk cream

298. Pseudomonas fungi and pseudomonas fluorescens belong to the category

a. Mesophilic bacteria
b. Thermophilic bacteria
c. Psychrophilic bacteria
d. All of the above

Ans. (c) Psychrophilic bacteria

299. The temperature range for the survival of thermophilic bacteria

a. 50–70°C
b. 75–80°C
c. 03–20°C
d. 20–50°C

Ans. (a) 50–70°C

300. The temperature range for the survival of mesophilic bacteria

a. 50–70°C
b. 75–80°C
c. 03–20°C
d. 20–50°C

Ans. (d) 20–50°C

301. The temperature range for the survival of psychrophilic bacteria

a. 50–70°C
b. 20–50°C
c. 03–20°C
d. None of these

Ans. (c) 03–20°C

302. The energy which is available from 1 gm milk

a. 12 Calorie
b. 10 Calorie
c. 9 Calorie
d. 8 Calorie

Ans. (c) 9 Calorie

303. During heat period, the milk will

a. Decrease
b. Increase
c. Remain same
d. Not known

Ans. (a) Decrease

304. Lymphoid stem cells give rise to

a. Pre-B and Pre T-cells
b. Lymphocyte progenitor cells
c. Pro-B and Pro T-cells
d. All of the above

Ans. (d) All of the above

305. Which of the following milk has higher per cent of fat?

a. Middle milk
b. Striped milk
c. Fore milk
d. All of these

Ans. (b) Striped milk

306. The fat per cent in evening milk is found higher because of

a. Cow eats more food in the day and gives higher fat per cent in evening
b. Cow produces more concentrated milk in evening than morning
c. Less interval in the milking
d. None of the above

Ans. (c) Less interval in the milking

307. If the interval of milking increases the fat per cent in milk will

a. Decrease
b. Increase
c. Remain same
d. Not known

Ans. (a) Decrease

308. What will be the impact of high temperature on the milk's fat?

a. Decrease
b. Increase
c. Remain same
d. Not known

Ans. (b) Increase

309. Which of the following increase with advancement of lactation period?

a. Fat
b. Ca and P
c. CI_2
d. All of these

Ans. (d) All of these

310. What will the effect of mixing of SNF in milk?

a. Relative density will not change
b. Relative density will increase
c. Relative density will decrease
d. All of the above

Ans. (b) Relative density will increase

311. Lactometer is used to measure the

a. Relative density of the protein
b. Relative density of the fat

c. Relative density of the water
d. Relative density of the milk

Ans. (c) Relative density of the water

312. Which of the following is considered TB free milk?

a. Camel milk
b. Sheep milk
c. Cow milk
d. Goat milk

Ans. (b) Sheep milk

313. In comparison to cow and goat milk has fat globules of

a. Smaller size
b. Longer size
c. Same size
d. None of these

Ans. (a) Smaller size

314. Which of the following cheese has the highest protein per cent?

a. Swiss
b. Limberger
c. Cheddar
d. Camembert

Ans. (a) Swiss

315. If the humidity is >70%, the cheese may get

a. Wet
b. Pungus growth
c. Dry
d. All of these

Ans. (b) Pungus growth

316. If the humidity is <70%, the cheese may get

a. Wet
b. Pungus growth
c. Dry
d. All of these

Ans. (c) Dry

317. Pasty in cheese is caused by

a. High salt per cent
b. High moisture and acidity
c. Low moisture and acidity
d. All of the above

Ans. (b) High moisture and acidity

318. Which is not correct about T-cells?

a. T-cells are primarily of two types, viz. T-helper cells and T-cytotoxic cells
b. During T-cells maturation, re-arrangement of the genes encoding T-cell receptor (TCR) takes place
c. T-lymphocytes originate from myeloid stem cells
d. Lymphoid stem cells that migrate into thymus ultimately mature into T-cells

Ans. (d) Lymphoid stem cells that migrate into thymus ultimately mature into T-cells

319. Which of the following amylase is present in the milk?

a. β amylase
b. γ amylase
c. α amylase
d. All of these

Ans. (c) α amylase

320. Lactose in milk is a

a. Protein
b. Carbohydrate
c. Fat
d. All of these

Ans. (b) Carbohydrate

321. Lacto globule is known mainly for

a. It increases the body weight
b. It saves people from heat strokes
c. It provides immunity to newly born babies
d. All of the above

Ans. (c) It provides immunity to newly born babies

322. Which of the following casein is highest available in milk?

a. Y casein
b. A casein
c. B casein
d. All of these

Ans. (b) a casein

323. Embryo transfer technology suffers from

a. The cost of producing each progeny is several fold higher than that from natural events
b. The donor females are removed from production for the period they are used as donor of young embryo
c. A high degree of expertise is required for an efficient and successful operation
d. All of the above

Ans. (d) All of the above

324. Which of the following cow has the highest fat per cent in the milk?

a. Shahiwal
b. Tharparkar
c. Sindhi
d. Haryana

Ans. (c) Sindhi

325. Which of the following protein is available in curd?

a. Casein
b. Glycerol
c. Lactose
d. All of these

Ans. (a) Casein

326. Which one is commonly used in animal cell culture media?

a. Horse serum
b. Foetal calf serum
c. Cattle serum
d. Placental cord blood

Ans. (b) Foetal calf serum

327. Paraffining of the cheese means

a. To cover the cheese with thin layer of wax
b. To cover cheese with thin layer of the colour
c. To cover cheese with thin layer of salt
d. All of the above

Ans. (c) To cover cheese with thin layer of salt

328. Evaporated milk means that

a. Milk is condensed at 40°C
b. Sugar free milk is condensed in vaccum
c. Sweet milk is condensed in open pan
d. None of the above

Ans. (b) Sugar free milk is condensed in vaccum

329. The main reason of milk fat rancidity is

a. Conversion of fat into hydroperoxide
b. Conversion of fat into methyl ketones
c. Conversion of fat into butyric acid
d. All of the above

Ans. (d) All of the above

330. The colour of the milk is

a. White b. Grey
c. Colourless d. None of these

Ans. (c) Colourless

331. Serum can be obtained from

a. Adult human blood
b. Placental cord blood
c. Horse blood
d. All of these

Ans. (a) Adult human blood

332. Foamy of ice cream is caused by

a. Hydrolysis of fat b. High over run
c. High acidity d. None of these

Ans. (b) High over run

333. Rancidity of ice cream is caused by

a. Hydrolysis of fat
b. High over run
c. High acidity
d. None of these

Ans. (a) Hydrolysis of fat

334. Which of the following has higher protein per cent?

a. Cream b. Butter
c. Ice cream d. Milk

Ans. (b) Butter

335. Which of the following is considered the most important parameter for judging the quality of Khoa

a. Packing b. Colour
c. Flavour d. Body and texture

Ans. (c) Colour

336. Cheddar paneer is prepared by which milk

a. Cow milk b. Buffalo milk
c. Both a and b d. None of these

Ans. (c) Both a and b

337. The example of natural medium

a. Plasma clot b. Biological fluids
c. Tissue extract d. All of these

Ans. (d) All of these

338. Type of the paneer is most popular in the World

a. Cheddar b. Limberger
c. Swiss d. Roquefort

Ans. (a) Cheddar

339. Paneer is the mainly source of

a. Milk lactose b. Milk fat
c. Milk protein d. All of these

Ans. (c) Milk protein

340. Which of the paneer is with gas boles?

a. Cheddar b. Limberger
c. Swiss d. Roquefort

Ans. (c) Swiss

341. Which of the paneer is without gas boles?

a. Cheddar b. Limberger
c. Swiss d. All of these

Ans. (a) Cheddar

342. Which of the following is a soft paneer?

a. Cheddar
b. Limberger
c. Swiss
d. All of these

Ans. (d) All of these

343. Unripened paneer is known as

a. Cheddar
b. Cattahe
c. Swiss
d. All of these

Ans. (b) Cattahe

344. Which of the following goat breeds are available for meat purpose?

a. Bengal goat
b. Barbari
c. Marwari
d. All of these

Ans. (d) All of these

345. Pashmina is a

a. It produces fine and silky hairs
b. It is a goat breed
c. It is found in Ladakh, Lahaul and Spiti Valleys
d. All of the above

Ans. (d) All of the above

346. The most beautiful goat breed is

a. Surti
b. Beetal
c. Jamanapari
d. Barbari

Ans. (c) Jamanapari

347. Which of the following is the highest producer of milk?

a. Toggenburg
b. Saanen
c. Anglo–nubian
d. Alpine

Ans. (a) Toggenburg

348. Lymph nodes are located abundantly in

a. Armpit
b. Neck
c. Groin
d. All of these

Ans. (d) All of these

349. Goat milk is easily digested because of

a. Fat and protein per cent are equal to human milk
b. Small size of fat globules and soft curd
c. Percentage of fat is low
d. All of the above

Ans. (d) All of the above

350. The minimum standards of milk and milk products quality is maintained by the rules/Acts of

a. Indian dairy corporation
b. Prevention of Food Adulteration Rules, 1965 and amended in 1976
c. Food Adulteration Act 1976
d. None of the above

Ans. (b) Prevention of Food Adulteration Rules, 1965 and amended in 1976

351. Which is correct for Angora breed of goat?

a. It originated in Asia–Minor and Turkey
b. It is a goat breed and its hair is known as Mohair
c. It is found in Himalayan region
d. All of the above

Ans. (d) All of the above

352. Billy refers to

a. It survive on sea water
b. It is a goat breed
c. It is found in Barren Island in Andaman's
d. All of the above

Ans. (d) All of the above

353. Barbari goat is more useful because of

a. Higher butter fat (5%)
b. Goat milk and meat producer
c. More prolific as it may kid twice with two kids
d. All of the above

Ans. (d) All of the above

354. Which of the following breed is found in Himalayan region of India?

a. Kashmiri
b. Guddi and Chamba
c. Angora
d. All of these

Ans. (d) All of these

355. The events occurs during inflammatory response

a. An increase in capillary permeability
b. Influx of phagocytes from the capillaries into the tissues
c. An increase in blood vessel diameter
d. All of the above

Ans. (d) All of the above

356. The techniques, which is used for the separation of X- and Y-chromosomes bearing sperms

a. Sephadex gel column
b. Zoobloting
c. Gel electrophoresis
d. Both a and c

Ans. (a) Sephadex gel column

357. Cashgora refers to

a. It is a cross between Changthangi x Angora
b. Goat breed
c. Both a and b
d. None of these

Ans. (c) Both a and b

358. Feeder lambs refer to

a. Castrated lambs
b. Under 1 year age used for slaughter
c. Under 2 years age used for slaughter
d. Lambs are fed properly and make ready for mating

Ans. (b) Under 1 year age used for slaughter

359. The condition, broken mouth in case of sheep, refers to

a. All teeth become red and brown
b. Few teeth broken
c. All teeth disappeared
d. All of the above

Ans. (c) All teeth disappeared

360. Gummar refers to

a. Sheep with only 2 teeth
b. Sheep having no teeth in her mouth
c. Sheep that has broken her teeth
d. None of the above

Ans. (b) Sheep having no teeth in her mouth

361. Which of the following is hardiest breed of poultry?

a. New Hempshire
b. Australorp
c. Rhode Island Red
d. White Leghorn

Ans. (d) White Leghorn

362. Butter refers to

a. It should not have >16% water
b. It is manufactured from either cream or milk
c. It should have <50% fat and >2% other
d. All of the above

Ans. (d) All of the above

363. Which country used centrifugal force first time to separate the cream from milk?

a. Pakistan b. Germany
c. Sweden d. Denmark

Ans. (b) Germany

364. The surface available for the attachment of cultured cells is called

a. Substrate
b. Platform
c. Surface attachment
d. Both a and c

Ans. (a) Substrate

365. Separator slime is a

a. It is an mixture of impurities of milk
b. Concentrated and sticky product of the milk that is found in the inner walls of bowl hood
c. The colour is grey white to ash
d. All of the above

Ans. (d) All of the above

366. What is used for cream standardization?

a. Whey b. Separate
c. Water d. Milk

Ans. (c) Water

367. What are benefits of homogenization of the milk?

a. Better colour and flavour
b. No creamy layer at the milk surface
c. No or little effect on the flavour
d. All of the above

Ans. (d) All of the above

368. The benefits of pasteurization of the milk

a. No or little effect on the flavour of milk
b. No effect on Ca, P and vit. A, D and B complex
c. No effect on cream layer
d. All of the above

Ans. (d) All of the above

369. Milk pasteurization is refers to

a. It does not affect the quality of the milk and cream layer
b. To kill the bacteria before its use
c. To heat milk at 60°C for 20 minutes
d. All of the above

Ans. (d) All of the above

370. Who reported first time the germicidal property in goat milk?

a. Michael b. Me Millon
c. Fokker d. R. Hook

Ans. (c) Fokker

371. The protein, which is not found in the milk

a. Albumin b. Globulin
c. Casein d. All of these

Ans. (a) Albumin

372. Which one is the mostly used as culture medium?

a. Plasma
b. Chick embryo extract
c. Liver extract
d. Bone marrow

Ans. (b) Chick embryo extract

373. The milk pH of mastitis infected animal will be

a. Decreased b. Increased
c. Remain same d. Unknown

Ans. (b) Increased

374. The fat percent of mastitis infected animal will be

a. More b. Less
c. Same d. None for those

Ans. (a) More

375. Which of the following milk has higher amount of lower fatty acid (i.e. Caprie, Caprylic and Caproic acids)?

a. Camel milk b. Buffalo milk
c. Goat milk d. Cow milk

Ans. (c) Goat milk

376. The techniques of cyclic exposure to medium and gas phase is successful in long-term cultures of which human adult tissues?

a. Oesophagus
b. Uterine endocervix
c. Mammary epithelium
d. All of these

Ans. (d) All of these

377. Tollowy flovour in ghee is caused by

a. Protolysis b. Hydrolysis
c. Oxidation d. Reduction

Ans. (c) Oxidation

378. Grey level ghee is known as

a. Special ghee b. Normal ghee
c. Buffalo ghee d. Cow ghee

Ans. (b) Normal ghee

379. Red level ghee is known as

a. Special ghee b. Normal ghee
c. Buffalo ghee d. Cow ghee

Ans. (a) Special ghee

380. Blue level ghee is known as

a. Special ghee b. Normal ghee
c. Buffalo ghee d. Cow ghee

Ans. (c) Buffalo ghee

381. Yellow level ghee is known as

a. Special ghee b. Normal ghee
c. Buffalo ghee d. Cow ghee

Ans. (d) Cow ghee

382. Curdy of ice cream is due to

a. Hydrolysis of fat b. High over run
c. High acidity d. None of these

Ans. (c) High acidity

383. Which is not correct about T-cells?

a. TCR gene re-arrangements follows the same general scheme ads that for antibody genes
b. Each T-cell expresses TCR of single antigenic specificity
c. Each TCR molecule is a heteromer consisting of as α and β chain or a δ and γ chain
d. During the T-cell maturation re-arrangement of genes encoding T-cell receptor (TCR) takes place

Ans. (a) TCR gene re-arrangements follows the same general scheme ads that for antibody genes

384. Capon refers to

a. Chicks without male organs
b. Female chicks produced after implanting of synthetic females hormones in young cookeries
c. Both a and b
d. None of these

Ans. (a) Chicks without male organs

385. Caponette refers to

a. Chicks without male organs
b. Female chicks produced after implanting of synthetic females hormones in young cookeries
c. Both a and b
d. None of these

Ans. (b) Female chicks produced after implanting of synthetic females hormones in young cookeries

386. Brooder house refers to

a. House of cocks
b. House of chicks
c. House of pullets
d. House of layers

Ans. (b) House of chicks

387. Cannibalism in hens refers to

a. Laying of eggs
b. Breaking of eggs by other hens
c. Picking of each other by hens
d. None of the above

Ans. (c) Picking of each other by hens

388. Ringing pigs refer to

a. To brand the bogs with round hot iron ring
b. To put ring or iron ring in the nose of pig
c. To make a ring by removing hair from the neck
d. All of the above

Ans. (b) To put ring or iron ring in the nose of pig

389. The techniques was used for the development of Dolly

a. Cell culture
b. Cell fusion
c. Nucleus removal
d. All of these

Ans. (d) All of these

390. The method, which is used commonly used in pigs identification

a. Neck rings
b. Iron branding
c. Ear notching
d. All of these

Ans. (c) Ear notching

391. Mules are

a. Infertile
b. Fertile
c. Both a and b
d. None of these

Ans. (a) Infertile

392. Mule is a cross of

a. Zebra × horse
b. Male horse × female donkey
c. Male donkey × mare
d. She ass × stallion pony

Ans. (c) Male donkey × mare

393. Foal–heat refers to

a. First heat of a mare
b. Mares come into heat just after 4–11 days of foaling
c. Matting of mares with stallion
d. None of the above

Ans. (b) Mares come into heat just after 4–11 days of foaling

394. The bacteria, which is responsible for the good flavour in Dahi

a. Lactonostoc eitrocorum
b. Streptococcus diacetyl aromatieus
c. Streptoccous lactis
d. All of the above

Ans. (d) All of the above

395. Dahi refers to

a. Starter is mixed at 21°C milk temperature
b. Fermented milk products
c. Lactose is converted into lactic acid
d. All of the above

Ans. (d) All of the above

396. Rancidity of the butter is caused by

a. Storage at low temperature
b. Hydrolysis of fat in cream by lipase enzymes
c. High acidity of the cream
d. All of the above

Ans. (d) All of the above

397. Mottled butter is caused by

a. Improper working of the butter
b. Improper washing of the butter
c. Improper mixing of salt
d. All of the above

Ans. (d) All of the above

398. Fishy flavour in butter is developed due to

a. Oxidation of Fe and Cu
b. Hydrolysis of lecithin
c. Oxidation of butter due to high acidity
d. All of the above

Ans. (d) All of the above

399. How are fat per cent and cream acidity related for cream churning?

a. Negative
b. Inverse
c. Linear
d. Positive

Ans. (b) Inverse

400. Among the given biological fluids used as culture medium, which one is the most commonly used in animal cell culture?

a. Aqueous humour from eye
b. Insect haemolymph
c. Serum
d. Amniotic fluid

Ans. (c) Serum

401. Why does goat rearing is beneficial profession?

a. Production of meat, milk, skins and fibre
b. Quick onset of reproduction and high fecundity
c. High survival of rate under adverse conditions
d. All of the above

Ans. (d) All of the above

402. Nitric acid is used for the detection of

a. Adulteration of cotton oil in ghee
b. Adulteration of wax, vegetable ghee and animal fat ghee
c. Adulteration of vegetable oil in ghee
d. All of the above

Ans. (d) All of the above

403. Shrinkage of sheep wool refers to

a. Loss of wool weight
b. Weight of grease dirt, etc. expressed as a percentage of the grease fleece weight

c. Shrinking of hairs
d. None of the above

Ans. (b) Weight of grease dirt, etc. expressed as a percentage of the grease fleece weight

404. Klemp is a

a. Course hair
b. Very fine hair
c. Fine hair
d. All of these

Ans. (a) Course hair

405. Kappa light chain gene has

a. A signal C (constant) segment
b. 300 different V (variable) segments
c. Five different J (joining) segments
d. All of the above

Ans. (d) All of the above

406. Scouring of wool refers to

a. Removal thick and short hairs from fine wool
b. Removal of grease dirt and vegetable matters from wool
c. Removal of clotted fleece from the wool
d. All of the above

Ans. (b) Removal of grease dirt and vegetable matters from wool

407. The sheep wool is divided on the basis of length into

a. Course and rough wool
b. Klemp and fine wood
c. Carpel and apparel wood
d. All of the above

Ans. (c) Carpel and apparel wood

408. Which of the following is a recognized quality of sheep wool for the export?

a. Harnal
b. Rajpootana
c. Jeria
d. All of these

Ans. (d) All of these

409. Conventional linkage maps suffer from

a. Genes governing quantitative traits cannot be mapped
b. The number of genes producing distinct morphological effects is rather limited
c. Their mapping is tedious and time–taking
d. All of the above

Ans. (d) All of the above

410. Ringing refers to

a. Putting belt around the necks of sheep
b. Removal the wool from the neck and around the penis of rams before breeding season
c. Making the colour rings in necks for identification
d. All of the above

Ans. (b) Removal the wool from the neck and around the penis of rams before breeding season

411. Shearing in sheep refers to

a. Eye separation in case of eye problems
b. Treating of eyes
c. Clipping of wool from whole body of rams and ewes before breeding season
d. None of the above

Ans. (c) Clipping of wool from whole body of rams and ewes before breeding season

412. Eyeing in sheep refers to

a. Eye separation in the case of eye problem
b. Clipping of wool from around the eyes
c. Treating of eye
d. All of these

Ans. (b) Clipping of wool from around the eyes

413. Tagging in sheep refers to

a. Putting tags on necks for their identification
b. Making colour marks for their identification
c. Removal of wool from around the dock before breeding season starts
d. All of the above

Ans. (c) Removal of wool from around the dock before breeding season starts

414. Which of the following method is used for marketing of flock/ewes/rams?

a. Metal tags
b. Ear notches
c. Paint brands
d. All of these

Ans. (d) All of these

415. Docking can be performed with the help of

a. Rubber band
b. Knife and emasculator
c. Hot iron
d. All of these

Ans. (d) All of these

416. Docking refers to

a. Removal of fleece
b. Removal of wool
c. Removal of tails
d. Removal of testicles

Ans. (c) Removal of tails

417. Grafting in the case of sheep is refers to

a. To remove tails
b. To remove fleece
c. To put dead skin of a lamb over the another lamb
d. None of the above

Ans. (c) To put dead skin of a lamb over the another lamb

418. Flushing is useful for

a. Possibility of more twins
b. It brings ewes into heat early
c. Higher conception rate
d. All of the above

Ans. (d) All of the above

419. Flushing refers to

a. Good feeding to sheep before shearing
b. Good feeding to sheep before mating
c. Good feeding to sheep before marketing
d. All of the above

Ans. (b) Good feeding to sheep before mating

420. Feeder sheep refers to

a. >2 years old fattened sheep
b. <1 year old fattened sheep
c. Over 1 year old fattened sheep for marketing purposes
d. All of the above

Ans. (c) Over 1 year old fattened sheep for marketing purposes

421. Shearer lamb refers to

a. Castrated male sheep
b. One year full growth of wool
c. Fattened male ready for slaughter
d. Mating male sheep

Ans. (b) One year full growth of wool

422. Weathers refer to

a. Male lambs ready for slaughter
b. Mating male sheep
c. Male lambs castrated at an early age before
d. Lambs bearing a full year's growth of the wool

Ans. (c) Male lambs castrated at an early age before

423. Which of the following pair is matched correctly?

a. Karakul—USA
b. Cheviot—Scotland
c. Leicester—England
d. All of the above

Ans. (d) All of the above

424. Which of the following pair is matched correctly?

a. Corriedale—New Zealand
b. Merino—Spain
c. Rambouillet—France
d. All of the above

Ans. (d) All of the above

425. The sheep of Southern region are suited mainly for

a. Meat
b. Fine wool and meat
c. Fine wool
d. Carpet wool

Ans. (a) Meat

426. Persian lamb fur is collected from

a. > 3 weeks old lambs
b. < 10 days old lambs
c. Newly born lambs
d. > 2 weeks old lambs

Ans. (b) < 10 days old lambs

427. Which of the following fur wool is most valuable?

a. Broadtail
b. Karakul
c. Persian Lamb
d. All of these

Ans. (c) Persian Lamb

428. The main component of ghee adulteration

a. Edible oil
b. Vegetable fat
c. Pig fat
d. None of these

Ans. (b) Vegetable fat

429. Dahi like product refers to

a. Dahi is made of *streptococcus lactis*
b. Dahi is made up of artificial milk
c. Dahi is made of *lactobacillus acidophilus*
d. All of the above

Ans. (c) Dahi is made of lactobacillus acidophilus

430. Dahi has more nutritive value than milk because of

a. Dahi casein is more digestible than milk casein
b. Dahi has more Ca and P
c. Dahi has bacteria that help to prepare vit. B and C
d. All of the above

Ans. (d) All of the above

431. What are the following bacteria present in starter?

a. *L. bulgaricus*
b. *Lactobacillus acidophilus*
c. *Streptococcus lactis*
d. All of these

Ans. (d) All of these

432. Male goats should be castrated at a age of

a. 10 days to 3 weeks of the age
b. Just after the birth
c. 5 days after birth
d. All of these

Ans. (a) 10 days to 3 weeks of the age

433. Castrated male goat is called

a. Chhanga
b. Wether
c. Buck
d. Ram

Ans. (b) Wether

434. Which of the following method recommended for castration the males calves?

a. Removal of whole male organs
b. Removal of testicles by making incision
c. Crush and destroy spermatic cord and blood vessels with the help of Burdizzo castrator
d. All of the above

Ans. (c) Crush and destroy spermatic cord and blood vessels with the help of Burdizzo castrator

435. A hybrid cell obtained by cell fusion has

a. Cytoplasm derived for two fusion partners
b. Two genetically different nuclei
c. A single nucleus obtained by fusion of two genetically different nuclei
d. Both a and c

Ans. (d) Both a and c

436. Best season for castration is

a. Winter season
b. Rainy season
c. Spring season
d. All of these

Ans. (a) Winter season

437. Age of male calves for castration is

a. 20 months
b. 15 months
c. 12 months
d. 6 months

Ans. (c) 12 months

438. Castration is stands for

a. Complete milking of cow
b. Feed properly to cattle
c. Removal of male parts from male calves
d. None of the above

Ans. (c) Removal of male parts from male calves

439. The age of cattle can be determined with the help of

a. Pregnancy
b. Tail
c. Health
d. Teeth

Ans. (d) Teeth

440. The old cattle may be dehorned with the help of

a. Clippers and Saws
b. Electric Dehorner
c. Chemicals
d. All of these

Ans. (a) Clippers and Saws

441. Select the wrong statement

a. Antibodies belong to the special category of protein called immunoglobulin
b. Monoclonal antibodies are produced from hybrid cells obtained by fusing a memory B cell with a myeloma cell
c. In general antigens are immunogenic
d. Protein produced by genes transferred by genetic engineering into selected hosts are called recombinant protein

Ans. (b) Monoclonal antibodies are produced from hybrid cells obtained by fusing a memory B cell with a myeloma cell

442. Which chemical is used for dehorning of calves?

a. Benzene
b. Caustic potash
c. Potassium chloride
d. All of these

Ans. (b) Caustic potash

443. Which of the following method is used for dehorning?

a. Clippers and saws
b. Chemical
c. Hot iron
d. All of these

Ans. (d) All of these

444. Cell fusion leads to the production of

a. Hybrid cells
b. Homokaryons
c. Heterokaryons
d. All of these

Ans. (d) All of these

445. A house of 6 m × 12 m may accommodate

a. 260 hens of light breeds or 300 hens of heavy breeds
b. 300 hens of light breeds or 260 of heavy breeds
c. 200 hens of light breed
d. 200 hens of heavy breeds

Ans. (b) 300 hens of light breeds or 260 of heavy breeds

446. Memory cells lack in

a. IgA
b. IgM
c. IgG
d. IgD

Ans. (d) IgD

447. The housing place of a horse is known as

a. Brood
b. Ward
c. Stable
d. None of these

Ans. (c) Stable

448. Which of the following is the common type of goat keeping system

a. Intensive
b. Subsistence
c. Extensive
d. All of these

Ans. (d) All of these

449. Which is a product of insect body?

a. Royal polly, wax and lac
b. Honey, wax and silk
c. Silk, lac and wax
d. All of the above

Ans. (c) Silk, lac and wax

450. Kerosol is used for

a. To kill internal parasite of goats
b. To kill the eternal parasite of goats
c. To disinfect the goat floor by killing most the bacteria and it spores
d. None of these

Ans. (c) To disinfect the goat floor by killing most the bacteria and it spores

451. Animal cell cultures may be recommended by

a. Bacteria
b. Viruses
c. Other cell lines
d. All of these

Ans. (d) All of these

452. 10% solution of ammonia is mainly used for

a. To kill the protozoa
b. To kill all the types of bacteria and viruses
c. To kill the coccidice spores on goat flors
d. None of these

Ans. (d) None of these

453. Which of the housing system is considered best for goats?

a. Stanchion system
b. Closed housing system
c. Loose housing system
d. All of these

Ans. (c) Loose housing system

454. The goats are reared under the housing system of

a. Stanchion system
b. Closed housing system
c. Loose housing system
d. All of the above

Ans. (d) All of the above

455. Chhena refers to

a. The solid particles are separated from paneer water
b. It is a milk product
c. It is prepared after curding of the milk
d. All of the above

Ans. (d) All of the above

456. Ice cream may be pasteurized at

a. 68°C for 30 minutes
b. 71°C for 30 minutes
c. 60°C for 30 minutes
d. All of the above

Ans. (d) All of the above

457. Which is not correct about artificial skin?

a. Skin cells newborns grow as fast as those from adult skin
b. Artificial skin from newborn skin explants is used to cover the wound till artificial skin is obtained from patient's own skin
c. The skin explants used for obtaining artificial skin may be either obtained from the patient concerned or from the foreskin of newborn
d. Use of PGA (a synthetic polymer) allows the newborn skin to grow without scars

Ans. (a) Skin cells newborns grow as fast as those from adult skin

458. Which is not correct about suspension cultures?

a. Cell harvested from late log phase cultures are inoculated into fresh liquid medium maintained at 20°C
b. The initial cell density is usually between 5×10 to 2×10^6 cells/ml
c. Cells of the certain types are grown in liquid media as suspension cultures
d. The cultures are stirred at 200–300 rpm

Ans. (a) Cell harvested from late log phase cultures are inoculated into fresh liquid medium maintained at 20°C

459. Which of the following affects the quality of Dahi?

a. Body and texture
b. Acidity
c. Flavour
d. All of these

Ans. (d) All of these

460. Cheesy butter is caused due to

a. Pasteurization at high temperature
b. Breaking of casein by proteolytic bacteria
c. Low salt in butter
d. All of the above

Ans. (b) Breaking of casein by proteolytic bacteria

461. Keeping quality of dahi in comparison of milk is

a. Unknown
b. Same
c. Less
d. More

Ans. (a) Unknown

462. Generally cell proliferation is promoted by

a. Low cell density
b. Low Ca^{++} Ions
c. High growth factor levels
d. All of the above

Ans. (d) All of the above

463. What will happen if cream of more acidity is churned for butter?

a. Reduced keeping quality of the butter
b. To reduce the fat recovery
c. Bad odour developed
d. All of the above

Ans. (d) All of the above

464. Disadvantages of Deshi method of butter preparation

a. More water in butter
b. Butter may have coked flavour
c. Less vitamin B_2 and C due to more heating of milk
d. All of the above

Ans. (d) All of the above

465. Which of the following essential amino acid is not found in optimum dose in normal milk?

a. Thymine
b. Riboflavin
c. Nicotinic acid
d. None of these

Ans. (b) Riboflavin

466. Which of the following two elements are not found in proper amount in normal milk?

a. K and Ca
b. Fe and Cu
c. Ca and Mg
d. All of these

Ans. (b) Fe and Cu

467. The reason for the production of antibodies of a single specificity by a hybridoma clone

a. Production of the antibodies by the other fusion partner of the hybridoma clone
b. Fusion with a single B cell
c. Production of antibodies of a single specificity by a single B cell
d. All of the above

Ans. (d) All of the above

468. Cholesterol is a

a. Phytosterole
b. Phosphonized fat
c. Milk fat sterols
d. All of these

Ans. (c) Milk fat sterols

469. Pure ghee has a special odour due to the presence of the following

a. Diacetyle
b. Minerals
c. Lactose
d. Vit. B complex

Ans. (a) Diacetyle

470. The specification value of the milk

a. 266–270
b. 261–265
c. 250– 260
d. 210– 235

Ans. (d) 210– 235

471. Milk powder means

a. It is like a condensed milk
b. Evaporated milkin powder form with <3% moisture
c. Milk powder has 30% water
d. None of the above

Ans. (b) Evaporated milkin powder form with <3% moisture

472. In animal cell cultures, differentiation and cell proliferation (cell division) are affected by

a. Cell to cell interaction
b. Cell density and serum
c. Ca^{++} ions and hormones
d. All of the above

Ans. (d) All of the above

473. What will happen if cream of more acidity is churned for butter?

a. Reduced keeping quality of butter
b. To reduce fat recovery
c. Bad odour developed
d. All of the above

Ans. (d) All of the above

474. Evaporated milk means

a. Sweet milk is condensed in open pan
b. Sugar free milk is condensed in vacuum
c. Milk is condensed at 40°C
d. None of these

Ans. (b) Sugar free milk is condensed in vacuum

475. When should colour be added in milk in the process of cheddar preparation?

a. After rennet adding or before lactic acid adding
b. Before adding of lactic acid or rennet
c. After adding of lactic acid or before rennet adding
d. All of the above

Ans. (c) After adding of lactic acid or before rennet adding

476. Which of the following is main reason of paraffining of cheese?

a. The cheese is protected from fungal growth
b. The beles of cheese are closed
c. The cheese moisture is not changed
d. All of the above

Ans. (d) All of the above

477. Cell fusion is enhanced by

a. Ultraviolet inactivated Sendai virus
b. Polythylene glycol
c. Colchicine
d. Both a and b

Ans. (d) Both a and b

478. Which of the following is a breed of?

a. Breasted Bronze
b. Norfolks
c. Beltville white
d. All of these

Ans. (d) All of these

479. Which of the following poultry breed is suitable for drier areas?

a. White Cornish
b. White Rock
c. Australorp
d. White Leghorn

Ans. (a) White Cornish

480. Which of the following pig bread produces high quality pork?

a. Danish Landrace
b. Middle white × Yorkshire
c. Berkshire
d. All of these

Ans. (d) All of these

481. How many recognized breeds of goat are found in India?

a. 23
b. 21
c. 18
d. 15

Ans. (d) 15

482. Indian sheep produce mostly

a. Long wool
b. Carpet wool
c. Fur wool
d. Fine wool

Ans. (b) Carpet wool

483. Which of the following is an oldest cross bred wool breed of the sheep?

a. Hissardale
b. Bharat Merino
c. Corriedale
d. None of these

Ans. (c) Corriedale

484. Which of the following exotic cattle breed is known as dual purpose type?

a. Red Dane
b. Brown Swiss
c. Hlstein–Friossian
d. Jersey

Ans. (a) Red Dane

485. Which of the following breed considered best draft breed of buffalo?

a. Murrah
b. Nili
c. Nagpuri
d. Surti

Ans. (c) Nagpuri

486. Which of the following breed considered the most beautiful?

a. Ayreshire
b. Jersey
c. Tharparkar
d. Red Deoni

Ans. (a) Ayreshire

487. Which of the following cattle breed is the smallest one?

a. Brown Swiss
b. Jersey
c. Holstei–Friesians
d. Ayrshire

Ans. (b) Jersey

488. Santa Gertrudis is a cross of

a. Jersey × Local Breed
b. Kankry × Dargi
c. Bull of Indian breed × Shorthorn cow of USA
d. None of the above

Ans. (c) Bull of Indian breed × Shorthorn cow of USA

489. The true stomach in ruminants is known as

a. Omasum
b. Abomasum
c. Beticulum
d. Rumen

Ans. (b) Abomasum

490. Rabies is transmitted to camels by

a. Jackal
b. Wolves
c. Bits of Rabid dogs
d. All of these

Ans. (d) All of these

491. The important symptom of surra is

a. Emaciation
b. Anemia
c. High body temperature
d. All of these

Ans. (d) All of these

492. Surra disease is transmitted with the help of

a. Biting and blood sucking flies
b. Water
c. Mosquitoes
d. House fly

Ans. (a) Biting and blood sucking flies

493. Which of the following disease is not found in equines?

a. FMD
b. Colic
c. Tetanus
d. Epimatic lymphangitis

Ans. (a) FMD

494. Mycetic dermetitis is caused by

a. Liver flukes
b. Fungus
c. Bacteria
d. Roundworm

Ans. (b) Fungus

495. Florosis in goats is caused by

a. Excess P
b. Deficiency of P
c. Excess florine
d. None of these

Ans. (c) Excess florine

496. Which of the following parasite caused disease in goat herds?

a. Tapeworms
b. Protozoan
c. Flakes
d. All of these

Ans. (d) All of these

497. Ketosis is a serious disease of goat herd caused by

a. External parasites
b. Metabolic disorders of carbohydrates and fats
c. Bacteria
d. Z virus

Ans. (b) Metabolic disorders of carbohydrates and fats

498. Trichomoniasis is

a. Infectious bacterial disease of goats
b. Infectious viral disease of goats
c. Contagious protozoan veneral disease of both sexes
d. None of the above

Ans. (c) Contagious protozoan veneral disease of both sexes

499. Dystocia is a

a. Bacterial disease
b. Viral disease
c. Disease caused by internal parasites
d. Condition in which goat has difficulty in kidding due to malposition of kids

Ans. (d) Condition in which goat has difficulty in kidding due to malposition of kids

500. Which of the following goat's disease is caused by virus?

a. Rinderpest
b. Goat Pox
c. Pleuropneumonia
d. All of these

Ans. (d) All of these

501. Which of the following is a bacterial disease of goats?

a. Brucellosis
b. Vibriosis
c. Anthrax
d. All of these

Ans. (d) All of these

502. The continuous sniffing and nose run in sheep are caused by

a. Sheep bots
b. Lice
c. Liver fluke
d. Ticks

Ans. (a) Sheep bots

503. Sheep scab is caused by

a. Bacteria
b. Mites
c. Lice
d. Fungus

Ans. (b) Fungus

504. Shooting diarrhea with fetid smell and high temperature are the symptoms of appear in sheep due to the disease of

a. Anthrax
b. Sheep Pox
c. Rindrpest
d. Black Quarter

Ans. (c) Rindrpest

505. Bloody severe diarrhea is a main symptom of

a. Mastitis
b. Coccidiosis
c. Black Quarter
d. Rinderpest

Ans. (b) Coccidiosis

506. Which of the following is external parasite of the sheep?

a. Ticks
b. Blow fly
c. Lice
d. All of these

Ans. (d) All of these

507. Which of the following method is used for the making of flock/ewes/rams?

a. Metal tags
b. Ear notches
c. Paint brands
d. All of these

Ans. (d) All of these

508. Which of the following is known as Bang's disease?

a. Black quarter
b. Brucellosis
c. FMD
d. Rinderpest

Ans. (b) Brucellosts

509. Select the correct statement regarding ketosis

a. Affected animals are nervous and loss their appetite
b. It is a disease caused by shortage of sugar in the body
c. High producing cows are most affected
d. All of the above

Ans. (d) All of the above

510. What is the correct for mastitis?

a. Milk will be stringy and sometimes bloody
b. Caused by bacteria
c. It is disease of lactating dairy cattle
d. All of the above

Ans. (d) All of the above

511. Tympanitis is a

a. It is highly infectious disease of cattle
b. Disorder caused by overfeeding resulting more gas production known as a bloat
c. Disease of cattle caused by bacteria
d. Instrument used for castrating male animals

Ans. (b) Disorder caused by overfeeding resulting more gas production known as a bloat

512. Which of the following disease of the cattle is not caused by virus?

a. FMD
b. Black quarter
c. Cowpox
d. Rinderpest

Ans. (b) Black quarter

513. Which of the following is a internal parasite of cattle?

a. Ring worm
b. Screw worm
c. Ticks
d. Liver fluke

Ans. (d) Liver fluke

514. Milk fever disease is found in

a. Camel
b. Cows
c. High producing cows
d. Calves

Ans. (c) High producing cows

515. Milk fever is caused by

a. Bacteria
b. Virus
c. Ca deficiency in blood
d. P deficiency

Ans. (c) Ca deficiency in blood

516. Which of the following is a serious threat to young calves?

a. Calf scours
b. Warts
c. Milk fever
d. Pneumonia

Ans. (d) Pneumonia

517. High temperature and bloody discharge from natural opening are the major symptoms of

a. Anthrax
b. FMD
c. Black quarter
d. Mastitis

Ans. (a) Anthrax

518. Which of the following disease is not a infectious disease?

a. Haemorrhagic septicaemia
b. Mastitis
c. FMD
d. Black quarter

Ans. (b) Mastitis

519. Which of the following disease is a infectious disease of cattle?

a. FMD
b. Brucellosis
c. Rinderpest
d. All of these

Ans. (d) All of these

520. Which of the following is a external parasite of cattle?

a. Protozoa
b. Screw worm
c. Live fluke
d. All of these

Ans. (b) Screw worm

521. Which of the following is a calf feeding system?

a. Limited milk feeding plus a dry calf starter
b. Using milk replacers
c. Liberal milk feeding
d. None of the above

Ans. (d) None of the above

522. Which of the following method is considered best, feeding system of calves?

a. Limited milk feeding plus a dry calf starter
b. Using milk replacers

c. Liberal milk feeding
d. None of the above

Ans. (c) Liberal milk feeding

523. Nurse cow refers to

a. A diseased cow
b. A cow that feeds the calves of another cow
c. A feeding cow of her own calves
d. None of the above

Ans. (b) A cow that feeds the calves of another cow

524. Which of the following parameter is most important for judging quality of cheese?

a. Colour
b. Texture
c. Flavour
d. Body

Ans. (c) Flavour

525. Which is not correct about plastic substrates?

a. Thin Teflon films are available as Petri dishes or as membranes to be used as rafts, these films are permeable to O_2 and CO_2
b. The organic substrates must be suitably treated to make them wettable and positively charged
c. Polystyrene is the most commonly used but polyethylene, Perspex, PVS, polycarbonate, Teflon, cellophane and cellulose acetate are all suitable substrates
d. More plastic ware are nonautoclavable and are supplied sterile for a signal use

Ans. (b) The organic substrates must be suitably treated to make them wettable and positively charged

526. What is the colouring agent is mixed in milk for paneer preparation?

a. 1.0–1.2%
b. 0.5–0.7
c. 0.04–0.05%
d. 0.003–0.012%

Ans. (d) 0.003–0.012%

527. The quality parameters of judging chhena are given below in decreasing importance. Which of the following order is correct?

a. Flavour > Colour and Body > Texture > Modified product
b. Flavour > Texture > Colour and Body > Modified product
c. Texture > Flavour > Colour and Body > Modified product
d. All of the above

Ans. (b) Flavour > Texture > Colour and Body > Modified product

528. At what temperature, citric acid should be mixed in milk for curding

a. 82°C
b. 70°C
c. 60°C
d. 50°C

Ans. (a) 82°C

529. The main difference between cow and buffalo khoa?

a. Cow khoa contains higher Fe than buffalo khoa
b. Cow khoa contains higher per cent of the water
c. Buffalo khoa contains higher per cent of fat and ash
d. All of the above

Ans. (d) All of the above

530. 100 g ice cream is equal to

a. 350 calories
b. 206 calories
c. 218 calories
d. 306 calories

Ans. (b) 206 calories

531. What is the role of ice cream ageing?

a. It also improves flavour of the ice cream
b. It solidifies the ice cream
c. To increases whipping ability
d. All of the above

Ans. (d) All of the above

532. Sandiness of ice cream can be reduced by

a. Increasing percentage of lactose
b. Reducing percentage of fat
c. Increasing percentage of fat
d. None of the above

Ans. (c) Increasing percentage of fat

533. Sandiness of ice cream is due to

a. High percentage of fat
b. Lactose crystallization
c. Low percentage of lactose
d. None of these

Ans. (b) Lactose crystallization

534. Shearing in sheep is done during

a. After winter and rainy season
b. Summer season
c. Winter season
d. All of the above

Ans. (a) After winter and rainy season

535. Which of the chemical is used for blocking the heat cycle sows?

a. IC–35
b. IAA
c. ICI–33828
d. All of the above

Ans. (c) ICI–33828

536. Select the correct pair

a. Horse–Pooling
b. Pig–Farrowing
c. Cattle–Calving
d. All of these

Ans. (d) All of these

537. Which of the following goat breeds birth twice in a year?

a. Saanen
b. Beetal
c. Barbari
d. Jamanapari

Ans. (c) Barbari

538. An antibody molecule consists of

a. Two α and 25 chains
b. Two identical light chains
c. Two identical heavy chains
d. Both B and C

Ans. (d) Both B and C

539. Which of the following statement is correct?

a. If animal is fed on green fodder, there is no need to provide concentrate ration
b. If roughage contains no legumes, the protein in concentrate ration should be 17–20%
c. If cow is receiving all high quality legume hay or legume silage, concentrate ration should have 9–10% protein
d. All of the above

Ans. (d) All of the above

540. Under the feeding rule, the roughage should provide the total dry matter to dairy animal is

a. >2/3
b. ½
c. 1/3
d. 2/3

Ans. (a) >2/3

541. Which of the following marking method is used for marketing of buffalos?

a. Hot iron branding
b. Tattooing the inside of the root of the tail
c. Horn branding
d. All of these

Ans. (b) Tattooing the inside of the root of the tail

542. Adult cattle are generally marked successfully with

a. Hot iron branding on hind flanks
b. Ear notches
c. Neck chains
d. All of these

Ans. (a) Hot iron branding on hind flanks

543. Which of the following marketing method of calves is considered the best one?

a. Metal ear tags
b. Ear notches
c. Tattooing inside
d. All of these

Ans. (c) Tattooing inside

544. EDTA readily disaggregates in which of the tissues

a. Muscles
b. Skin
c. Epithelium
d. Fibraous tissues

Ans. (c) Epithelium

545. Which of the following method is used for market of calves?

a. Tattooing
b. Metal ear tags
c. Ear notches
d. All of these

Ans. (b) Metal ear tags

546. Most common system for housing dairy cattle is

a. Half open and half closed system
b. Open bran
c. Stanchion bran
d. All of the above

Ans. (c) Stanchion bran

547. Select the correctly matched pair

a. Gurney—USA
b. Brown Swiss—Switzerland
c. Ayrshire—Scotland
d. Holastein Friesian—Holland

Ans. (a) Gurney—USA

548. Milk replacer refers to

a. It is also fortified with vitamin A, D and antibiotics
b. Readymade dry feed mixture
c. Substitute of milk
d. All of these

Ans. (d) All of these

549. Strip cup is used for

a. Cleaning of treat canals
b. Removing 2–3 streams of milk from each quarter before milking

c. Normal checking of the milk
d. All of the above

Ans. (d) All of the above

550. Which of the following method of drying off is most suitable for high yielder animals?

a. Incomplete milking
b. Abrupt milking
c. Intermittent milking
d. All of the above

Ans. (b) Abrupt milking

551. Which of the following method is used for selecting the dairy bull?

a. Physical appearance
b. Dairy character
c. Body capacity
d. All of these

Ans. (a) Physical appearance

552. The most important criteria are used for selecting the dairy animals

a. Mammary appearance
b. General appearance
c. Dairy character
d. Body appearance

Ans. (b) General appearance

553. Which of the following criteria is used for selecting the dairy milking animals?

a. Production and records
b. Physical appearance
c. Breed and pedigree
d. All of these

Ans. (d) All of these

554. Which of the following is not a draft cattle breed?

a. Gir
b. Halikar
c. Amritmahal
d. Nagore

Ans. (a) Gir

555. Cell cultures are used for obtaining

a. Hormones, enzymes and antibodies
b. Interleukins and interferous
c. Viral vaccines
d. All of these

Ans. (d) All of these

556. The highest milk producer cattle breed is

a. Brown Swiss
b. Jersey
c. Holstein Fruiesian
d. The trademarks sable Fashion

Ans. (c) Holstein Fruiesian

557. Which of the following group belongs to goat breeds?

a. Lohi, Merino, Rambouillet and Corriedale
b. Murrah, Jaffarabadi, Surti and Mehsana
c. Gir, Nagore, Rath and Knakrej
d. Pashmina, Beetal Barbari and Malabari

Ans. (a) Lohi, Merino, Rambouillet and Corriedale

558. Which of the following group belongs to buffalo breeds?

a. Lohi, Merino, Rambouillet and Corriedale
b. Murrah, Jaffarabadi, Surti and Mehsana
c. Gir, Nagore, Rath and Knakrej
d. Pashmina, Beetal-Barbari and Malabari

Ans. (b) Murrah, Jaffarabadi, Surti and Mehsana

559. Select the unmatched pair

a. Surti–Punjab
b. Parlakmedi–Odisha
c. Bhadrawari– UP
d. Toda–Nilgiri hills

Ans. (a) Surti–Punjab

560. The cattle breed of belongs to South India

a. Ongole
b. Tharparkar
c. Mewati
d. Rath

Ans. (a) Ongole

561. The correct statement regarding Tharparkar breed of cattle

a. Main breed of Jaisalmer and Jodhpur in Rajasthan
b. Dual purpose breed
c. Originated from Tharparkar district of Western Pakistan
d. All of the above

And. (d) All of the above

562. Cell cultures are used for obtaining which viral vaccines?

a. Polio and mumps
b. Foot and mouth
c. Measles and rabies
d. All of the above

Ans. (d) All of the above

563. Indobrazil is a cattle breed of

a. Suitable for beef and milk
b. Cows between Indian breeds x Local of Brazil cow
c. New cross breed of Brazil
d. All of the above

Ans. (d) All of the above

564. Which of the following breed of Turkey is most popular and heaviest one?

a. Broad Breasted Bronze
b. Beltsville White
c. Cambridge
d. Western White

Ans. (a) Broad Breasted Bronze

565. Which of the following is not a breed of Turkey?

a. Norfloks
b. New Hampshire
c. British White
d. Cambridge

Ans. (b) New Hampshire

566. Which normal cells do not give rise to continuous cell lines?

a. Chick fibroblasts
b. Human glia cells
c. Human fibroblasts cells
d. All of the above

Ans. (d) All of the above

567. Cell cloning is used for the purpose of

a. To isolate the biochemical mutants and cell strains with marker chromosomes
b. To obtain homogenous cell lines from heterogeneous cell cultures
c. To develop hybridoma clones
d. To make exact genetic copies of living things

Ans. (d) To make exact genetic copies of living things

568. Which of the following belongs to duck breeds?

a. Nageswari
b. Indian Runner
c. Sylhet met
d. All of these

Ans. (d) All of these

569. Which of the following is the largest bread of poultry?

a. New Hampshire
b. Black Minorca
c. White Leghorn
d. Light Sussex

Ans. (b) Black Minorca

570. Which of the following breed is known as best round breed of all poultry?

a. White Rock
b. Rhode Island Red
c. Plymoth Rock
d. White Leghorn

Ans. (b) Rhode Island Red

571. Which of the following is most popular egg breed of fowl, in all over the world?

a. White Rock
b. Rhode Island Red
c. Plymoth Rock
d. White Leghorn

Ans. (d) White Leghorn

572. Which of the following poultry breed is suitable for wet and heavy rainfall regions?

a. White Cornish
b. Australop
c. White Leghorn
d. White Rock

Ans. (b) Australop

573. Continuous cell lines provide which advantages

a. Faster rate of growth
b. Lower serum requirement
c. Ability to grow in suspension
d. All of the above

Ans. (d) All of the above

574. Which of the following is an American fowl?

a. Rhode Island Red
b. New Hampshire
c. Polymoth Rock
d. All of these

Ans. (d) All of these

575. Select the pair, which is correctly matched

a. Berkshire—black
b. Tamworth—red colour
c. Hampshire—black but white belt encircling
d. All of these

Ans. (b) Tamworth—red colour

576. Which of the following pig breed is known as bacon hog?

a. Bershire
b. Duroc
c. Hampshire
d. Wessex Saddleback

Ans. (a) Bershire

577. Which of the following is a exotic pig breed?

a. Chester white
b. Danish Landrace
c. Duroc
d. All of these

Ans. (d) All of these

578. Which is not correct?

a. During colony isolation, desired colony may be shielded and the remaining colonies irradiated by a lethal done X-rays
b. Cells derived from a single cell through meiosis constitute a clone
c. Plating efficiency of continuous cell lines is generally 10% of higher
d. A feeder layer is a layer of cells, which has been treated to prevent their growth

Ans. (b) Cells derived from a single cell through meiosis constitute a clone

579. Riverine camel is mostly found in

a. Kerala and AP
b. Asom and Uttarakhand
c. Rajasthan and TN
d. UP and Punjab

Ans. (d) UP and Punjab

580. Which of the following camel breed is found in India?

a. Arabian
b. Bacterian
c. Both a and b
d. None of these

Ans. (c) Both a and b

581. Which of the following camel breed is used for riding purpose?

a. Riverine Camel
b. Desert Camel
c. Hill Camel
d. All of these

Ans. (b) Desert Camel

582. Which of the following camel breed is found in India?

a. Riverine Camel
b. Desert Camel
c. Hill Camel
d. All of these

Ans. (d) All of these

583. Most cell lines will grow for a period of about how many weeks?

a. 18
b. 15
c. 12
d. 5

Ans. (c) 12

584. Which of the following is a baggage type of camel breed in India?

a. Riverine Camel
b. Hill Camel
c. Both a and b
d. None of these

Ans. (c) Both a and b

585. Mules are most suitable for

a. Military operations
b. Stress climate
c. Hilly tracts
d. All of the above

Ans. (d) All of the above

586. The statement, which is not correct regarding animal organ cultures

a. The development of foetal organs *in vitro* is comparable to that *in vitro*
b. Results from them are comparable to those from whole animals
c. Hormone–dependent organs remain hormones–dependent
d. They can be maintained only for few months

Ans. (b) Results from them are comparable to those from whole animals

587. Which of the following horse breed is popular in hilly areas in India?

a. Spiti
b. Bhutia
c. Manipuri
d. All of these

Ans. (d) All of these

588. Which of the following horse breed is generally known as race horse

a. Spiti
b. Arabi
c. Thoroughbred
d. None of these

Ans. (c) Thoroughbred

589. Which of the following horse breed is found in Pakistan and India both

a. Unmol
b. Baluchi
c. Hizzai
d. All of these

Ans. (c) Hizzai

590. Which of the following is a horse breed?

a. Marwari
b. Kathiawari
c. Bhutia
d. All of these

Ans. (a) Marwari

591. The most striking feature of Jamnapari goat is

a. High reproductive rate
b. Roman nose coupled with a shortened upper lip
c. High milk production
d. All of these

Ans. (c) High milk production

592. Which of the following goat breed is the highest milk producer

a. Asom local
b. Jamnapari
c. Bengil black
d. Barbari

Ans. (b) Jamnapari

593. *In vitro* transformation of animal cell may occur due to

a. Induced by virus
b. Chemically induced
c. Spontaneously
d. All of these

Ans. (d) All of these

594. What is correct for Bharat Merino sheep?

a. Cross of Rambouillet and Merino with indigenous breed
b. Indigenously developed cross breed
c. Fine wool sheep
d. All of these

Ans. (d) All of these

595. Which is not correct about the production of artificial skin?

a. Irradiated 3T3 fibroblast cells are used as feeder layer
b. Intact skin explants is cultured on a suitable medium
c. Cell division occurs in keratinocytes
d. Corneocytes present in the explants do not contribute to the artificial skin

Ans. (b) Intact skin explants is cultured on a suitable medium

596. The sheep breed, which belongs to temperate region

a. Lohi
b. Gaddi
c. Bhakarwal
d. Gurej

Ans. (a) Lohi

597. Which of the following sheep breed is most popular for its fine wool?

a. Gurej
b. Merino
c. Corriedale
d. Rambouillet

Ans. (b) Merino

598. Which of the following sheep bred is found in arid Western Region?

a. Marwari
b. Bikaneri
c. Kathiawari
d. All of these

Ans. (d) All of these

599. Which of the following is a sheep breed of Southern Region of India?

a. Mandy
b. Deccani
c. Nellore
d. All of these

Ans. (d) All of these

600. Cell lines having specific cell types may be obtained by

a. Physical and separation
b. Cloning
c. Selective culture
d. All of these

Ans. (d) All of these

601. Hiasale is a cross of

a. Merino ewes × Rambouillet rams
b. Bikaneri ewes × Merino rams
c. Merino ewes × Bikaneri rams
d. Rambouillet ewes × Merino rams

Ans. (b) Bikaneri ewes × Merino rams

602. Cow Jill is the cross of

a. Sahiwal × Sindhi
b. Jersey × Sindhi
c. Ayrshire × Holestein Priesian
d. Ayrshire × Harayana

Ans. (d) Ayrshire × Harayana

603. Best source of dietary protein for vegetation is

a. Milk
b. Soybean
c. Gram
d. Groundnut

Ans. (c) Gram

604. Huskies are

a. Thick coated dog
b. Yaks
c. Water Buffaloes
d. Donkeys

Ans. (a) Thick coated dog

605. Which cell types present in heterogeneous animal cell cultures are least likely to divide?

a. Differentiated cells
b. Precursor cells
c. Stem cells
d. Both A and B

Ans. (a) Differentiated cells

606. Which of the following is not a exotic breed of cattle?

a. Brown Swiss
b. Holstein–briesian
c. Hallikar
d. Jersey

Ans. (c) Hallikar

607. Zebu is a name Indian breeds of cattle in

a. South America
b. Europe
c. Both a and b
d. None of these

Ans. (c) Both a and b

608. Which of the Indian cattle breed was exported to Brazil?

a. Jersey
b. Sahiwal
c. Kankrej
d. All of these

Ans. (b) Sahiwal

609. The enzyme is the most commonly used for disaggregation of explants?

a. Trypsin and Collagenase
b. Elastase and Pappain
c. Mucase and Elastase
d. All of the above

Ans. (a) Trypsin and Collagenase

610. The true statement for omasum

a. It helps in squeezing out water from fed before it enters to abomasum
b. Third compartment of ruminantal stomach
c. It has storing muscular walls
d. All of the above

Ans. (d) All of the above

611. The function of reticulum is

a. To furnish additional storage space
b. To hold foreign harmful bodies
c. Squeezing out the water from feed
d. Both a and b

Ans. (c) Squeening out the water from feed

612. Which is the essential for maintenance of heterogeneous animal cell culture?

a. Stem cells
b. Differentiated cells
c. Precursor cells
d. Both b and c

Ans. (a) Stem cells

613. The main function of abomasums is

a. Cheaning of feeds
b. Secretion of gastric juice
c. Squeening of water from feed
d. Storage of feed

Ans. (b) Secretion of gastric juice

614. Which of the following part is not found in the digestive systems poultry?

a. Abomasum
b. Gizzard
c. Proventriculus
d. Crop

Ans. (a) Abomasum

615. The main function of Gizzard is

a. Digestive juices are secreted and mixed with feed
b. Chewing of the food
c. Grinding of feed into small prices
d. All of the above

Ans. (c) Grinding of feed into small prices

616. The main function of peroventriculus in poultry is

a. Digestive juices are secreted and mixed with feed
b. Chewing of the food
c. Grinding of feed into small prices
d. All of the above

Ans. (a) Digestive juices are secreted and mixed with feed

617. Which of the following has not a simple digestive tract?

a. Human
b. Goat
c. Poultry
d. Swine

Ans. (b) Goat

618. Regurgitation takes place in

a. Omasum
b. Abomasum
c. Rumen
d. Reticulum

Ans. (c) Rumen

619. Which of the following is not a compartment of ruminant stomach?

a. Abdomen
b. Abomasum
c. Reticulum and Omasum
d. Rumen

Ans. (a) Abdomen

620. The main formation of abomasums is

a. Cheating of feeds
b. Storage of feed
c. Secretion of gastric juice
d. Squeezing of water from feed

Ans. (c) Secretion of gastric juice

621. The true stomach in ruminants is known as

a. Omasum
b. Reticulum
c. Rumen
d. Abomasum

Ans. (d) Abomasum

622. Turkey production is not popular in India because of

a. Poor laying capacity in summer
b. High cost
c. Low growth
d. All of the above

Ans. (d) All of the above

623. Milk and milk products under, 1992 is related to

a. Production of the ghee
b. Registration of dairy man if he handles >10,000 liters or 500 MT milk solids/year
c. Production of clean milk
d. Production of the butter

Ans. (b) Registration of dairy man if he handles >10,000 liters or 500 MT milk solids/year

624. Flushing refers to

a. Measuring of fat % in pig's carcasses
b. Removing the extra teats of boar
c. Proper feeding of sows/gilts before two weeks of the breeding
d. None of the above

Ans. (c) Proper feeding of sows/gilts before two weeks of the breeding

625. The camel can sustain without for longer period because of

a. It releases out meager water in urine and faeces
b. It has higher water in the blood plasma
c. Both a and b
d. None of these

Ans. (c) Both a and b

626. Camel can tolerate the water loss up to

a. 50% of the body weight
b. 40% of the body weight
c. 20% of the body weight
d. 30% of the body weight

Ans. (d) 30% of the body weight

627. The main function of camel hump is

a. It stress water
b. It helps in riding
c. Acts as an energy food store in the form of fatty acids
d. None of the above

Ans. (c) Acts as an energy food store in the form of fatty acids

628. PETA refers to

a. Problems in exotic treated animals
b. People for ethical treatment of the animals
c. People for exotic treated animals
d. None of the above

Ans. (b) People for ethical treatment of the animals

629. How much aureomycin hydrochloride (Aureomycin) can be given to calf per day?

a. 120 mg
b. 100 mg
c. 80 mg
d. 50 mg

Ans. (c) 80 mg

630. Generally calf starter contains

a. Steamed bone meal
b. Ground grain of cereals
c. Iodized salt and aureomycin
d. All of the above

Ans. (d) All of the above

631. A calf starter refers to

a. A kind of dried milk to calves
b. High energy ration for calves
c. A kind of liquid milk fed to calves
d. All of the above

Ans. (b) High energy ration for calves

632. C–ELISA kit is useful for

a. It is a machine used for quick milking
b. It is a technique to test milk fat in a adulterated milk
c. Diagnosis and the treatment of rinderpest disease
d. It is a vaccine against T. B.

Ans. (c) Diagnosis and the treatment of rinderpest disease

633. Bronchitis in poultry refers to

a. Egg production suddenly drops
b. Viral diseases but death loss is highest among young
c. Raspy cough, gasp and discharge from nose and eyes
d. All of the above

Ans. (d) All of the above

634. Infectious coryza is a

a. Nassal discharge and sneezing are the common symptoms
b. Serious disease of poultry in India
c. Caused by Hemophilus gallinarum bacterium
d. All of the above

Ans. (d) All of the above

635. The commercial egg farms in India maintain Austro White, a cross between

a. Australop male × Wyandotte female
b. Australop male × New Hampshire female
c. Australop male × Leg Horn female
d. Australop male × White Leghorn female

Ans. (d) Australop male × White Leghorn female

636. The poultry breed New Hampshire developed in ……., about 200 years ago, primarily as a table bird

a. England
b. New Zealand
c. Holland
d. Poland

Ans. (a) England

637. The poultry breed New Hampshire was developed both for meat and egg production in New Hampshire from single comb Rhode Island Red and Red Stock during

a. 1940 b. 1930
c. 1920 d. 1910

Ans. (b) 1930

638. Barned variety of Polymath Rock was developed in about ……, due to the cross of the Dominique and Black Cochin breeds

a. 1865 b. 1855
c. 1845 d. 1835

Ans. (a) 1865

639. Ordinary, lambs are not used for servicing until ……., months of the age

a. 14 b. 16
c. 18 d. 20

Ans. (c) 18

640. On attainment of maturity, between first and second year a bull can serve ……., cows

a. 25 b. 23
c. 20 d. 18

Ans. (a) 25

641. Undulant fever is very common in

a. Cow b. Sheep
c. Goat d. All of these

Ans. (c) Goat

642. Septic sore throat is caused by

a. *S. epidermicus* b. *Diphtheria bacilli*
c. *S. scarlatine* d. Vibrio sp.

Ans. (a) *S. epidermicus*

643. Gastroenteritis is mainly caused by

a. *Clostridium welchii*
b. *Staphylococcus aureus*
c. *Proteus vulgaris*
d. All of these

Ans. (d) All of these

644. The nutritive value of a fodder can be evaluated by the method

a. Calorimetric measurement
b. Digestibility trials
c. Metabolic experiments
d. All of the above

Ans. (d) All of the above

645. Which of the following is rich in coline?

a. Liver b. Ghee
c. Egg d. All of these

Ans. (d) All of these

646. Vitamin A is stored in

a. Lungs b. Gallbladder
c. Liver d. Pancreas

Ans. (c) Liver

647. Colostrum is more concentrated than milk due to the presence of

a. Clorine ions b. Globulin
c. Total solids d. All of these

Ans. (b) Globulin

648. Which of the following element has lower content in colostrums than milk?

a. Potassium b. Iron
c. Clorine d. All of these

Ans. (c) Clorine

649. The colour of colostrums is yellow due to the presence of

a. Blood particles b. Carotene
c. Immune globulin d. All of these

Ans. (b) Carotene

650. Paratyphoid fever is caused by

a. *Salmonella Paratyphi*
b. *Salmonellia typhous*
c. *Bruscella abortus*
d. All of these

Ans. (a) *Salmonella Paratyphi*

651. Abortion is caused in cattle mainly due to

a. *Brucella melitensis* b. Salmonella spp
c. *Brucella abortus* d. All of these

Ans. (c) *Brucella abortus*

652. Diphtheria is caused by

a. *B. dysenteriae* b. *S. Lactis*
c. *Diphtheria bacillis* d. All of these

Ans. (c) *Diphtheria bacillis*

653.A system of grazing known as Henbenhein system was developed in

a. Poland b. Germany
c. England d. Holland

Ans. (b) Germany

654. The manure gutter should have a gradient of one inch for every…... feet length

a. 10 b. 12
c. 14 d. 15

Ans. (a) 10

655. Which is the preferred enzyme for disaggregating of animal tissue

a. Mucase b. Elastase
c. Trypsin d. Collagenase

Ans. (a) Mucase

656. Serum contains which growth factor

a. Endothelial and platelet derived growth factor
b. Epidermal and fibroblast growth factor
c. Transforming growth factor
d. All of these

Ans. (d) All of these

657. In bovine ….. per cent of the total rumen bacteria have a photolytic activity

a. 38 b. 36
c. 34 d. 32

Ans. (a) 38

658. It has been estimated that human stomach wall is replete with …. Glands

a. 1500000000
b. 3500000000
c. 100000000
d. 300000000

Ans. (b) 3500000000

659. The rate of gas production in rumen is most rapid immediately after meal and in the cow may exceed …… per hour

a. 25 b. 15
c. 30 d. 20

Ans. (c) 30

660. The large intestine of …….., is the shortest and simplest if all the domestic animals

a. Dog b. Horse
c. Cat d. Cow

Ans. (a) Dog

661. Typsin is preferred over other enzymes for tissue disaggregation because of

a. Neutralized by serum
b. Effective for many tissues
c. Tolerated by most of the cells
d. All of the above

Ans. (d) All of the above

662. The intestine represents a long tube approximately ……., feet long in average dairy cattle

a. 220 b. 200
c. 180 d. 160

Ans. (c) 180

663. Jensen and Donath in ……., successes in crystaling vitamin B_1 in the pure form

a. 1936 b. 1926
c. 1916 d. 1906

Ans. (b) 1926

664. Vitamin K was identified by ……, in 1935 as a factor present in the green leaves

a. Diggins b. Dukes
c. Dixon d. Dam

Ans. (d) Dam

665. By late ……., synthetic vitamin A became available on the commercial market

a. 1940 b. 1935
c. 1930 d. 1925

Ans. (a) 1940

666. As early as…., a Swiss Physician J. Francois Coindet, recommended first iodine as a remedy for goiter

a. 1860 b. 1840
c. 1820 d. 1800

Ans. (c) 1820

667. About ……, per cent of the plasma copper is firmly bound to as alpha–2 globulin as ceruloplasmin, the form in which it is transported in the body

a. 90 b. 92
c. 64 d. 96

Ans. (d) 96

668. Wool is rich in cystine and contains ……., per cent of sulphur

a. 4.0 b. 3.0
c. 2.0 d. 1.5

Ans. (a) 4.0

669. There may be about ……., different enzymes in a single cell

a. 500
b. 1000

c. 750
d. 250

Ans. (b) 1000

670. The term protein (from word protrus) was suggested in 1840 by

a. Waternail
b. Coleure
c. Mulder
d. Shudder

Ans. (c) Mulder

671. In practice, the food value of either extract has been taken as yielding ……., kCal of gross energy per gram of the product while carbohydrates and proteins yield about 5 kCal per gram

a. 9.35
b. 8.35
c. 7.35
d. 6.35

Ans. (a) 9.35

672. Which is the most labile?

a. Trypsin and proteins
b. Peptone and salts
c. Growth factors and serum
d. Both a and c

Ans. (b) Peptone and salts

673. The percentage of abnormal semen in a normal bull should not excess

a. 26–30
b. 21–26
c. 5–12
d. 15–20

Ans. (d) 15–20

674. Haemacytometer contains in the centre 16 big squires divided into ……, small squares

a. 512
b. 384
c. 256
d. 128

Ans. (c) 256

675. In species viz., ……., semen after ejaculation remains liquid unlike in others wherein it tends to gelate or coagulate shortly after ejaculation

a. Cat and camel
b. Bull and dog
c. Sheep and goat
d. Horse and ass

Ans. (b) Bull and dog

676. The identification of the seminal sugars as ……., by Mann (1956) opened up the way for detailed studies on its generation capacity of the necessary tissues

a. Ribulose
b. Sucrose
c. Fructose
d. Glucose

Ans. (c) Fructose

677. The prostatic secretion represents the main source of citric acid and acid phosphate for whom ……., semen

a. Dog
b. Human
c. Bull
d. Stallion

Ans. (b) Human

678. The human prostatic secretion contains fibrinolysin that is so powerful that 2 cc of the same can liquidify 100 cc of cloted blood in ……., hours at 37°C

a. 12
b. 14
c. 18
d. 16

Ans. (c) 18

679. "Broad helix" of "Spiral body" or mitochondrial sheath is ……., rich structure believed to be derived from mitochondria

a. Lipids
b. Carbohydrates
c. Minerals
d. Proteins

Ans. (a) Lipids

680. Dr. Sampath Kumaron employed artificial insemination Method for the first in India in ....., at the place Dairy Farm, Mysore

a. September, 1938
b. August, 1938
c. September, 1939
d. August, 1939

Ans. (d) August, 1939

681. In Denmark, Edward Soremen and Jens Gylling Ham, organized the first Cooperative Artificial Breeding Association in

a. 1936
b. 1946
c. 1926
d. 1916

Ans. (a) 1936

682. Mikhali Fyalorovich Ivanoy, a Russian Physiologist commenced his investigation on artificial insemination in farm animals as early as

a. 1897
b. 1899
c. 1879
d. 1889

Ans. (b) 1899

683. The discovery of spermatozoa dates back to ……., when the compound microscope was invented by Leeuwenhoek, the Dutch Naturalist

a. 1707
b. 1697
c. 1677
d. 1627

Ans. (c) 1677

684. The first scientific research on artificial insemination of domestic animals was conducted with …., by the Italian Psychologist, Lazarro Spallantani in 1780

a. Cows b. Goats
c. Sheep d. Dogs

Ans. (d) Dogs

685. According to legend artificial insemination had its origin in ……., at which time and Arab Chieflain used it to impregnate a prized mare with semen stealthily collected by night from the sheath of an enemy's stallion

a. 1322 b. 1319
c. 1315 d. 1310

Ans. (a) 1322

686. In unipara as the cow, mare, etc. usually single ovum is released, in sheep one or two and occasionally three, whereas in swine several ova up to ……, are related in a single ovulation

a. 30 b. 25
c. 20 d. 15

Ans. (b) 25

687. A cow during her productive life must remain pregnant only for ……., months in every year

a. 8 b. 7
c. 9 d. 6

Ans. (c) 9

688. A fertile berd takes less than ……, months between calving

a. 16 b. 15
c. 14 d. 13

Ans. (d) 13

689. An acceptable record is 70% non-returns up to 60 days after breeding or 60% non-returns up to ……..…, days after breeding

a. 90 b. 100
c. 80 d. 70

Ans. (a) 90

690. It is estimated that …….., volumes of blood flow through the mammary gland for the each volume of milk synthesized

a. 300
b. 400
c. 500
d. 600

Ans. (c) 500

691. In Holstein cow, between 2 months and the time of puberty (7–10 Months), the mammary gland grows three and half times faster than the body weight and reaches the peak pubertal development at ……, months of age

a. 14–16 b. 11–13
c. 6–8 d. 10–12

Ans. (d) 10–12

692. The udder usually increases about ……, in the size between milking, depending upon the quality of the udder and the amount of milk secreted

a. Two-thirds b. One-third
c. Half d. One-fourth

Ans. (b) One-third

693. The milk exudes from ……., separate gland tubes that open at the base of the "Mammary Hairs"

a. 155–195 b. 100–150
c. 50–95 d. 40–80

Ans. (b) 100–150

694. ……., % animals contracting bang's diseases become either temporarily or permanently sterile

a. 25–30 b. 18–23
c. 15–20 d. 10–15

Ans. (a) 25–30

695. Vitamins ……., are synthesized by the ruminants in their body

a. C and D b. E and D
c. B and K d. A and D

Ans. (c) B and K

696. The discovery of the living cells would have been difficult, if most impossible, before the ccompound microscope was invented by Zachalas Jensen of ……,

a. Holland b. France
c. Poland d. England

Ans. (a) Holland

697. The amount of ……., needed by an adult cow for efficient reproduction is about 10–12 g per day

a. Phosphorus b. Sodium
c. Potassium d. Calcium

Ans. (b) Sodium

698. Dystokia, among the domesticate species is mostly met within

a. Monkeys b. Dogs
c. Dairy cattle d. Cats

Ans. (c) Dairy cattle

699. The ovary can be examined up to ……., months of pregnancy after which it sinks deeper into the abdominal cavity

a. Four b. Three
c. Two d. One

Ans. (b) Three

700. The critical hormones control electrolytes as well as water metabolism which helps in retention of ……., in the body

a. Phosphorus b. Iodine
c. Sulphur d. Sodium

Ans. (d) Sodium

701. ……., compounds have been isolated from the adrenal cortexes which are all sterol derivatives

a. Twenty-three b. Twenty-four
c. Twenty-eight d. Twenty-six

Ans. (c) Twenty-eight

702. The parathyroid glands were discovered by sandstorm in

a. 1900 b. 1880
c. 1860 d. 1840

Ans. (b) 1880

703. The egg after formation of fertilization membrane decreases in diameter by ……., per cent due to the secretion of some fluids

a. 14 b. 11
c. 8 d. 4

Ans. (a) 14

704. The process of spermatogenesis in the male and oogenesis in the female finally gives rise to ……., daughter cells

a. Eight b. Six
c. Four d. Two

Ans. (c) Four

705. In the case of cows, the vagina is about ……., cm long

a. 20.0–25.0 b. 16.5–19.0
c. 12.5–15.0 d. 7.5–10.0

Ans. (a) 20.0–25.0

706. In each ovary (of farm animals) there may be as many ……., follicles

a. 10, 0000 b. 75, 000
c. 50, 000 d. 25, 000

Ans. (b) 75, 000

707. An examination of the rainfall map of India how that is invariably in the higher elevations, and in humid areas that the cattle are

a. Small and non-descript
b. Small and well-descript
c. Large and well-descript
d. Large and non-descript

Ans. (a) Small and non-descript

708. The sac of the scrotium in bulk is termoregulatory in function, that is, it provides production to the tests and maintains them at a temperature lower by ……., °F than the abdomen which is necessary for active spermatogenesis

a. 11–13 b. 8–10
c. 5–7 d. 2–4

Ans. (c) 5–7

709. In case of ……., the ovaries are enclosed by membranous covering which is continuous with the wall of tube to ensure that the discharged ova passes into the tubes and is not lost into the body

a. Rabbit b. Goat
c. Cow d. Dog

Ans. (d) Dog

710. Sex linkage has been indicated for more than 200 traits in

a. Humans b. Horse
c. Sheep d. Cattle

Ans. (a) Humans

711. Jersey claves suffering from ……., have broad skull, large eye-sockets, short and broad nasal bones and forehead broader than normal

a. Cerebral hornia
b. Aguatha
c. Bull dog head (prognathium)
d. Uneblical hornia

Ans. (b) Aguatha

712. The ribosome is the composed of two subunits and has an approximate size of

a. 195 Å b. 200 Å
c. 210 Å d. 220 Å

Ans. (a) 195 Å

713. The nucleus contains ……., % of the RNA in the cell

a. 8–20 b. 7–17
c. 6–12 d. 4–10

Ans. (b) 7–17

714. The medium used for *in vitro* culture of hybridoma cells must serve

a. Give high antibody yield
b. Support adequate cell proliferation
c. Promote cell differentiation
d. Both a and b

Ans. (d) Both a and b

715. Surti and Beetal are the breeds of

a. Goat b. Swine
c. Buffalo d. Cattle

Ans. (a) Goat

716. Tamworth and middle White Yorkshire are the breeds of

a. Cattle b. Swine
c. Goat d. Buffalo

Ans. (b) Swine

717. Jamanapari and Barabari are the breeds of

a. Cattle b. Swine
c. Goat d. Buffalo

Ans. (c) Goat

718. Name the sheep cloned for the first time is

a. Holly b. Molly
c. Polly d. Dolly

Ans. (d) Dolly

719. In silkworm, if juvenile hormone is absent at the time of larval moulting, the worm will

a. Moult into adult
b. Die
c. Moult into larval stage
d. Moult into Pupa

Ans. (d) Moult into Pupa

720. Best aquarium is located at

a. Z. S. I., Kolkata
b. Tarapur Mumbai
c. Chennai
d. Vishakhapatnam

Ans. (b) Tarapur Mumbai

721. Fish introduced in India by foreigners is

a. Clasius hatrachits b. Labeo rohita
c. Mysnis Singhala d. Pomphret

Ans. (d) Pomphret

722. The statement, which is not correct about Thenterferon?

a. Large-scale (1000 to 10001) cell cultures are infected with Sendal Virus and incubated for 24 hours after which the supernatant is collected, centrifuged and used for isolation of interferon
b. Interferons are known to enhance growth of some types of tumours
c. Inferons enhance the cytotoxic activity of natural killer cells
d. Interferons induce in the cells production of 2, 5–adenosine polymerase

Ans. (b) Interferons are known to enhance growth of some types of tumours

723. Three carp fishes, Catla Lbaeo and Cyrrhina, can be grown together in the same pond more essentially as they have

a. No competition for food
b. Positive interactions
c. Communalism
d. Symbiosis

Ans. (a) No competition for food

724. Silkworm larva spins silk from

a. Anterior to posterior side
b. In side to out side
c. Outside to inside
d. Random fashion

Ans. (c) Outside to inside

725. Lac is produced by

a. More by males than by the females
b. More by females than males
c. Females
d. Males

Ans. (b) More by females than males

CHECK YOUR GRASP

1. The first case of AIDS was recognized by

a. George Kohler (1975)
b. Robert Gallo (1978)
c. Luc Montangnier (1980)
d. Ceaser Milstein (1970)

2. 100 g ice cream is equal to

a. 350 calories
b. 206 calories
c. 218 calories
d. 306 calories

3. Cell culture are used for obtaining which of the following viral vaccines?

a. Polio and mups
b. Mouth and hand disease
c. Both a and b
d. Non of the above

4. Which of the following culture vessels are used for large scale culture of anchorage dependent cells?

a. Opticell culture system
b. Hollow fibre cartridge
c. Heli-cell vessels
d. All of the above

5. What is the difference between B and T lymphocytes?

a. There is no difference
b. Differ in maturation and storage
c. Differ in origin
d. Differ in location in the lymphoid pool

6. Monoclonal antibodies produced for carcinoembryonic antigen and some tumour associated antigens can be used in histochemical assays that permit the identification of which of the following?

a. Benign and malignant nature of tumours
b. Non Tumour cell type
c. late cases of metastasis
d. none of these

7. Which of the following is not correct about P elements?

a. These elements are transposons of 2.9 kh.0
b. P element vectors are derived from flour mouth
c. Helper p element are needed to enable recombinant p vector integration into the host genome
d. None of these

8. Cells take in calcium phosphate DNA precipitate particles by which of the following?

a. Pincocytosis
b. Lipofection
c. Phagocytosis
d. All of the above

9. Production of recombinant human protein in insect larvae poses which of the following problems?

a. Protein folding
b. Glycosylation
c. Downstream processing
d. Up stream processing

10. Why cream pasteurization is required?

a. To get the homogenous butter
b. To get the higher fat per cent in butter
c. To improve taste, texture and flavour of butter
d. All of the above

11. Which of the following increase with advancement of lactation period?

a. Fat
b. Ca and P
c. CI_2
d. All of these

12. Which of the following cheese has the highest protein per cent?

a. Swiss
b. Limberger
c. Cheddar
d. Camembert

13. Which of the paneer is with gas boles?

a. Cheddar
b. Limberger
c. Swiss
d. Roquefort

14. Wethers refer to

a. Male lambs ready for slaughter
b. Mating Male Sheep
c. Male lambs castrated at an early age before
d. Lambs bearing a full year's growth of the wool

15. Which of the following is an American fowl?

a. Rhode Island Red
b. New Hampshire
c. Polymoth Rock
d. All of these

16. Vitamin A is stored in

a. Lungs
b. Gall Bladder
c. Liver
d. Pancreas

In case of less than 80% score, go through brief review and glance once again from chapter

Key: 1-c 2-d 3-a 4-d 5-b 6-a 7-b 8-c 9-b 10-d 11-d 12-a 13-c 14-c 15-d 16-c

14

Instrumentation and Bioanalytical Techniques

1. What is the condenser on a light microscope used for?

a. To diffuse the light source
b. To focus the light source
c. To provide the light source
d. To control the light source

Ans. (b) To focus the light source

2. What is the correct name for the microscope lens located in the eyepiece?

a. Binocular
b. Objective
c. Condenser
d. Ocular

Ans. (d) Ocular

3. What is the correct name for the main microscope lens that focuses the image?

a. Binocular
b. Objective
c. Condenser
d. Ocular

Ans. (b) Objective

4. A light microscope is also referred to as a?

a. Electron microscope
b. Compound microscope
c. Scanning problem microscope
d. X-ray

Ans. (b) Compound microscope

5. The two knobs used for focussing the image include fine adjustment knob and?

a. Diaphragm
b. Stage
c. Objective lens
d. Coarse adjustment knob

Ans. (d) Coarse adjustment knob

6. When maintaining the microscope what is used to clean the lenses?

a. Alcohol
b. Water
c. Oil
d. Detergent

Ans. (a) Alcohol

7. On the microscope stage, what is used to hold the glass slide in place and prevent it from moving?

a. Stage
b. Stage clip
c. Fine adjustment knob
d. Condenser

Ans. (b) Stage clip

8. All the following are components of compound microscope except

a. Stage clips
b. Fine adjustment
c. Binocular eyepiece
d. Electron gun

Ans. (d) Electron gun

9. Which of these objectives should be used to first view the specimen?

a. X10
b. X4
c. X40
d. X100

Ans. (b) X4

10. If the eyepiece magnification on light microscope is x10 and the objective is x40, what is the overall magnification?

a. x40
b. x10
c. x400
d. x4

Ans. (c) x400

11. Which part of the compound microscope helps in gathering and focussing light rays on the specimen to be viewed?

a. Eyepiece lens
b. Objective lens
c. Condenser lens
d. Magnifying lens

Ans. (c) Condenser lens

12. Resolution power is the ability to

a. Distinguish two close objects
b. Magnify image
c. Reduce magnification
d. Distinguish amongst organelles

Ans. (a) Distinguish two close objects

13. In Phase contrast microscopy, the rate at which light enters through objects is

a. Constant
b. Inversely proportional to their refractive indices
c. Directly proportional to their refractive indices
d. Exponentially related to their refractive indices

Ans. (b) Inversely proportional to their refractive indices

14. When maintaining the microscope, which is not an essential step?

a. Blow away dust
b. Oil the mechanics and moving parts
c. Wash the base and arm
d. Clean off grease and spills

Ans. (c) Wash the base and arm

15. Which part of the light microscope controls the intensity of light entering the viewing area?

a. Coarse adjustment screw
b. Fine adjustment screw
c. Diaphragm
d. Condenser lens

Ans. (c) Diaphragm

16. What is the minimum distance for the eye to focus any object?

a. 11 cm
b. 25 cm
c. 32 cm
d. 42 cm

Ans. (b) 25 cm

17. Resolving power of a microscope is a function of

a. Wavelength of light used
b. Numerical aperture of lens system
c. Refractive index
d. Wavelength of light used and numerical aperture of lens system

Ans. (d) Wavelength of light used and numerical aperture of lens system

18. Which of the following is best suited to get the surface view of an object?

a. SEM
b. TEM
a. Compound microscope
c. None of these

Ans. (a) SEM

19. To obtain total magnification, you should ..... the magnification of the eyepiece to the objective lens power

a. Add
b. Multiply
c. Divide
d. Subtract

Ans. (b) Multiply

20. What is the neutral value of pH scale?

a. Equal to 7
b. Less than 5
c. Less than 8
d. Less than 10

Ans. (a) Equal to 7

21. Which one is the most important in microscopy

a. Study of living cells
b. Stage
c. Resolving power
d. Study of biochemical's

Ans. (c) Resolving power

22. Who had invented the pH Scale?

a. Benjamin Franklin
b. S.P.L Sorenson
c. Henry Moseley
d. Wilhelm Rontgen

Ans. (b) S.P.L Sorenson

23. Which of the following is an effective way of purifying liquids containing suspensions?

a. Crystallization
b. Decanting
c. Centrifuging
d. Separating funnel

Ans. (c) Centrifuging

24. What is the greatest resolution in light microscopy?

a. Longest wavelength of visible light used
b. An objective with minimum numerical aperture
c. Shortest wavelength of visible light used
d. Shortest wavelength of visible light used and an objective with the maximum numerical aperture

Ans. (d) Shortest wavelength of visible light used and an objective with the maximum numerical aperture

25. In fluorescence microscopy, the function of removing all light except the blue light is perform by .....

a. Exciter filter
b. Barrier filter
c. Dichroic mirror
d. Mercury arc lamp

Ans. (a) Exciter filter

26. Total Magnification of microscope is obtained from which?

a. Magnifying power of the objective lens
b. Magnifying power of eyepiece
c. Magnifying power of condenser lens
d. Magnifying power of both the objective lens and eyepiece

Ans. (d) Magnifying power of both the objective lens and eyepiece

27. For staining which of the following is used as fixatives in light microscopy?

a. Osmic acid
b. Glutaraldehyde
c. Heat
d. Osmic acid, glutaraldehyde, heat

Ans. (d) Osmic acid, glutaraldehyde, heat

28. Chromatography is generally used for the separation of mixtures based on the differences in their

a. Shape
b. Size
c. Structure
d. All of these

Ans. (d) All of these

29. Ion-exchange chromatography is used for the separation of

a. Non polar molecules
b. Polar molecules
c. Inert molecules
d. Toxic molecules

Ans. (b) Polar molecules

30. In gel permeation chromatography which molecules will be eluted last?

a. Larger molecules
b. Intermediate molecules
c. Small molecules
d. Larger molecules

Ans. (c) Small molecules

31. Thin layer chromatography is

a. Partition chromatography
b. Adsorption chromatography
c. Electrical mobility of ionic species
d. Planar chromatography

Ans. (b) Adsorption chromatography

32. In gel filtration chromatography, separation of proteins are based on their

a. Size and net charge
b. Size and specific affinity
c. Size and shape
d. Shape and net charge

Ans. (c) Size and shape

33. HPLC is an abbreviation for

a. High profit liquid chromatography
b. Higher profit low chromatography
c. Higher performance low chromatography
d. High performance liquid chromatography

Ans. (d) High performance liquid chromatography

34. Which polymer is often used for matrix materials in affinity chromatography?

a. Cellulose
b. Dextrose
c. Agarose
d. None of these

Ans. (a) Cellulose

35. Which chromatographic technique depends on the highly specific interactions between pairs of biological materials such as enzyme-substrate?

a. Adsorption chromatography
b. Affinity chromatography
c. Ion-exchange chromatography
d. Gel-permeation chromatography

Ans. (b) Affinity chromatography

36. Which is not generally used for separation of proteins, as proteins get denatured by it?

a. Ion-exchange chromatography
b. Affinity chromatography
c. Reverse phase chromatography
d. Gel-permeation chromatography

Ans. (c) Reverse phase chromatography

37. In thin layer chromatography, the stationary phase is made of ..... and the mobile phase is made of .....

a. Solid, liquid
b. Liquid, liquid
c. Liquid, gas
d. Solid, gas

Ans. (a) Solid, liquid

38. Which technique is much superior in terms of the speed, efficiency, sensitivity and ease of operation?

a. Adsorption chromatography
b. High performance liquid chromatography
c. Ion-exchange chromatography
d. Gel-permeation chromatography

Ans. (b) High performance liquid chromatography

39. In gas chromatography, the basis for separation of the components of the volatile material is the difference in

a. Conductivity
b. Molecular weight
c. Molarity
d. Partition coefficients

Ans. (d) Partition coefficients

40. Ion exchange chromatography is based on the

a. Electrostatic attraction
b. Electrical mobility of ionic species
c. Adsorption chromatography
d. Partition chromatography

Ans. (a) Electrostatic attraction

41. In reverse phase chromatography, the stationary phase is made

a. Polar
b. Non-polar
c. Either non-polar or polar
d. Inert

Ans. (b) Non-polar

42. In anion exchange chromatography,

a. The column contains positively charged beads where negatively charged proteins bind
b. The column contains negatively charged beads where positively charged proteins bind
c. The column contains both positive and negatively charged beads where proteins bind depending on their net charge
d. None of these

Ans. (a) The column contains positively charged beads where negatively charged proteins bind

43. Stationary phase in paper chromatography is

a. Gas
b. Either non-polar or polar
c. Solid
d. Semi solid

Ans. (c) Solid

44. Which type of filter paper are mostly used in paper chromatography?

a. Sample paper
b. Filter paper
c. Whatmann filter paper
d. Butter paper

Ans. (c) Whatmann filter paper

45. Size of spot in paper chromatography is

a. 2–5 mm
b. 1–2 mm
c. 7–8 mm
d. 6–8 mm

Ans. (a) 2–5 mm

46. Chromatography can be used to

a. Form mixtures
b. Change mixture compositions
c. Separate mixtures into pure substances
d. Mix the compositions

Ans. (c) Separate mixtures into pure substances

47. Platform where you put the specimen is known as

a. Stage
b. Turret
c. Diaphragm
d. Coarse

Ans. (a) Stage

48. Ocular lens occurs

a. On the path between reflector and object
b. Nearer the eye
c. Nearer the slide
d. Nearer the source of light

Ans. (b) Nearer the eye

49. Svedberg unit is for

a. Molecular weight
b. Density
c. Sedimentation coefficient
d. None of these

Ans. (c) Sedimentation coefficient

50. The term chromatography was given by:

a. Mikhail Tsvet
b. Michael Faraday
c. James and Martin
d. Surface tension

Ans. (a) Mikhail Tsvet

51. In autoradiography, radioactive isotope is located by

a. Geiger counter
b. Scintillation counter
c. Illumination screen
d. Photographic emulsion

Ans. (d) Photographic emulsion

52. A thin layer of cellulose or alumina powder is used for separating chemicals in

a. Column chromatography
b. Paper chromatography
c. Thin layer chromatography
d. Partition chromatography

Ans. (c) Thin layer chromatography

53. Instrument for measuring Svedberg units is

a. Density gradient centrifuge
b. Homogeniser
c. Analytical ultracentrifuge
d. Photometer

Ans. (a) Density gradient centrifuge

54. In Column chromatography, the stationary phase is made of ..... and the mobile phase is made of .....

a. Solid, liquid
b. Liquid, liquid
c. Liquid, gas
d. Solid, gas

Ans (a) Solid, liquid

55. Chromatography is a physical method that is used to separate and analyse .....

a. Simple mixtures
b. Complex mixtures
c. Viscous mixtures
d. Metals

Ans. (b) Complex mixtures

56. In which type of chromatography, the stationary phase held in a narrow tube and the mobile phase is forced through it under pressure?

a. Column chromatography
b. Planar chromatography
c. Liquid chromatography
d. Gas chromatography

Ans. (a) Column chromatography

57. In chromatography, the stationary phase can be ..... supported on a solid

a. Solid or liquid
b. Liquid or gas
c. Solid only
d. Liquid only

Ans. (a) Solid or liquid

58. In chromatography, which of the following can the mobile phase be made of?

a. Solid or liquid
b. Liquid or gas
c. Gas only
d. Liquid only

Ans. (b) Liquid or gas

59. Which of the following cannot be used as an adsorbent in column adsorption chromatography?

a. Magnesium oxide
b. Silica gel
c. Activated alumina
d. Potassium permanganate

Ans. (d) Potassium permanganate

60. Which of the following types of chromatography involves the separation of substances in a mixture over a 0.2 mm thick layer of an adsorbent?

a. Gas liquid
b. Column
c. Thin layer
d. Paper

Ans. (c) Thin layer

61. A method using paper or film with different electric poles at the two ends and used for separation of charged particles is

a. Electroplating
b. Electrolysis
c. Electrophoresis
d. Chromatography

Ans. (c) Electrophoresis

62. Autoclaves are used in the medical applications to perform .....

a. Heating
b. Cleaning
c. Vulcanization
d. Sterilization

Ans. (d) Sterilization

63. What is the inner surface of autoclaves made of?

a. Stainless steel
b. Mild steel
c. Copper
d. Aluminum

Ans. (a) Stainless steel

64. Which of the following is a pressure chamber used to carry out processes at high temperature and pressure.

a. Oven
b. Autoclave
c. Microclave
d. Hot air oven

Ans. (b) Autoclave

65. What is the common temperature used in autoclaves?

a. 109°C
b. 135°C
c. 121°C
d. 142°C

Ans. (c) 121°C

66. Using which of the following components is the generated X-rays focussed upon the specimen?

a. X-ray tube
b. Collimator
c. Monochromator
d. Detector

Ans. (b) Collimator

67. In X-ray spectrometers, the specimen or the sample is placed after which of the following components?

a. Monochromator
b. Collimator
c. Detector
d. X-ray tube

Ans. (d) X-ray tube

68. When the liquid is spun rapidly, the denser particles are forced to the bottom and the lighter particles stay at the top. This principle is used in:

a. Fractional distillation
b. Centrifugation
c. Evaporation
d. Tunneling

Ans. (b) Centrifugation

69. In this type of rotors, the sample tubes are loaded into individual buckets that hang vertically while the rotor is at rest. When the rotor begins to rotate the buckets swing out to a horizontal position

a. Fixed-angle
b. Vertical
c. Swinging bucket
d. None of these

Ans. (c) Swinging-bucket

70. RPM stands for

a. Revolution per minutes
b. Round per minutes
c. Right per minutes
d. None of these

Ans. (a) Revolution per minutes

71. Separation of analyte is based on

a. Size
b. Shape
c. Density
d. All of these

Ans. (d) All of these

72. In this type of rotors, the sample tubes are held fixed at the angle of the rotor cavity. When the rotor begins to rotate, the solution in the tubes reorients

a. Swinging-bucket
b. Fixed-angle
c. Vertical
d. None of these

Ans. (b) Fixed-angle

73. This type of rotor is not suitable for pelleting applications but is most efficient for isopycnic (density) separations due to the short path length.

a. Vertical
b. Fixed-angle
c. Swinging-bucket
d. None of these

Ans. (a) Vertical

74. Differential centrifugation is based on the differences in ..... of biological particles of different .....

a. Size, density
b. Size, structure
c. Mass, size
d. Colour, shape

Ans. (a) Size, density

75. Fine insoluble solid particles can be removed through which of the following process?

a. Crystallization
b. Centrifuging
c. Decanting
d. Separating funnel

Ans. (b) Centrifuging

76. What is the name of the machine that spins in order to separate out components making up a mixture?

a. Centrifugation tube
b. Blood plasma
c. Centrifuge
d. Autoclave

Ans. (c) Centrifuge

77. As compared to light microscope, the resolving power of electron microscope is

a. 1000 times
b. 50 times
c. 10 times
d. 5000 times

Ans. (a) 1000 times

78. SEM stands for

a. Serial electric microscope
b. Scanning electron microscope
c. Sensing electrode module
d. Silver electron microscope

Ans. (b) Scanning electron microscope

79. Electron microscope has a high resolution power. This is due to

a. Very low wavelength of electron beam
b. Low wavelength of light source used
c. High numerical aperture of glass lenses used
d. Electromagnetic lenses

Ans. (a) Very low wavelength of electron beam

80. Phase-contrast microscopy was invented by

a. Louise de Broglie
b. Ernst Ruska
c. J J Thompson
d. Fritz Zernike

Ans. (d) Fritz Zernike

81. Electron microscope is more advantageous than light microscope because it

a. Requires no light
b. Gives depth focus
c. Has higher magnification
d. Has low magnification

Ans. (c) Has higher magnification

82. A technique other than microscopy which can be used in study of cell is

a. Chromatography
b. Autoradiography
c. Plasmolysis
d. Maceration

Ans. (b) Autoradiography

83. Affinity chromatography separation is based on…

a. Specific interaction between the analyte and the ligand
b. Molecular weights—the flow
c. Through time of the analyte
d. The duration of the analyte

Ans. (a) Specific interaction between the analyte and the ligand

84. The sedimentation coefficient has units of time, expressed in

a. Angstrom
b. Wavelength
c. Svedbergs
d. Meter

Ans. (c) Svedbergs

85. TEM stands for

a. Transducer electron microscope
b. Transfer electron microscope
c. Tube electron microscope
d. Transmission electron microscope

Ans. (d) Transmission electron microscope

86. Affinity chromatography can be used for…

a. The study of enzyme substrate interactions
b. The separation of proteins according to their isoelectric points
c. The purification of compounds from a complex matrix
d. The concentration of a compound—the study of enzyme

Ans. (a) The study of enzyme substrate interactions

87. Which of the following separation technique is not based upon size

a. Gel filtration
b. Polyacrylamide gel electrophoresis
c. Isoelctric focussing
d. Velocity sedimentation

Ans. (c) Isoelctric focussing

88. Which of the following is used in electron microscope?

a. Electron beams
b. Magnetic fields
c. Light waves
d. Electron beams and magnetic fields

Ans. (d) Electron beams and magnetic fields

89. Electron microscope can give a magnification up to .....

a. 400,000X
b. 100,000X
c. 15000X
d. 100X

Ans. (a) 400,000X

90. Which of the following are true for electron microscopy?

a. Specimen should be thin and dry
b. Image is obtained on a phosphorescent screen
c. Electron beam must pass through evacuated chamber
d. Specimen should be thin and dry, image is obtained on a phosphorescent screen and electron beam must pass through evacuated chamber

Ans. (d) Specimen should be thin and dry, image is obtained on a phosphorescent screen and electron beam must pass through evacuated chamber

91. Degree of scattering in transmission electron microscope is a function of .....

a. Wavelength of electron beam used
b. Number of atoms that lie in the electron path
c. Number and mass of atoms that lie in the electron path
d. Mass of atoms that lie in the electron path

Ans. (c) Number and mass of atoms that lie in the electron path

92. Negative staining is used for examining .....

a. Virus particles
b. Protein molecules
c. Bacterial flagella
d. Virus particles, protein molecules and bacterial flagella

Ans. (d) Virus particles, protein molecules and bacterial flagella

93. Which among the following helps us in getting a three-dimensional picture of the specimen?

a. Transmission electron microscope
b. Scanning electron microscope
c. Compound microscope
d. Simple microscope

Ans. (b) Scanning electron microscope

94. The secondary electrons radiated back in scanning microscope is collected by?

a. Specimen
b. Anode
c. Vacuum chamber
d. Cathode

Ans. (b) Anode

95. On what factors do the intensity of secondary electrons depends upon?

a. Shape of the irradiated object
b. Chemical composition of the irradiated object
c. Number of electrons ejected
d. Size and chemical composition of the irradiated object, number of electrons ejected and on the number of electrons reabsorbed by surrounding

Ans. (d) Size and chemical composition of the irradiated object, number of electrons ejected and on the number of electrons reabsorbed by surrounding

96. Where do we obtain the magnified image of the specimen in SEM?

a. Cathode ray tube
b. Phosphorescent screen
c. Anode ray tube
d. Scanning generator

Ans. (a) Cathode ray tube

97. In centrifugation , the centrifuge tubes are placed in

a. Rotor b. Pump
c. Detector d. Tube

Ans. (a) Rotor

98. Infrared spectroscopy is the analysis of the interaction of a molecule with

a. Infrared light b. Visible light
c. UV light d. Blue light

Ans. (a) Infrared light

99. Affinity chromatography deals with the

a. Protein-protein interaction
b. Specific binding of a protein constituents for another molecule
c. Protein-carbohydrate interaction
d. None of these

Ans. (b) Specific binding of a protein constituents for another molecule

100. Which of the following scientists is credited with the invention of the electron microscope and awarded the Nobel Prize for the same?

a. Ernst Ruska b. J.J. Thompson
c. Louise de Broglie d. Otto van Borris

Ans. (a) Ernst Ruska

101. The kind of magnifying tool that could be used to observe the internal parts of a cell is a

a. Transmission electron microscope
b. Compound light microscope
c. Magnifying glass
d. Scanning electron microscope

Ans. (a) Transmission electron microscope

102. Which of the following instrument is used to visualise very small objects that cannot be seen with naked eye

a. Centrifuge b. Autoclvae
c. Incubator d. Microscope

Ans. (d) Microscope

103. In X-ray sepctroscopy, generated X-rays can be focussed upon the specimen by using

a. Collimator b. Detector
c. Monochromator d. X-ray tube

Ans. (a) Collimator

104. Electron microscope is used for

a. Structure of the pollen grain
b. Cell division study
c. Whole mount study
d. Viewing structure of the cell

Ans. (d) Viewing structure of the cell

105. NMR stands for

a. Nuclear magnetic resonance
b. New magnetic resonance
c. Nucleus magnetic reaction
d. Novel metal response

Ans. (a) Nuclear magnetic resonance

106. In which of the following type of paper, chromatography does the mobile phase move horizontally over a circular sheet of paper?

a. Ascending paper chromatography
b. Descending paper chromatography
c. Radial paper chromatography
d. Ascending – descending chromatography

Ans. (c) Radial paper chromatography

107. Liquid chromatography can be performed in which of the following ways?

a. Only in columns
b. Only on plane surfaces
c. Either in columns or on plane surfaces
d. Neither in columns nor on plane surfaces

Ans. (c) Either in columns or on plane surfaces

108. Gas chromatography can be performed in which of the following ways?

a. Only in columns
b. Only on plane surfaces
c. Either in columns or on plane surfaces
d. Neither in columns nor on plane surfaces

Ans. (a) Only in columns

109. In Gas-liquid phase chromatography, the stationary phase is composed of ..... and the mobile phase is made of .....

a. Solid, liquid
b. Liquid, liquid
c. Liquid, gas
d. Solid, gas

Ans. (c) Liquid, gas

110. Which of the following types of chromatography involves the process, where the mobile phase moves through the stationary phase by the influence of gravity or capillary action?

a. Column chromatography
b. High pressure liquid chromatography

c. Gas chromatography
d. Planar chromatography

Ans. (d) Planar chromatography

111. Which technique separates charged particles using electric field?

a. Hydrolysis
b. Electrophoresis
c. Protein synthesis
d. Protein denaturing

Ans. (b) Electrophoresis

112. Electrophoresis was developed by:

a. Tswett
b. Tsvedberg
c. Tiselius
d. Sanger

Ans. (c) Tiselius

113. The speed of migration of ions in electric field depends upon:

a. Shape and size of molecule
b. Magnitude of charge and shape of molecule
c. Magnitude of charge shape and mass of molecule
d. Magnitude of charge and mass of molecule

Ans. (b) Magnitude of charge and shape of molecule

114. Which of the following statements is true about migration of biomolecules?

a. The rate of migration is directly proportional to the resistance of medium
b. Rate of migration is directly proportional to current
c. Low voltage is used for separation of high mass molecules
d. Rate of migration is inversely proportional to current

Ans. (b) Rate of migration is directly proportional to current

115. What does the electrophoresis apparatus consist of?

a. Gel, buffer chamber and fire pack
b. Buffer chamber and electrophoresis unit
c. Electrophoresis unit and gel separator
d. Power pack and electrophoresis unit

Ans. (d) Power pack and electrophoresis unit

116. If proteins are separated according to their electrophoretic mobility then the type of electrophoresis is:

a. SDS PAGE
b. Affinity electrophoresis
c. Electrofocussing
d. Free flow electrophoresis

Ans. (a) SDS PAGE

117. Which of the following factors does not influence electrophoretic mobility?

a. Molecular weight
b. Shape of molecule
c. Size of molecule
d. Stereochemistry of molecule

Ans. (d) Stereochemistry of molecule

118. When is electrophoresis not used?

a. Separation of proteins
b. Separation of amino acids
c. Separation of lipids
d. Separation of nucleic acids

Ans. (c) Separation of lipids

119. What cannot be a reason for using electrophoresis?

a. Comparing two sets of DNA
b. Organizing DNA by shape of backbone
c. Organizing DNA fragments from largest to smallest
d. Organizing DNA in order we can see

Ans. (b) Organizing DNA by shape of backbone

120. For the separation of DNA by electrophoresis, which of the following method is commonly used?

a. Agarose—vertical
b. Agarose—horizontal
c. PAGE—vertical
d. PAGE—horizontal

Ans. (b) Agarose—horizontal

121. Sodium dodecyl sulfate (SDS) used in SDS PAGE is ..... .

a. An anionic detergent
b. A cationic detergent
c. A non-ionic detergent
d. An anion exchanger

Ans. (a) An anionic detergent

122. Function of β-mercaptoethanol in SDS-PAGE is ..... .

a. To give negative charges to amino acids in the proteins
b. For the oxidation of disulfide bonds in the proteins
c. For the reduction of disulfide bonds in the proteins
d. For breaking hydrogen bonds in the proteins

Ans. (c) For the reduction of disulfide bonds in the proteins

123. Electrophoresis is not used for the separation of ..... .

a. Nucleic acids
b. Proteins
c. Amino acids
d. Lipids

Ans. (d) Lipids

124. In SDS-PAGE, migration of protein is effected by ..... .

a. Charge of protein
b. Size of protein
c. Net charge of protein
d. All of these

Ans. (b) Size of protein

125. In SDS-PAGE of protein separation, one SDS molecule will binds to ..... .

a. Every amino acid
b. Every two amino acids
c. Every three amino acids
d. Every Four amino acids

Ans. (b) Every two amino acids

126. In 500 × g, what does g represent in accordance to centrifugation?

a. Gravitational force
b. Centrifugal force is 500 times greater than earthly gravitational force
c. Centrifugal force is 500 times less than earthly gravitational force
d. Centrifugal force is 500 times same as that of earthly gravitational force

Ans. (b) Centrifugal force is 500 times greater than earthly gravitational force

127. The different types of energies associated with a molecule are ..... .

a. Electronic energy
b. Vibrational energy
c. Rotational energy
d. All of the mentioned

Ans. (d) All of the mentioned

128. During the motion, if the centre of gravity of molecule changes, the molecule possess ..... .

a. Electronic energy
b. Rotational energy
c. Translational energy
d. Vibrational energy

Ans. (c) Translational energy

129. In gas chromatography, the carrier gas must be chemically

a. Inert
b. Active
c. Volatile
d. Non volatile

Ans. (a) Inert

130. The region of electromagnetic spectrum for nuclear magnetic resonance is ..... .

a. Microwave
b. Radiofrequency
c. Infrared
d. UV-rays

Ans. (b) Radiofrequency

131. Which of the following is an application of molecular spectroscopy?

a. Structural investigation
b. Basis of understanding of colors
c. Study of energetically excited reaction products
d. All of the mentioned

Ans. (d) All of the mentioned

132. Electric field is used in separating chemicals in

a. Column chromatography
b. Ion exchange chromatography
c. Electrophoresis
d. Thin layer chromatography

Ans. (c) Electrophoresis

133. Isopycnic or equal density centrifugation is achieved in

a. Electrophoresis
b. Buoyant density centrifugation
c. Density gradient centrifugation
d. Differential centrifugation

Ans. (c) Density gradient centrifugation

134. Ultrastructure of a cell organelle can best be studied through

a. Electron microscope
b. Phase-contrast microscope
c. Autoradiography
d. Differential centrifugation

Ans. (a) Electron microscope

135. NMR spectroscopy is used for determining structure in which of the following materials?

a. Radioactive materials
b. Insoluble chemical compounds
c. Liquids
d. Differential centrifugation

Ans. (c) Liquids

136. NMR is the study of absorption of ..... by nuclei in a magnetic field?

a. Radioactive radiation
b. IR radiation
c. Radiofrequency radiation
d. Microwaves

Ans. (c) Radiofrequency radiation

137. NMR spectrometer provides ..... and ..... method of determining structure in soluble chemical compounds.

a. Accurate, destructive
b. Accurate, non-destructive
c. Inaccurate, destructive
d. Inaccurate, non-destructive

Ans. (b) Accurate, non-destructive

138. NMR spectroscopy indicates the chemical nature of the ..... and spatial positions of .....

a. Electrons, protons
b. Neutrons, electrons
c. Nuclei, electrons
d. Nuclei, neighbouring nuclei

Ans. (d) Nuclei, neighbouring nuclei

139. In NMR spectroscopy, the spinning nuclei in strong magnetic field must be irradiated by which of the following?

a. Perpendicular and stronger field
b. Perpendicular and weaker field
c. Parallel and stronger field
d. Parallel and weaker field

Ans. (b) Perpendicular and weaker field

140. Interaction between matter and electromagnetic radiation can be observed by subjecting a substance to magnetic fields in which of the following manner?

a. Both fields should be stationary
b. Both fields should be varying
c. One field should be stationary and the other should be varying
d. It must be subjected to only one field

Ans. (c) One field should be stationary and the other should be varying

141. When energy is absorbed by the sample, the absorption can be observed as a change in signal developed by which of the following components?

a. Amplifier
b. Photodetector
c. GM counter
d. Radiofrequency detector

Ans. (d) Radiofrequency detector

142. Which of the following are considered to be the lowest form of electromagnetic radiation?

a. IR radiation
b. Microwaves
c. UV radiation
d. Radiowaves

Ans. (d) Radiowaves

143. The amount of energy available in radiofrequency radiation is sufficient for which of the following?

a. Excite an atom
b. Vibrate an atom
c. Vibrate a molecule
d. Affect the nuclear spin of an atom

Ans. (d) Affect the nuclear spin of an atom

144. Nuclei having either the number of protons or neutrons as odd have ..... spin.

a. Integral
b. Half integral
c. Zero
d. Positive

Ans. (b) Half integral

145. If the number of protons or neutrons is even the spin of the nucleus will be which of the following?

a. Integral spin
b. Half integral spin
c. Zero spin
d. Positive spin

Ans (c) Zero spin

146. The difference between the field necessary for resonance in the sample and in some arbitrary chosen compound is which of the following?

a. Field shift
b. Matrix effects
c. Chemical shift
d. Resonance shift

Ans. (c) Chemical shift

147. Mass spectrometers are used to determine which of the following?

a. Composition in sample
b. Concentration of elements in sample
c. Relative mass of atoms
d. Properties of sample

Ans. (c) Relative mass of atoms

148. Who invented mass spectrometers?

a. J.J. Thomson
b. Goldstein
c. Nikola Tesla
d. Aston

Ans. (a) J.J. Thomson

149. In mass spectrometer, the sample that has to be analysed is bombarded with which of the following

a. Protons
b. Electrons
c. Neutrons
d. Alpha particles

Ans. (b) Electrons

150. Mass spectrometer separates ions on the basis of which of the following?

a. Mass
b. Charge
c. Molecular weight
d. Mass to charge ratio

Ans. (d) Mass to charge ratio

151. In mass spectrometer, the ions are sorted out in which of the following ways?

a. By accelerating them through electric field
b. By accelerating them through magnetic field
c. By accelerating them through electric and magnetic field
d. By applying a high voltage

Ans. (c) By accelerating them through electric and magnetic field

152. The procedure for mass spectroscopy starts with which of the following processes?

a. The sample is bombarded by electron beam
b. The ions are separated by passing them into electric and magnetic field
c. The sample is converted into gaseous state
d. The ions are detected

Ans. (c) The sample is converted into gaseous state

153. In a mass spectrometer, the ion currents are measured using which of the following?

a. Scintillation counter
b. Ion counter
c. Electrometer tube
d. Electric fields

Ans. (c) Electrometer tube

154. Which of the following ions pass through the slit and reach the collecting plate?

a. Negative ions of all masses
b. Positive ions of all masses
c. Negative ions of specific mass
d. Positive ions of specific mass

Ans. (d) Positive ions of specific mass

155. Which of the following statements is not true about mass spectrometry?

a. Impurities of masses different from the one being analysed interferes with the result
b. It has great sensitivity
c. It is suitable for data storage
d. It is suitable for library retrieval

Ans. (a) Impurities of masses different from the one being analysed interferes with the result

156. What are the main criteria on which mass spectrometer used for?

a. Composition in sample
b. Relative mass of atoms
c. Concentration of elements in the sample
d. Properties of sample

Ans. (b) Relative mass of atoms

157. Pure fractions of cellular components can be obtained by

a. Differential centrifugation
b. Autoradiography
c. X-ray diffraction
d. Spectrophotometry

Ans. (a) Differential centrifugation

158. Electrophoresis cannot be used to separate .....

a. DNA
b. RNA
c. Histone
d. Protein

Ans. (c) Histone

159. The fluorescent dye such Ethidium is used for visualizing DNA. How do ethidium binds to DNA?

a. Stacked between histone molecules
b. Binds to the nucleotide base
c. Intercalated between the stacked bases
d. Binds to the phosphodiester backbone

Ans. (c) Intercalated between the stacked bases

160. The polymerization of the gel used in PAGE occurs between polyacrylamide and .....

a. N, N-acrylamide
b. Bisacrylamide
c. N-methylene acrylamide
d. N, N-methylene bisacrylamide

Ans. (d) N, N-methylene bisacrylamide

161. In electrophoresis, DNA will migrate towards

a. Anode or negative electrode
b. Cathode or positive electrode
c. Cathode or negative electrode
d. Anode or positive electrode

Ans. (b) Cathode or positive electrode

162. Which of the following is not a characteristic of the immobilized enzymes?

a. They cannot be re-used
b. It produces reproducible results
c. Stability exists
d. Same catalytic activity is present for number of analysis

Ans. (a) They cannot be re-used

163. Which of the following is the physicochemical component?

a. Enzymes
b. Antibodies
c. Transducer
d. Cells or tissues

Ans. (c) Transducer

164. An example of biosensor, urea electrode makes use of which of the following electrodes?

a. Carbon dioxide electrode
b. Ammonia electrode
c. Fluoride electrode
d. Ammonium electrode

Ans. (d) Ammonium electrode

165. In glucose electrode, glucose oxidase has been coupled to an electrode by which of the following materials?

a. Ferrocene derivatives b. Urease
c. Polyacrylamide d. Biochips

Ans. (a) Ferrocene derivatives

166. Biosensors measure glucose concentrations between which of the following ranges?

a. 10^{-1} to 10^{-2} M b. 10^{-2} to 10^{-4} M
c. 10^{-1} to 10^{-4} M d. 10^{-1} to 10^{-7} M

Ans. (d) 10^{-1} to 10^{-7} M

167. Transducers employed in the bulk of enzyme electrodes use which of the following principles?

a. Amperometric b. Optical
c. Magnetic d. Colorimetric

Ans. (a) Amperometric

168. Which of these biosensors use the principle of heat released or absorbed by a reaction?

a. Potentiometric biosensor
b. Optical biosensors
c. Piezoelectric biosensors
d. Calorimetric biosensors

Ans. (d) Calorimetric biosensors

169. Which of the following biosensors use the movement of electrons produced during redox reactions?

a. Amperometric biosensor
b. Potentiometric biosensors
c. Piezoelectric biosensors
d. Optical biosensors

Ans. (a) Amperometric biosensor

170. For constructing the glucose sensor, which of the following is used as a gel?

a. Urea
b. Urease
c. Acrylamide
d. Polyacrylamide

Ans. (d) Polyacrylamide

171. Doppler velocimetry works on the principle of .....

a. Frequency measurement of fiber optic sensor
b. Amplitude measurement of fiber optic sensor
c. Phase measurement of fiber optic sensor
d. Time shift measurement of fiber optic sensor

Ans. (a) Frequency measurement of fiber optic sensor

172. Fluoroptic temperature sensors work on the principle of .....

a. Thermistor b. Thermocouple
c. Cptical fiber d. Rtd

Ans. (c) Optical fiber

173. Monopolar needle ectrode have a coating of which material over the stainless steel wires which are bare only at the tips?

a. Carbon b. Calcium
c. Sodium d. Teflon

Ans. (d) Teflon

174. Endoscopic imaging uses .....

a. Thermal sensors b. Chemical sensors
c. Cptic fiber sensors d. Pressure sensors

Ans. (c) Optic fiber sensors

175. ..... converts biochemical events into measurable signals.

a. Amplifier b. Opamp
c. Rectifier d. Transducer

Ans. (d) Transducer

176. The biological response of the biosensor is determined by .....

a. Biocatalytic membrane
b. Physiochemical membrane
c. Chemical membrane
d. Artificial membrane

Ans. (a) Biocatalytic membrane

177. Human blood glucose sensor works on which principle?

a. Electrophysiological b. Electrochemical
c. Physiochemical d. Chemical

Ans. (b) Electrochemical

178. The chemical reaction of glucose with oxygen is catalyzed in the presence of .....

a. Glucose oxidase
b. Monoglucose carbodase

c. Glusose dioxidase
d. Biglucose oxidase

Ans. (a) Glucose oxidase

179. Beer Lambert's law gives the relation between which of the following?

a. Reflected radiation and concentration
b. Scattered radiation and concentration
c. Energy absorption and concentration
d. Energy absorption and reflected radiation

Ans. (c) Energy absorption and concentration

180. Select the wavelength range corresponding to UV-visible region.

a. 400–800 nm
b. 25 µm – 2.5 µm
c. 200–800 nm
d. 2.5 µm – 1 mm

Ans. (c) 200–800 nm

181. What is role of slit in UV-visible spectroscopy ?

a. Monochromatic radiation to polychromatic radiation
b. Polychromatic radiation to monochromatic radiation
c. Ultraviolet radiation to visible radiation
d. None of these

Ans. (b) Polychromatic radiation to monochromatic radiation

182. Proteins can be visualized directly in gels by

a. Using electron microscope only
b. Measuring their molecular weight
c. Staining them with the dye
d. None of these

Ans. (c) Staining them with the dye

183. In isoelectric focussing, proteins are separated on the basis of their

a. A relative content of positively charged residue only
b. Relative content of negatively charged residue only
c. Relative content of positively and negatively charged residue
d. None of these

Ans. (c) relative content of positively and negatively charged residue

184. How is the molar concentration of solute in stationary phase related to molar conc. of solute in mobile phase

a. Directly proportional
b. Inversely proposition
c. Equal
d. Not related

Ans. (a) Directly proportional

185. pH at which, the amino acids does not migrate in an electricfield in

a. Electric point
b. End point
c. Start point
d. Isoelectric point

Ans. (d) Isoelectric point

186. What is the pH value of pure water?

a. Less than 7
b. Greater than 14
c. Greater than 7
d. Equal to 7

Ans. (d) Equal to 7

187. Molecules containing radioisotopes are employed in

a. Autoradiography
b. Spectroscopy
c. Chromatography
d. Electrophoresis

Ans. (a) Autoradiography

188. The 'tracking dye' used in SDS PAGE will be ..... .

a. Anionic
b. Cationic
c. Non-ionic
d. Amphipathic

Ans. (a) Anionic

189. Glycerol is added to protein samples before they are loaded to the 'wells' of PAGE. The function of glycerol is to ..... .

a. Stabilize protein structure
b. Provide density to the sample
c. Helps to bind SDS to protein sample
d. Helps to reduce disulfide bonds

Ans. (b) Provide density to the sample

190. Which would be best to separate a protein that binds strongly to its substrate?

a. Gel filtration
b. Cation exchange
c. Affinity chromatography
d. Anion exchange

Ans. (c) Affinity chromatography

191. Proteins can be separated with .....

a. SDS page
b. Northern blot
c. PCR
d. Southern blot

Ans. (a) SDS page

192. In TLC, initially the sample is

a. In contact with mobile phase
b. Coated at the level of mobile phase

c. Coated below the level of mobile phase
d. Not in contact with mobile phase

Ans. (d) Not in contact with mobile phase

193. The chromaplate or thin layer chromatography plate is made up of .....

a. Wood
b. Fibre
c. Glass
d. Metal

Ans. (c) Glass

194. Which of the following is the physicochemical component?

a. Enzymes
b. Antibodies
c. Cells or tissues
d. Transducer

Ans. (d) Transducer

195. Piezoelectric transducer is used for measuring

a. Vibrational quantities
b. Electrical quantities
c. Chemical quantities
d. Any quantity

Ans. (a) Vibrational quantities

196. Electrical transducers generate .....

a. Biological signals
b. Chemical signals
c. Electrical signals
d. Physical signals

Ans. (c) Electrical signals

197. The sedimentation rate or velocity of the biological particle is expressed as its

a. Velocity coefficient
b. Sedimentation coefficient
c. Particle coefficient
d. Relative coefficient

Ans. (b) Sedimentation coefficient

198. RCF in centrifugation refers as

a. Relative centrifugal force
b. Relaxed centrifugal force
c. Repulse centrifugal force
d. Rational centrifugal force

Ans. (a) Relative centrifugal force

199. In affinity chromatography which type of arm ensures that the traget molecule has a full access to the ligand

a. Spacer arm
b. Right arm
c. Left arm
d. Light arm

Ans. (a) Spacer arm

200. Gel-filtration chromatography separates on the basis of

a. Size using porous beads packed in a column
b. Size and shape using porous beads packed in a column
c. Shape using porous beads packed in a column
d. None of these

Ans. (b) Size and shape using porous beads packed in a column

201. Diagnosis of Influenza virus can be done using which technique

a. Western blot and southern blot
b. Northern blot and western blot
c. ELISA and RT PCR
d. PCR and electron microscopy

Choose combination of techniques

a. a and b only
b. c and d only
c. b and c only
d. a and d only

Ans. (c) b and c only

202. Immuno precipitation involves the purification of

a. Antigen–antibody complex
b. Antigen and antibody
c. Antibody
d. Antigen

Ans. (a) Antigen–antibody complex

203. Enzyme linked immunosorbent assay is a

a. *In vitro* assay
b. *In silico* assay
c. Wet assay
d. Dry assay

Ans. (c) Wet assay

CHECK YOUR GRASP

1. What is the correct name for the microscope lens located in the eyepiece?

a. Binocular
b. Objective
c. Condenser
d. Ocular

2. All the following are components of compound microscope except

a. Stage clips
b. Fine adjustment
c. Binocular eye piece
d. Electron gun

3. Which part of the light microscope controls the intensity of light entering the viewing area?

a. Coarse adjustment screw
b. Fine adjustment screw
c. Diaphragm
d. Condenser lens

4. What is the greatest resolution in light microscopy?

a. Longest wavelength of visible light used
b. An objective with minimum numerical aperture
c. Shortest wavelength of visible light used
d. Shortest wavelength of visible light used and an objective with the maximum numerical aperture

5. In gel permeation chromatography which molecules will be eluted last?

a. Larger molecules
b. Intermediate molecules
c. Small molecules
d. Larger molecules

6. Which technique is much superior in terms of the speed, efficiency, sensitivity and ease of operation?

a. Adsorption chromatography
b. High performance liquid chromatography
c. Ion-exchange chromatography
d. Gel-permeation chromatography

7. A thin layer of cellulose or alumina powder is used for separating chemicals in

a. Column chromatography
b. Paper chromatography
c. Thin layer chromatography
d. Partition chromatography

8. Affinity chromatography deals with the

a. Protein-protein interaction
b. Specific binding of a protein constituents for another molecule
c. Protein-carbohydrate interaction
d. None of these

9. What cannot be a reason for using electrophoresis?

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d. Organizing DNA in order we can see

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d. Differential centrifugation

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b. Relaxed centrifugal force
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In case of less than 80% score, go through brief review and glance once again from chapter

Key: 1-d 2-d 3-c 4-d 5-c 6-b 7-c 8-b 9-b 10-c 11-c 12-c 13-c 14-a 15-c

15

Environmental Biotechnology

1. Bioaccumulation/biomagnifications may occurs due to which of the following reason?

a. Consumption of these organisms by other organisms leads to further accumulation in the lipid deposits of the body
b. The xenobiotics compounds are recalcitrant and lipids soluble
c. Both a and b is correct
d. None of these

Ans. (c) Both a and b is correct

2. Environment consists of which of the following?

a. Sum total of abiotic factor
b. Sum total of biotic factor
c. Both a and b minus humans
d. Both a and b are correct

Ans. (c) Both a and b minus humans

3. Which of the following abiotic components of environment contributes in various way to fulfilment of human needs?

a. Soil
b. Water
c. Air
d. All of the above

Ans. (d) All of the above

4. Which of the following constitutes environmental biotechnology?

a. Technology generate less waste
b. Technology for nonbiodegradable
c. Waste disposal
d. None of the above

Ans. (c) Waste disposal

5. Which of the following constitutes called 'front of pipe' technology?

a. Waste disposal
b. Technology generating less waste
c. Both a and b
d. Only a is correct

Ans. (d) Only a is correct

6. Which of the following constitutes called 'end of pipe' technology?

a. Waste treatment
b. Water disposal
c. Water deposition
d. All of the above

Ans. (a) Waste treatment

7. Water analysis is done to achieve which of the following objective?

a. No need to protect aquatic *flora* and *fauna*
b. To maintain and improve the quality of water for various uses like recreation, irrigation, etc.
c. No need to control the pollution level of water bodies
d. All of the above

Ans. (b) To maintain and improve the quality of water for various uses like recreation, irrigation, etc.

8. Which of the following properties are studied to determine water quality?

a. Chemical properties
b. Aroma properties
c. Colour properties
d. None of these

Ans. (a) Chemical properties

9. Which of the following is the contribution of biotechnology to waste treatment and environmental management?

a. Technology for degradation and conversion of readily biodegradable wastes
b. Cleaner technologies of production, which generate less waste and pollutants
c. Development of more sensitive and rapid detection techniques for a variety of pollutants
d. All of the above

Ans. (d) All of the above

10. Which of the following statements are correct about wastes and pollutants?

a. House building and domestic activities generate only non-biodegradable waste
b. Manufacturing industries using biological materials generate wastes of biological substance. Which are biodegradable

c. Transport is a minor contributor to atmospheric pollution
d. Manufacturing industries using biological materials generate non biodegradable waste

Ans. (b) Manufacturing industries using biological materials generate wastes of biological substance. Which are biodegradable

11. Xenobiotics compounds may be recalcitrant due to which of the following reasons?

a. Their smaller molecular size prevents their entry into microbial cells
b. Lack of permease needed for their transport in to microbial
c. They are recognised as substrate by the existing degradative enzyme
d. All of the above

Ans. (b) Lack of permease needed for their transport in to microbial

12. Recalcitrant xenobiotics compounds are highly stable due to the presence of which of the following substitution groups?

a. Halogens and carbamyl groups
b. Immuno and ethoxy group
c. Floro and nitrate group
d. All of the above

Ans. (a) Halogens and carbamyl groups

13. Which of the following hazards is associated with xenobiotics?

a. Certain halogenated hydrocarbons have been shown to be carcinogenic
b. Many xenobiotics are recalcitrant and persist in the environment
c. At low concentration, they may cause various skin problems and reduce reproductive
d. All of the above

Ans. (d) All of the above

14. Chemical wastes may be classified into which of the following?

a. Non-biodegradable
b. Calcitrant
c. Both a and b
d. None of these

Ans. (a) Non-biodegradable

15. Which of the following disease spread through contaminated water/food?

a. Tuberculosis
b. Typhoid
c. Black fever
d. All of the above

Ans. (b) Typhoid

16. Which of the following is not an example of physical pollutants?

a. Heavy metal
b. Radiation
c. Mechanical stress
d. Sound pollution

Ans. (a) Heavy metal

17. Presence of coliform bacteria in water is indicative of contamination by mammalian excreata ad suggestive of the presence of which of the following pathogenic bacteria?

a. *Shigella*
b. *Vibrio cholera*
c. *Salmonella*
d. All of the above

Ans. (d) All of the above

18. Water analysis permits which of the following?

a. Determination of polluting effects of various effluents and wastes discharged in water course
b. Determination of its suitability for various uses
c. Development of water quality objectives and strands
d. All of the above

Ans. (d) All of the above

19. Which of the following pollutants pose immediate threat to humans and is included in the black list?

a. Organophosphates, cyanides and asbestos.
b. Heavy metals, metalloids and compounds containing them
c. Oil and hydrocarbons from crude oils
d. All of the above

Ans. (d) All of the above

20. Various approaches to waste treatment may be grouped into which of the following categories?

a. Aerobic digestion
b. Bioreactor
c. Technology generating less waste
d. None of these

Ans. (a) Aerobic digestion

21. Among the given microorganisms, which one is the most commonly found in aerobic digestion systems?

a. Bacteria
b. Protozoa
c. Algae
d. Fungi

Ans. (a) Bacteria

22. Which of the following is correct about biofertilizers?

a. In the two phase bio-filters, the biological agents are immunobilized on the membrane on the side of liquid phase
b. Due to lack of control on the biomass unpredictable results of bioconversion of gases is obtained in the solid support system
c. These devices consist of either a solid support or a two-has system
d. All of the above

Ans. (d) All of the above

23. Which of the following statements are correct about liquid wastes?

a. They are treated by only anaerobic digestion
b. The main objectives of treatment are to enhance the amount of organic material and to inactivate pathogenic organisms
c. Agriculture use of sludge is limited by the presence of heavy metals, exotic xenobiotics, and pathogenic microorganisms
d. All of the above

Ans. (c) Agriculture use of sludge is limited by the presence of heavy metals, exotic xenobiotics, and pathogenic microorganisms

24. Landfill sites can be useful in which of following ways?

a. As a source of organic fertilizers
b. As a source of methane gas
c. Reclamation of derelict sites to develop
d. All of the above

Ans. (c) Reclamation of derelict sites to develop

25. In case of water quality, the quality parameter of biological properties includes which of the following?

a. Total coccus form bacteria
b. Faccal streptococci counts
c. Clorela count
d. All of the above

Ans. (b) Faccal streptococci counts

26. Bioremediation of inorganic contaminants is

a. Microorganisms
b. Plant species
c. Xerophytic species
d. None of the above

Ans. (b) Plant species

27. Solid waste is collected and may be pre-treated in some way before being placed in the pit. The pre-treatment may be which of the following?

a. Incineration
b. Sorting of the wastes
c. Mechanical pulverization
d. All of the above

Ans. (d) All of the above

28. The water from landfills may contains which of the following?

a. BOD value of 1000–2000
b. Sodium up to 1000 mg/l
c. Total solid content upto 6000–7000 mg/l
d. COD value of 200–300

Ans. (c) Total solid content upto 6000–7000 mg/l

29. The various parameters used to determine the level of pollution in water bodies, usually, determine which of the following?

a. Amount of important inorganic nutrient
b. Amount of waste matter present in the water
c. Numbers of bacteria per millilitre of waste water
d. All of the above

Ans. (a) Amount of important inorganic nutrient

30. Which of the following statements is correct about landfill management?

a. The risk of damage from landfill leachate may be avoided by lining the pit with an impermeable material
b. The risk due to methane can be removed by burning or tapping
c. The risk of fires, offensive odours and increased vector population may be circumvented by covering the waste water
d. All of the above

Ans. (d) All of the above

31. Which of the following parameter is used to determined the level of pollution in water bodies like rivers?

a. Ammoniacal nitrogen and phosphate content
b. Biochemical and chemical oxygen demand
c. Suspended solid
d. All of the above

Ans. (d) All of the above

32. Which of the following statement are correct?

a. Measurements of chlorine in water are based on colorimetric assay
b. BOD estimates the amount of biologically oxidisable organic matter present in water
c. COD is an estimate of the chemically oxidisable inorganic matter present in water
d. All of the above

Ans. (b) BOD estimates the amount of biologically oxidisable organic matter present in water

33. Recalcitrant xenobiotics compounds can be grouped into which of the following types?

a. Synthetic polymers b. Polysaccharides
c. Alkylbenzyl nitrate d. All of the above

Ans. (a) Synthetic polymers

34. Which of the following waste water treatment is an anaerobic process?

a. Sludge treatment b. Tertiary treatment
c. Primary treatment d. All of the above

Ans. (a) Sludge treatment

35. Preliminary treatment for waste water is necessary to prevent which of the following?

a. Interference with subsequent process
b. Damage to pump
c. Cogging of pipeline
d. All of the above

Ans. (d) All of the above

36. Which of the following is correct about aerobic digestion of waste water?

a. Bacteria are responsible for the removal of about 10–20% of the BOD
b. Bacterial population may be more common organism
c. Bacterial population may be less than 100 cell/ml
d. All of the above

Ans. (b) Bacterial population may be more common organism

37. Practical application of microbes for xenobiotics degradation is facilitated by which of the following?

a. Maintenance of the xenobiotics compounds at toxic levels
b. Provision of microbial population
c. Supply of sufficient nutrient
d. Both b and c

Ans. (d) Both b and c

38. Rotating biological contactor offer which of the following advantage?

a. Large scale application
b. Very high maintenance
c. Low land requirements
d. All of the above

Ans. (c) Low land requirements

39. During determination of water quality, which of the following chemical properties are measured?

a. Total chlorine and phosphate
b. Total insecticide
c. BOD and COD
d. All of the above

Ans. (c) BOD and COD

40. Aeration in the digester vessel is achieved by which of the following?

a. Introducing pure CO_2 as a fine stream of bubbles
b. Chemical stirring
c. Generating coarse air bubble stream from a system of pipes
d. None of these

Ans. (c) Generating coarse air bubble stream from a system of pipes

41. The quality of treated effluent from the digester depends mainly on which the following?

a. Residence time
b. Organic loading rate
c. Sludge loading rate
d. All of the above

Ans. (d) All of the above

42. NO_3^- is removed from water by the action of which of the following bacteria?

a. Streptococcus b. Micrococcus
c. Nitrobactor d. Nitrosomonas

Ans. (b) Micrococcus

43. Which of the following statement are correct about Denitrification?

a. Denitrification is often achieved by alternating aerobic and anaerobic condition
b. Denitrifying bacteria are aerobic
c. Denitrification bacteria convert NO^{-2} to NO^{-3}
d. Denitrification may also produce various oxides of nitrogen in addition of Cl_2

Ans. (a) Denitrification is often achieved by alternating aerobic and anaerobic condition

44. Sewage contains which of the following pathogenic organisms?

a. Bacteria causing typhoid, cholera, diarrhoea
b. Viruses causes cholera, diarrhoea
c. Protozoa causes tetanus
d. All of the above

Ans. (a) Bacteria causing typhoid, cholera, diarrhoea

45. Protozoa are represented in waste water by which of the following?

a. Ascaris form b. Pseudopodia
c. Lopopodia d. Amoebal forms

Ans. (d) Amoebal forms

46. Efficiency of anaerobic digestion can be enhanced by which of the following?

a. By recycling the active biomass
b. By limiting the biomass loss to a rate compatible with high population density in the digester.
c. By using solid support to retain biomass
d. All of the above

Ans. (d) All of the above

47. Bioremediation of organic contaminants in primarily based on which of the following?

a. Microorganisms artificially present at the site
b. Microbial inoculants developed in the laboratory and introduced at the site
c. Suitable plants not planted at the site
d. None of these

Ans. (b) Microbial inoculants developed in the laboratory and introduced at the site

48. Oil spills cause severe damage to the ecosystem and pose which of the following threats?

a. Water pollution due to evaporation
b. Fire
c. Air water pollution due to percolation
d. All of the above

Ans. (b) Fire

49. Which of the following statement is not correct?

a. Oilzapper has not been effective in field trials
b. In india, a consortium of bacterial species has developed to combat oilspills and oily sludge; the inoculants is aptly called oilzapper
c. Inoculation with oilzapper reduced oil sludge contamination in soil to merely 0.5 ub 360 dyas from the initial 13.14%
d. The U.S. Environment protection Agency and the exxon company used microorganisms to clean up Alaskan beaches contaminated by the Valdez oil spill

Ans. (a) Oilzapper has not been effective in field trials

50. The anaerobic digestion process involves a wide variety of organisms which digest the organic molecules, such as lipids, protein, carbohydrates, etc. into mainly which of the following?

a. CH_4 and CO_2
b. NO_2 and CO_3
c. SO_4 and CO
d. SO_3 and CO_2

Ans. (a) CH_4 and CO_2

51. Biofilms contain a complex community of organisms, which degrade coarbohydrates, proteins, lipids etc. Into which of the following?

a. PO^{-3} b. SO_2
c. CO_2 d. NO_2

Ans. (c) CO_2

52. Which of the following heterotropic bacteria are responsible for oxidation of organic matter?

a. Pesticides leach into water bodies, where many of them are subjected to biomagnifications
b. They contain different numbers of halogen atoms in the place of He atoms
c. They used as a solvent, in condenser units of cooling system
d. The C1-C2 haloalkane escape in to the atmosphere where they destroys the protective ozone layer

Ans. (b) They contain different numbers of halogen atoms in the place of He atoms

53. Which of the following heterotrophic bacteria are responsible for oxidation of organic molecules?

a. Shigella and Aerobactor
b. Pseudomonas and Escherichia
c. Streptococcus and salmonelia
d. All of the above

Ans. (d) All of the above

54. Which of the following is correct about alkylbenzyl sulphonates?

a. Sulphonate group present at both end resists microbial degradation
b. At present, alkylbenzyl sulphonates are biodegraded by β-oxidation from their alkyl group
c. These are not surface active detergents
d. All of these

Ans. (b) At present, alkylbenzyl sulphonates are biodegraded by β-oxidation from their alkyl group

55. Phytoremediation has which of the following inherent technical technical limitation?

a. The site must be sufficiently large for easy plant cultivation
b. The contamination must be present within the root zones of actively growing plants.
c. It takes much longer than do dig and dump techniques.
d. All of the above

Ans. (d) All of the above

56. For phytoremediation of fly ash, seedlings of which of the following trees are established at abandoned fly ash pond/dams?

a. Seqoia
b. Dabargia siso
c. Popular
d. Cinchona

Ans. (c) Popular

57. Continued exposure of microorganisms to xenobiotics compounds can often lead to the evolution of metabolic processes needed to wholly or partly degrade the xenobiotics. These capabilities may arise due to which of the following?

a. Translation
b. Termination
c. Transfer of plasmid-borne genes
d. Transcription

Ans. (c) Transfer of plasmid-borne genes

58. Alicyclic hydrocarbons are present naturally in which of the following?

a. Wax from bee
b. Microbial lipid
c. Safflower oil
d. All of the above

Ans. (b) Microbial lipid

59. Which of the following is correct about oxidation of aromatic hydrocarbons?

a. These are oxidized by oxidoreductase to catechol
b. These are not oxidized by oxidoreducase to catechol
c. Catechol if further metabolised by metering cleavage pathway to yield 2-hydroxymyconic semialdehyde
d. None of these

Ans. (a) These are oxidized by oxidoreductase to catechol

60. Which of the following is not related to green house gas?

a. CFC
b. CO_2
c. O_2
d. CH_4

Ans. (c) O_2

61. Which of the following statements are correct about aliphatic hydrocarbons?

a. Biodegradation of n-alkane is catalyzed by oxygenase to produce carboxylic acid
b. Saturated aliphatics are easier to degrade than unsaturated ones
c. They may be saturated or unsaturated
d. All of the above

Ans. (d) All of the above

62. Flurode pollution mainly affected which of the following?

a. Liver
b. Brain
c. Teeth
d. Stomach

Ans. (c) Teeth

63. Which of the following statement are correct about aromatic hydrocarbons?

a. Catechol is further metabolised by two separate pathways called ortho-clevage pathway and meta-clevage pathway
b. Benzene is degraded by the ortho cleavage pathway
c. They are oxidised by di-oxygenases to catechol
d. All of the above

Ans. (d) All of the above

64. Biochemical oxygen demand measures which of the following?

a. Water pollution
b. Dissolved O_2 needed by microbes to decompose organic waste
c. Oxygen need to support microorganism growth
d. Industrial pollution

Ans. (b) Dissolved O_2 needed by microbes to decompose organic waste

65. The aerobic degradation of halogenated aromatic compounds usually involves which of the following?

a. Cleavage of the ring by ortho- or meta cleavage
b. Elimination of the halogen from the straight chain product
c. Degradation
d. All of the above

Ans. (d) All of the above

66. Smog is the product of the which of the following?

a. Smoke +fog
b. Fog + carbon
c. Smoke +water
d. Water + carbon

Ans. (a) Smoke +fog

67. Green house effect is related to which of the following?

a. Global warming
b. Noise pollution
c. Water pollution
d. Global afforestation

Ans. (a) Global warming

68. The national Institute of Oceanography is presently situated at

a. Kerala b. Calicut
c. Goa d. Cochin

Ans. (c) Goa

69. Mycorrhizae help in the uptake of

a. Potassium b. Phosphorus
c. Nitrate d. Boron

Ans. (b) Phosphorus

70. Chaparral vegetation is found in which area?

a. Deccan plateau
b. Coastal India
c. Mediterranean areas
d. Between equator and temperature

Ans. (c) Mediterranean areas

71. The residence time of N_2O in atmosphere is approximately

a. 15 years b. 114–120 years
c. 15 weeks d. 15 days

Ans. (b) 114–120 years

72. Which elemental cycle has no atmospheric reservoir?

a. Sulphur b. Carbon
c. Nitrogen d. Phosphorus

Ans. (d) Phosphorus

73. Muscovite is example of which group of minerals?

a. Feldspar b. Ferromagnesium
c. Quartz d. Mica

Ans. (d) Mica

74. Highest porosity is found in

a. Sand b. Clay
c. Gravel d. Silt

Ans. (b) Clay

75. Solubility of gases in water can be calculated by using

a. Darcy's law b. Henry's law
c. Avagadro's law d. Stoke's law

Ans. (b) Henry's law

76. The main constituent of biogas is

a. H_2 b. H_2S
c. N_2 d. CH_4

Ans. (d) CH_4

77. The actual global average surface air temperature is about

a. 331 K
b. 288 K
c. 18°C
d. 21°C

Ans. (b) 288 K

78. The ministry of environment was set up in

a. 1970 b. 1980
c. 1975 d. 1985

Ans. (b) 1980

79. Age of earth is approximately

a. 3.5 billion
b. 4.5 billion
c. 4.5 million
d. 3.5 million

Ans. (b) 4.5 billion

80. Among the following which gas is found in maximum concentration in atmosphere?

a. Rn b. Xe
c. Kr d. Ar

Ans. (d) Ar

81. Ventilation coefficient is

a. Maximum mixing depth divided by average wind speed.
b. Product of maximum mixing depth and maximum wind speed.
c. Maximum mixing height divided by maximum wind speed
d. Product of maximum mixing depth and average wind speed

Ans. (d) Product of maximum mixing depth and average wind speed

82. Mosquito repellent coil/ mats contain

a. Paraquat
b. BHC
c. Toxaphene
d. Derivatives of allethrin

Ans. (d) Derivatives of allethrin

83. The concentration of CO_2 in atmosphere is increasing at the rate of about

a. 4% b. 2%
c. 0.4% d. 0.2%

Ans. (c) 0.4%

84. 1 Dobson unit at standard temperature and pressure is equal to ozone column thickness of

a. 1mm
b. 10 mm
c. 100 mm
d. 0.01 mm

Ans. (b) Sunita Narayan

85. Who is the director of centre for science and Environment

a. Anil Agarwal
b. Sunita Narayan
c. Menka Gandhi
d. Medha Patekar

Ans. (b) Sunita Narayan

86. Which CFC was discovered first?

a. CFC –11
b. CFC – 12
c. CFC – 114
d. CFC – 11n5

Ans. (b) CFC – 12

87. The concentration of ozone is found maximum in

a. Trophosphere
b. Upper stratosphere
c. Lower stratosphere
d. Mesosphere

Ans. (c) Lower stratosphere

88. The national Institute of Oceanography is presently situated at

a. Kerala
b. Calicut
c. Goa
d. Cochin

Ans. (c) Goa

89. The normal lapse rate of temperature per kilometre is

a. 6.5°C
b. 4.6°C
c. 10°C
d. 9°C

Ans. (a) 6.5°C

90. The albedo of the earth as a whole is

a. 25%
b. 50%
c. 29%
d. 10%

Ans. (c) 29%

91. Atmospheric humidity is measured by

a. Radiometer
b. Hygrometer
c. Hydrometer
d. Micrometer

Ans. (b) Hygrometer

92. The origin of simplest life is attributed to

a. Proteozoic Era
b. Cambrian Era
c. Archaezoic Era
d. None of the above

Ans. (c) Archaezoic Era

93. The maximum permissible limit of free residual chlorine in water is

a. 2 ppm
b. 0.02 ppm
c. 0.2 ppm
d. 20 ppm

Ans. (c) 0.2 ppm

94. Radiosonde is used to study

a. Earth's albedo at surface
b. Estimate pollutants in air
c. Atmospheric moisture content
d. Upper atmosphere's conditions

Ans. (d) Upper atmosphere's conditions

95. Which of the following enzymes is involved in the primary carboxylation in C_4 plants?

a. RUBP carboxylase
b. PEP
c. Oxygenase
d. None of the above

Ans. (b) PEP

96. The compound used for artificial rain making/ cloud seeding is

a. Dry ice
b. Ag I
c. HgCl2
d. Both a and b

Ans. (b) Ag I

97. How many agro-climatic zones are found in India?

a. 15
b. 16
c. 17
d. 18

Ans. (a) 15

98. About 50% of the atmosphere lies below

a. 5.6 km
b. 10 km
c. 15 km
d. 30 km

Ans. (a) 5.6 km

99. After methane and carbon dioxide which gas is found in highest concentration in biogas?

a. CO
b. H_2
c. N_2
d. H_2S

Ans. (b) H_2

100. The target organ of cadmium toxicity

a. Lung
b. Liver
c. Kidney
d. Bones

Ans. (c) Kidney

101. Nalgonda technique is used for

a. Chloride
b. Fluoride
c. Bromide
d. Cadmium

Ans. (b) Fluoride

102. The process used for removal of water hardness is

a. Zeolite process
b. Haber's process
c. Ostwald process
d. None of these

Ans. (a) Zeolite process

103. Who gave the term ecosystem and when?

a. A.G. Tansley (1935)
b. A.G. Tansley (1925)
c. E.P. Odum (1935)
d. E.P.Odum (1925)

Ans. (a) A.G. Tansley (1935)

104. IPCC came into exist in

a. 1978
b. 1968
c. 1988
d. 1998

Ans. (c) 1988

105. The first international conference on environmental education held in

a. Tbilisi
b. New Delhi
c. Bombay
d. Turkey

Ans. (b) New Delhi

106. Kyoto protocol came into force on

a. 16 Feb. 2004
b. 16 Feb. 2005
c. 16 Feb. 2002
d. 16 Feb. 2000

Ans. (b) 16 Feb. 2005

107. Indian institute of petroleum is in situated at

a. New Delhi
b. Goa
c. Dehradun
d. Mumbai

Ans. (c) Dehradun

108. Which of the following is mainly responsible for eutrophication?

a. Phosphate
b. Nitrate
c. Carbonate
d. Sulphate

Ans. (a) Phosphate

109. The atmospheric layer reflecting radio waves is called

a. Homosphere
b. Ionosphere
c. Ozonosphere
d. None of these

Ans. (c) Ozonosphere

110. The specific heat of water is

a. 1 cal/gm/°C
b. 4.18cal/gm/°C
c. 10 cal/gm/°C
d. 1 joule/gm/°C

Ans. (a) 1 cal/gm/°C

111. The first biosphere reserve in India was

a. Sundarban
b. Nanda devi
c. Nilgiri
d. Nokrek

Ans. (c) Nilgiri

112. In which year biodiversity act was proposed?

a. 2000
b. 2002
c. 2004
d. 1998

Ans. (a) 2000

113. Headquater of UNEP is situated at

a. Kenya
b. Switzerland
c. U.S.A
d. Britain

Ans. (a) Kenya

114. At which temp. density of water is found maximum?

a. 0°C
b. 100°C
c. 15°C
d. 4°C

Ans. (d) 4°C

115. The important GHG mainly released from paddy field is

a. CO_2
b. N_2O
c. CH_4
d. None of the above

Ans. (c) CH_4

116. What is the studies of tree as individuals in relation to their environment known as ?

a. Forest ecology
b. Forest synecology
c. Forest autecology
d. All of the above

Ans. (c) Forest autecology

117. Demography is the statistical study of

a. Human society
b. Human population
c. Human settlement
d. Human life

Ans. (b) Human population

118. The pH of normal rain is

a. 6.5
b. 5.6
c. 4.6
d. 3.6

Ans. (b) 5.6

119. Which harmful gas is emitted by masonry building materials, even ground water?

a. H_2S
b. Radon
c. Ammonia
d. CO_2

Ans. (b) Radon

120. Which is the most abundant of all the hydrocarbon pollutants in the atmosphere?

a. Propane
b. Methane
c. Butane
d. Benzene

Ans. (b) Methane

121. Which oil-tanker accident first alerted the public of the grave problem of oil spills in oceans

a. Agro merchant
b. Ocean eagle
c. Exon valdez
d. Torrey canyon

Ans. (d) Torrey canyon

122. The process of preparing compost with the help of earth worm is known as

a. Composting
b. Bioslury
c. Vermin composting
d. Maturing

Ans. (c) Vermin composting

123. Mycorrhizae is the association of

a. Higher plants and fungi
b. Algae and fungi
c. Lower plants and fungi
d. Both a and b

Ans. (a) Higher plants and fungi

124. When was Ganga action plan launched?

a. June 1985
b. December 1985
c. May 1984
d. July 1984

Ans. (a) June 1985

125. Largest salt water lake in India is

a. Lonar
b. Chilika
c. Sambhar
d. Wullar

Ans. (b) Chilika

126. The main pollutant of London smog was

a. SO_2
b. NO_2
c. PAN
d. Ozone

Ans. (a) SO_2

127. Which detector for DDT should be used in gas chromatography?

a. Electron capture detector
b. Flame ionised detector
c. Thermal conductivity detector
d. None of the above

Ans. (a) Electron capture detector

128. In which of the following, inverted pyramid of biomass is found?

a. Grassland ecosystem
b. Pond ecosystem
c. Desert ecosystem
d. Forest ecosystem

Ans. (b) Pond ecosystem

129. Which term represents the sum total of life on earth?

a. Biomass
b. Gaia
c. Biosphere
d. Biome

Ans. (c) Biosphere

130. Any living thing that successfully competes with people for food space, of other essential needs is called

a. Virus
b. Bug
c. Parasite
d. Pest

Ans. (d) Pest

131. Of the following environmental assessment terms, tell which one deals exclusively with the carbon content of the environment?

a. BOD
b. COD
c. TOC
d. POC

Ans. (c) TOC

132. The dominance of a new genetic from as a result of environment change is called

a. Adaptation
b. Natural selection
c. Succession
d. Synergism

Ans. (b) Natural selection

133. What does the term overkill deal with?

a. Pesticidal poisoning
b. Soil erosion
c. Nuclear holocaust
d. Global warming

Ans. (c) Nuclear holocaust

134. What is a chemical substance or physical agent capable of inducing inheritable genetic change called?

a. Carcinogen
b. Mutagen
c. Teratogen
d. Tumorogen

Ans. (b) Mutagen

135. When lakes become acidic due to acid rain, this is added to counteract the acidity in

a. Soil
b. Sand
c. Lime
d. None of the above

Ans. (c) Lime

136. Which technique can map the concentration of SO_2 over a whole town by operation gadget from one location?

a. LIDAR
b. Spectrophotometer
c. Gas chromatography
d. Mass spectroscopy

Ans. (a) LIDAR

137. Air pollution can be controlled and reduced considerably, but which one of the following factors comes in its way?

a. Politics
b. Economics
c. Manpower
d. Geography

Ans. (b) Economics

138. Photocopying and other electrical equipment produce one of the following pollutants?

a. Methane
b. Ozone
c. Hydrogen
d. Nitrogen oxides

Ans. (b) Ozone

139. Who formulated the ecological concept of the pyramid of numbers?

a. Charles Elton
b. Paul R. Ehrlich
c. Paul colivaus
d. All of the above

Ans. (a) Charles Elton

140. Where was the Mitti bachao movement launched in India?

a. Thane, Maharashtra
b. Mysore, Karnataka
c. Darbhanga, Bihar
d. Hooshangabad, M.P

Ans. (d) Hooshangabad, M.P

141. When was the use of DDT banned for agricultural purposes in India?

a. 1962
b. 1985
c. 1974
d. 1971

Ans. (b) 1985

142. For the production of biogas, the Indian biogas plant need

a. Fire wood
b. Cattle dung
c. Agricultural waste
d. Kerosene

Ans. (c) Agricultural waste

143. Which forest area in India was first brought under control and protection?

a. Malabar
b. Konkan
c. Garhwal
d. Sunderbans

Ans. (a) Malabar

144. When was the first national forest policy formulated?

a. 1948
b. 1980
c. 1964
d. 1952

Ans. (d) 1952

145. Which plant is known as the gasoline plant?

a. Salvadora persica
b. Sterculia feetida
c. Thevetia peraviana
d. Euphoribia lathyris

Ans. (d) Euphoribia lathyris

146. When did the three mmile island disaster occur?

a. 1972
b. 1979
c. 1980
d. 1976

Ans. (b) 1979

147. Fly ash is the environmental pollutant generated by

a. Thermal power plant
b. Oil refinery
c. Fertilizer plant
d. Strip mining

Ans. (a) Thermal power plant

148. Which of the following is known as liquid gold?

a. Water
b. Petroleum
c. Mercury
d. Mustard oil

Ans. (b) Petroleum

149. In denitrification process the nitrogen is released in the form of

a. NH_3
b. N_2
c. N_2O
d. Both a and b

Ans. (d) Both a and b

150. Who coined the term symbiosis?

a. A.G. Tansley
b. De Bary
c. Clements
d. Mc Dougall

Ans. (b) De Bary

151. Which type of symbiosis is obligatory?

a. Mutualism
b. Protocooperation
c. Commensalism
d. Amensalism

Ans. (a) Mutualism

152. Concept of hyper volume niche was given by

a. Grinnel
b. Clement
c. Hutchinson
d. Odum

Ans. (c) Hutchinson

153. Vehicular pollution emits mainly

a. SO_2
b. CO
c. NO
d. Ozone

Ans. (b) CO

154. Of the following classes of beings, tell which one is least sensitive to nuclear radiation's

a. Single celled organism
b. Amphibian
c. Repliles
d. Birds

Ans. (a) Single celled organism

155. Which region of the seas and occans are the most polluted?

a. Estuarine
b. Coastal
c. Sea depths
d. Coral

Ans. (b) Coastal

156. Of the following types of nuclear bombs, tell which one was tested on a pacific atoll?

a. Atom bomb
b. Hydrogen bomb
c. Neutron bomb
d. None of these

Ans. (b) Hydrogen bomb

157. Which were the first living beings to establish themselves on rocky slopes?

a. Toads
b. Grasses
c. Lichens
d. Frogs

Ans. (c) Lichens

158. What is lost when one organism consume other?

a. Food
b. Water
c. Energy
d. Chemicals

Ans. (c) Energy

159. Which category of wastewater dosen't require seeding during a BOD test?

a. Distillery spentwash
b. Dyeing unit effluent
c. Domestic sewage
d. Pulp and paper mill effluent

Ans. (c) Domestic sewage

160. Permanent hardness of water is caused by

a. Carbonates and chlorides
b. Bicarbonates and sulphates
c. Carbonates and bicarbonates
d. Chlorides and sulphates

Ans. (d) Chlorides and sulphates

161. The most commonly used method for desalination of water is

a. Distillation
b. Reverse osmosis
c. Electrodialysis
d. Flash evaporation

Ans. (b) Reverse osmosis

162. Elemental chlorine is widely used in

a. Metallurgy
b. Water purification
c. Process industry
d. Deodorants

Ans. (c) Process industry

163. The single largest class of insecticides of total registered pesticides in the world is

a. Organochlorine
b. Organophosphate
c. Carbamate
d. Pyrethroids

Ans. (b) Organophosphate

164. Cup anemmommeter is used for measuring

a. Water evaporation
b. Wind speed
c. Wind direction
d. Water flow

Ans. (b) Wind speed

165. Which type o humus is acidic in nature?

a. Mor
b. Mull
c. Moder
d. All of the above

Ans. (a) Mor

166. Lambert's and Beer's law is used in

a. Spectrophotometer
b. Chromatography
c. Potentiometer
d. pH meter

Ans. (a) Spectrophotometer

167. Law of minimum was given by

a. Shelford
b. Liebig
c. Blackman
d. Clement

Ans. (b) Liebig

168. When was project higer launched by India?

a. 1972
b. 1973
c. 1978
d. 1974

Ans. (b) 1973

169. Increasing skin cancer and rate of mutation are the result of which of the following?

a. CO pollution
b. CO_2 pollution
c. Ozone depletion
d. Acid rain

Ans. (c)

170. Which of the following diseases is caused by eating fish inhabiting mercury contaminated water?

a. Osteosclerosis
b. Brain fever

c. Osteosclerosis
d. Minamata disease

Ans. (d) Minamata disease

171. The atmosphere of metro cities is polluted by which of the following?

a. House hold wastes
b. Automobile exhausts
c. Radioactive fallout
d. Pesticide

Ans. (b) Automobile exhausts

172. Depletion of ozone layer is caused by which of the following?

a. CFC
b. SO_2
c. CO_2
d. Both a and b

Ans. (d) Both a and b

173. Which of the following decibels of sound becomes hazardous noise pollution?

a. >80
b. >100
c. >120
d. >150

Ans. (a) >80

174. Which of the following associates with the blood haemoglobin more rapidly than oxygen?

a. CO
b. NO_2
c. SO_2
d. CO_2

Ans. (a) CO

175. Attack of asthama in certain persons may be due to which of the following?

a. Exposure to all type of pollen grains
b. Exposure to hot temperature
c. Exposure to cold temperature
d. All of the above

Ans. (c) Exposure to cold temperature

176. Which of the following plants can be used as indicator of SO_2 pollution of air?

a. Hornworts
b. Fern
c. Liverworts
d. Lichen

Ans. (d) Exposure to cold temperature

177. Which of the following green house gases is being generated by agriculture field?

a. Ammonia
b. Nitrous oxide
c. Sulphur oxide
d. SO_3

Ans. (b) Nitrous oxide

178. Which of the following gases contributes the maximum to the green house effect?

a. CO
b. N_2O
c. CFC
d. CH_4

Ans. (d) CH_4

179. Ozone day is observed on which of the following?

a. 5 June
b. 1 December
c. 16 September
d. 23 December

Ans. (c) 16 September

180. Which of the following poses the greatest risk?

a. Biogas plants
b. Nuclear plants
c. Thermal power plant
d. Hydroelectric plants

Ans. (b) Nuclear plants

181. Which of the following is an example of a renewable resource?

a. Microorganism
b. Animals
c. Plants
d. All of the above

Ans. (d) All of the above

182. Which of the following is an example of non renewable resources?

a. Natural gas
b. Petroleum
c. Both a and b
d. Biological agents

Ans. (c) Both a and b

183. Ozone depletion in the stratosphere will cause which of the following

a. Increased incidence of skin cancer
b. Global warming
c. Increased sea level
d. All of the above

Ans. (d) All of the above

184. Maximum deposition of DDT will occur in which of the following?

a. Fish
b. Sea gull
c. Crab
d. Phytoplankton

Ans. (b) Sea gull

185. Ozone layer of upper atmosphere is being destroyed by which of the following?

a. Soot
b. Smoke
c. CFC
d. Smog

Ans. (c) CFC

186. Bioremediation of organic waste is generally based on which of the following?

a. Plant species
b. Bacteria
c. Animal species
d. All of the above

Ans. (b) Bacteria

187. Which of the following is the most ecofriendly?

a. Biogas plant
b. Thermal plant
c. Nuclear plant
d. All of the above

Ans. (a) Biogas plant

188. The term nuclear war associated with

a. Water pollution
b. Soil pollution
c. Radioactive pollution
d. Noise pollution

Ans. (c) Radioactive pollution

189. Most dangerous radioactive pollutant is

a. St^{90}
b. Ca^{40}
c. S^{32}
d. P^{32}

Ans. (a) St^{90}

190. Algal bloom in a lake

a. Kills fshes and other organisms
b. Increase CO_3 level
c. Lead to O_2 depletion
d. All of these

Ans. (d) All of these

191. Secondary pollutant is

a. CO
b. O_2
c. SO_2
d. PAN

Ans. (a) CO

192. Chemical causes bone cancer and degeneration of tissue

a. Ca-40
b. Str-90
c. C-14
d. I-131

Ans. (b) Ca-40

193. A pollutant is any substance, chemical or other factor that changes

a. The natural balance of our environment
b. The natural wildlife of our region
c. The natural flora of our environment
d. None of these

Ans. (a) The natural balance of our environment

194. The chief source of pollutant H_2S is

a. Oil refineries
b. Automobiles
c. Thermal power plants
d. Decaying vegetation and animal matter

Ans. (d) Decaying vegetation and animal matter

195. Black foot disease in human is caused by

a. Fluorine
b. Cd
c. SPM
d. Arsenic

Ans. (d) Arsenic

196. The antiknock agent added to unleaded petrols

a. Tetramethyl lead
b. Tetraethyl lead
c. Dibromo ethane
d. Methyl tertiary butyl ether

Ans. (b) Tetraethyl lead

197. Lichens like Usnea is an indicator of

a. CO_2
b. CO
c. NO
d. SO_2

Ans. (d) SO_2

198. Ozone hole over antarctica was first detected by

a. Framan *et al*
b. Augus
c. Molina and Molina
d. Molina and Rowland

Ans. (a) Framan *et al*

199. Leukemia is caused by

a. Iodine
b. Ca-40
c. Sr-90
d. Caesium

Ans. (c) Sr-90

200. 3–4 benzopyrene causes

a. Leukemia
b. Cytosilicosis
c. Lung cancer
d. Tuberculosis

Ans. (c) Lung cancer

201. Osteoporosis will be caused by pollutant

a. Chlorine
b. Bromine
c. Fluorine
d. None of the above

Ans. (c) Fluorine

202. Kyoto conference is connected with

a. Reduction in use energy
b. Limiting production of CO_2 and other green house gases
c. Developing alternative to ODS
d. None of these

Ans. (b) Limiting production of CO_2 and other green house gases

203. Component of living cell affected by pollutant SO_2 is

a. Cell wall
b. All cell membrane system
c. Nucleus
d. None of these

Ans. (b) All cell membrane system

204. The threshold of normal human hearing lies between

a. 50–60 db
b. 120–140 db
c. 30–40 db
d. 160–180 db

Ans. (b) 120–140 db

205. SPM causes

a. Skin disease
b. Respiratory disease
c. Bone deformities
d. All of the above

Ans. (b) Respiratory disease

206. Montreal protocol was signed in (reduction in CFC)

a. 1990
b. 1987
c. 1978
d. 1993

Ans. (b) 1987

207. Ozone hole is widest in

a. Equator
b. Antarctica
c. North pole
d. North temperate area

Ans. (b) Antarctica

208. BOD is related to

a. Organic pollutant
b. Inorganic pollutant
c. Detergents
d. Putrescibility

Ans. (a) Organic pollutant

209. In metro cities, the automobile causes air pollution

a. 70%
b. 80%
c. 60%
d. 50%

Ans. (b) 80%

210. Climate of the world is threatened by

a. Increasing concentration of atmospheric oxygen
b. Increase amount of atmospheric CO_2
c. Decrease amount of atmospheric CO_2
d. None of the above

Ans. (b) Increase amount of atmospheric CO_2

211. Green house gases are

a. Transparent to both large and short waves
b. Absorb of solar radiation for warming the atmosphere of earth
c. Absorbs of large-wave radiations from earth
d. Transparent to emission from earth for passage into outerspace

Ans. (c) Absorbs of large-wave radiations from earth

212. Classical smog was first observed in

a. London
b. New York
c. Tokyo
d. Sydney

Ans. (a) London

213. Montreal protocol which calls for appropriate action to protect the ozone layer from human activities, was passed in the year

a. 1982
b. 1984
c. 1987
d. 1990

Ans. (c) 1987

214. Pulmonary oedema is caused by

a. Hydrocarbon
b. Carbon oxide
c. Nitrogen oxide
d. SO_2

Ans. (a) Hydrocarbon

215. The blue baby syndrome result from

a. Excess of dissolved oxygen
b. Methaemoglobin
c. Excess of TDS
d. Excess of chloride

Ans. (b) Methaemoglobin

216. Common indicator organism of water pollution is

a. *Cholera vibro*
b. *Salmonella typhi*
c. *E. coli*
d. None of the above

Ans. (c) *E. coli*

217. Which of the following pair is mismatch

a. Fossil fule burning-release of CO_2
b. Nuclear power-radioactive wastes
c. Solar energy-green house effect
d. Biomass burning-release of CO_2

Ans. (c) Solar energy-green house effect

218. Limit of BOD prescribed by Central pollution control board for the discharge of Industrial and municipal waste waters in to natural surface water, is

a. <50 ppm
b. <100 ppm
c. <10 ppm
d. <5ppm

Ans. (c) <10 ppm

219. Bhopal gas tragedy of 1984 took place because methyl isocyanate reacted with

a. DDT
b. CO_2
c. SO_2
d. Water

Ans. (d) Water

220. Fluoride pollution mainly affected

a. Brain
b. Heart
c. Teeth
d. Kidney

Ans. (c) Teeth

221. Polluted water do not contains

a. Water hyacinth
b. Sewage fungus
c. Cyanobacteria
d. Stone fly larvae

Ans. (d) Stone fly larvae

222. Melanin protects us from

a. IR rays
b. X-rays
c. UV rays
d. Visible rays

Ans. (c) UV rays

223. Intensity of sound n normal conversation is

a. 10–20 db
b. 20–30 db
c. 30–60 db
d. 60–70 db

Ans. (c) 30–60 db

224. Green house effect is related to

a. Global warming
b. Cultivation of vegetables in houses
c. Development of terrace gardens
d. Increased growth of green algae

Ans. (a) Global warming

225. Pollution related occupational hazard is

a. Silicosis
b. Asthma
c. Leprosy
d. Pneumoconiosis

Ans. (d) Pneumoconiosis

226. Amospheric content of CO_2 s

a. 0.36%
b. 0.036%
c. 0.0036%
d. 3.6%

Ans. (b) 0.036%

227. Highest DDT deposition shall occur in

a. Crab
b. Sea gull/birds
c. Phytoplankton
d. Eel

Ans. (b) Sea gull/birds

228. Carbon monoxide, emitted by automobile prevents transport of oxygen in body due to

a. Preventing reaction between oxygen and haemoglobin
b. Destruction of haemoglobin
c. Forming stable compound with haemoglobin
d. None of the above

Ans. (c) Forming stable compound with haemoglobin

229. Which green house gas other than methane is being produced by agriculture fields?

a. Sulphur oxide
b. Nitrous oxide
c. Sulphur dioxide
d. Ammonia

Ans. (b) Nitrous oxide

230. In coming years, skin related disorder will become more common due to

a. Depletion of ozone layer
b. Air pollution
c. Water pollution
d. Excessive use of detergent

Ans. (a) Depletion of ozone layer

231. Phosphate pollution is caused by

a. Agriculture fertilizer
b. Sewage and agriculture fertilizer
c. Phosphate rock and sewages
d. Weathering of phosphate rocks only

Ans. (b) Sewage and agriculture fertilizer

232. MIC and Chernobyl tragedies occurred at

a. Bhopal 1983, Ukraine 1984
b. Bhopal 1984, Ukraine 1988
c. Bhopal 1986, Ukraine 1988
d. Bhopal 1984, Ukraine 1988

Ans. (c) Bhopal 1986, Ukraine 1988

233. Country contributed maximum to hole formation in ozone layer is

a. Australia
b. USA
c. Germany
d. Japan

Ans. (b) USA

234. Which of the following is normally not an important atmospheric pollutant and remains constant?

a. SO_2
b. CO
c. NO
d. CO_2

Ans. (d) CO_2

235. Which of the following is an environment related disorder with the correct main cause?

a. Blue baby syndrome due to heavy use of nitrogenous fertilizers in the area
b. Black lung disease found mainly in worker in stone quarries and crushers
c. Skin cancer mainly in people exposed to benzene and methane
d. All of the above

Ans. (b) Black lung disease found mainly in worker in stone quarries and crushers

236. Pollutant released by jet planes is

a. Smog
b. Aerosol
c. Colloid
d. Fog

Ans. (b) Aerosol

237. Mottling of teeth is due to presence of an element in drinking water

a. Fluorine
b. Chlorine
c. Boron
d. Mercury

Ans. (a) Fluorine

238. Pollution is rising due to

a. Pollution explosion
b. Rain
c. Research institute
d. Automobile and industries

Ans. (d) Automobile and industries

239. Catalytic converter in vehicle is used for controlling

a. Water pollution
b. Air pollution
c. Soil pollution
d. Radioactive pollution

Ans. (b) Air pollution

240. Sudden mass death of fish is more likely to occurs in

a. Oligotrophic lake
b. Oxalotrophic lake
c. Eutrophic lake
d. Mesotrophic lake

Ans. (c) Eutrophic lake

241. The chemical that contribute to the destruction of ozone layer of the earth's surface is

a. Chlorofluorocarbon
b. Carbon mono oxide
c. Sulphur dioxide
d. Mercury

Ans. (a) Chlorofluorocarbon

242. Minimata and itai-itai disease are due to toxicity of

a. Mercury and lead
b. Mercury and strontium
c. Mercury and tin
d. Mercury and cadmium

Ans. (d) Mercury and cadmium

243. Carbon monoxide kills because of the destruction of structure

a. Cytochrome
b. Phytochrome
c. Haemoglobin
d. None of the above

Ans. (c) Haemoglobin

244. In Bhopal gas tragedy gas methyl isocyanate is a

a. Organo phosphate
b. Carbamate
c. Organochlorides
d. None of the above

Ans. (b) Carbamate

245. The loss of species in the tropical countries is mainly due to

a. Soil erosion
b. Urbanization
c. Deforestation
d. Pollution

Ans. (c) Deforestation

246. Ozone hole cause

a. More UV rays come to earth
b. Reduction in the rate of photosynthesis
c. Global warming
d. All of the above

Ans. (a) More UV rays come to earth

247. It is said, the Taj Mahal may be destroyed due to

a. Flood in Yamuna river
b. Air pollutants (SO_2) released from oil refinery of Mathura
c. Decomposition of marble as a result of high temperature
d. All of the above

Ans. (b) Air pollutants (SO_2) released from oil refinery of Mathura

248. Treatment of polluted water is carried out with the help of

a. Ferns
b. Phytoplankton
c. Fungi/bacteria
d. Lichens

Ans. (c) Fungi/bacteria

249. The number of ecological hot spot in the world is

a. 15 b. 35
c. 25 d. 45

Ans. (c) 25

250. Number of ecological hotspot in India are

a. 1 b. 3
c. 5 d. 2

Ans. (d) 2

251. A pollutant is any substance, chemical or other factor that changes

a. The natural balance of our environment
b. Natural flora of a place
c. Natural geochemical cycles
d. Natural wild life of a region

Ans. (a) The natural balance of our environment

252. Lichens are imp. in the studies on atmospheric pollution because they

a. Efficiently purify the atmosphere
b. Can readily multiply polluted atmosphere
c. Can also grow in greatly polluted atmosphere
d. Are very sensitive to pollutants like SO_2

Ans. (d) Are very sensitive to pollutants like SO_2

253. Which of the following is normally not an atmospheric pollutant

a. Hydrocarbons
b. SO_2
c. CO_2
d. CO

Ans. (c) CO_2

254. Which of the following is rich source of energy but never causes atmospheric pollution

a. Solar energy
b. Wood
c. Coal
d. Nuclear energy

Ans. (a) Solar energy

255. Some effects of SO_2 and its transformation products on planet include

a. Plasmolysis
b. Golgi body destruction
c. Chlorophyll destruction
d. None

Ans. (c) Chlorophyll destruction

256. BOD stands for

a. Biotic community
b. Chemical oxygen demand
c. Biochemical oxygen demand
d. Growing algae in large tanks

Ans. (c) Biochemical oxygen demand

257. D.D.T. is a

a. Antibiotic
b. Biogradable pollutant
c. Non biogradable pollutant
d. None

Ans. (c) Non biogradable pollutant

258. If water pollution continues at its present rate, it will eventually

a. Make nitrate molecules unavailable to water plants
b. Make oxygen molecules unavailable to water plants
c. Prevent precipitation
d. None

Ans. (b) Make oxygen molecules unavailable to water plants

259. In a polluted lake the index of pollution is

a. Frog b. Daphnia
c. Artemia d. None

Ans. (b) Daphnia

260. All the following contribute to pollution except

a. Nuclear power plants
b. Thermal power plants
c. Hydroelectric power project
d. Automobiles

Ans. (c) Hydroelectric power project

261. Some reliable indicators of air pollutants (SO_2 gases) are

a. Neem tree and Eichornia
b. Lichens and mosses
c. Green algae and aquatic liverworts
d. Ferns and cycas

Ans. (b) Lichens and mosses

262. U.V. rays prove lethal due to inactivation of

a. Minerals, air and water
b. Carbohydrates, fats and vitamins
c. Proteins, pigments and nucleic acid
d. Water, oxygen and carbon dioxide

Ans. (c) Proteins, pigments and nucleic acid

263. Radioactive strontium as aresult of radioactive fall out is

a. Sr^{90} b. Sr^{80}
c. Sr^{95} d. Sr^{85}

Ans. (a) Sr^{90}

264. Exposure of plants to high fluoride conc. result in necrosis or chlorosis characteristic in

a. Leaf tip and leaf marging
b. Only mid rib of lamina
c. Petiole but not in lamina
d. Stem tips only

Ans. (a) Leaf tip and leaf marging

265. Major pollution causing agent is

a. Animals b. Man
c. Hydrocarbon gases d. None

Ans. (b) Man

266. Biological treatment of water pollution is done with the help of

a. Fungi b. Lichens
c. Phytoplanktons d. None

Ans. (c) Phytoplanktons

267. Effect of pollution is first and most marked on

a. Natural balance of our environment
b. Natural gaseous cycle
c. Natural geo-chemical cycle
d. Natural flora of a place

Ans. (a) Natural balance of our environment

268. Which one of the following radiations is nonionising and has more specific biological effects than others

a. Beta rays
b. Gamma rays
c. U.V. rays
d. X-rays

Ans. (c) U.V. rays

269. Pollutant from motor car exhaust that causes mental diseases is

a. SO_2 b. NO_2
c. Hg d. Pb

Ans. (d) Pb

270. Air pollution is maximum caused by

a. Sewage and pesticides
b. Automobile exhausts and chemicals from industries
c. House hold detergents and pesticides
d. Industrial effluents

Ans. (b) Automobile exhausts and chemicals from industries

271. Which of the following statement is incorrect?

a. Lichens are affected by SO_2
b. N_2 and Mg can pollute water
c. All pollutants are not waste
d. CO is the major environmental pollutant

Ans. (b) N_2 and Mg can pollute water

272. Which of the following does not cause pollution?

a. Thermal power project
b. Nuclear energy project
c. Automobiles
d. Hydro-electric schemes

Ans. (d) Hydro-electric schemes

273. Species that occur in different geographical regions reported by special barrier are

a. Allogenic b. Sympatic
c. Autogenic d. Allopartic

Ans. (d) Allopartic

274. UVradiations from sunlight causes the reaction that produces

a. Fluorides b. Ozone
c. SO_2 d. CO

Ans. (b) Ozone

275. Which of the following atmospheric pollutant is not produced by exhaust of motor vehicle in Delhi

a. CO
b. SO_2
c. Fly ash
d. Hydrocarbon gases

Ans. (c) Fly ash

276. The component of a living cell affected by the pollutant SO_2 is

a. Plasmodesmata
b. Cell wall
c. All cell membrane system
d. Nucleus

Ans. (c) All cell membrane system

277. The molecular action of UV light is mainly reflected through

a. Formation of sticky metaphase
b. Formationpyrimidine

c. Phytodynamic action
d. Destruction of hydrogen bonds between DNA strands

Ans. (d) Destruction of hydrogen bonds between DNA strands

278. National Environmental Planning Engineering Organization at Nagpur is engaged in the problem of environmental pollution

a. ICAR
b. CPHERI
c. NEERI
d. CSIR

Ans. (c) NEERI

279. National institute of oceanography is situated at

a. Panaji
b. Mumbai
c. Chennai
d. Lucknow

Ans. (a) Panaji

280. The ultimate environmental hazard to mankind is

a. Nuclear winter
b. Noise pollution
c. Water pollution
d. Air pollution

Ans. (a) Nuclear winter

281. Thermal pollution of water bodies is due to

a. Discharge of waste from mining
b. Discharge of agricultural run of
c. Discharge of heat from power plants
d. Discharge of chemical from industries

Ans. (c) Discharge of heat from power plants

282. Spraying D.D.T. on crops produce pollution of

a. Air and water only
b. Air, soil and water
c. Air and soil only
d. Air only

Ans. (b) Air, soil and water

283. The atmospheric pollutant is caused by

a. N_2
b. CO_2
c. CO
d. O_2

Ans. (c) CO

284. Water pollution is caused by

a. Industrial effluents
b. Growth of phytoplanktons
c. Rain
d. Decay of bodies of acquatic animals

Ans. (a) Industrial effluents

285. Rhizosphere is denoted to soil which is

a. Subjected to the influence of plant rhizoids
b. Attached to root surface only
c. Attached to surface of root hair only
d. Subjected to the influence of plant root

Ans. (d) Subjected to the influence of plant root

286. CO is a pollutant because

a. Combines with oxygen
b. Inactivates nerves
c. Inhibits glycolysis
d. Combines with haemoglobin

Ans. (d) Combines with haemoglobin

287. Decomposition of domestic waste under natural processes is known as

a. Thermal pollution
b. Industrial pollution
c. Biogradable pollution
d. Non biogradable pollution

Ans. (c) Biogradable pollution

288. Increase in the percentage of fauna and decrease in the flora may be dangerous because it enhances

a. Percentage of radioactive pollution
b. Percentage of oxygen
c. Percentage of disease
d. Percentage of CO_2

Ans. (d) Percentage of CO_2

289. In cities like Delhi pollution can be controlled to some extent

a. By cleanliness of city proper and less use of insecticides
b. By proper disposal of organic wastes of industries and sewage
c. By broader roads and factories away from city proper
d. By all the above means

Ans. (d) By all the above means

290. Burning of fossil fuels is the main cause of

a. Nitric oxide pollution
b. Nitrogen oxide pollution
c. Nitrous oxide pollution
d. Sulphur dioxide pollution

Ans. (d) Sulphur dioxide pollution

291. Water pollution is caused by or which one of the following is most important water pollutant

a. Ammonia
b. Pesticides
c. Detergents
d. Industrial wastes or effluents

Ans. (d) Industrial wastes or effluents

292. Air pollution causing production of photochemical oxidants include

a. Oxygen, chlorine, nitric acid fumes
b. Nitric oxide, Nitrous oxide and nitric acid fumes
c. O_3, SO_2, Cl_2
d. SO_2, CO_2, CO

Ans. (b) Nitric oxide, Nitrous oxide and nitric acid fumes

293. When UV rays fall on the plant cell wall, which one of the following pigment helps in prevention against the damage of the cells

a. Phycobillins
b. Xanthophylls
c. Carotenoids
d. Chlorophyll

Ans. (c) Carotenoids

294. Gases commonly referred as green house gases are

a. CH_4, N_2, CO_2 and NH_3
b. N_2, CO_2, NH_3, NO_2 and O_2
c. CFC, N_2, CO_2 and NH_3
d. CFC, CO_2, CH_4 and NO_2

Ans. (d) CFC, CO_2, CH_4 and NO_2

295. Lead is considered as

a. Soil pollutant
b. Water pollutant
c. Air pollutant
d. Radioactive pollutant

Ans. (c) Air pollutant

296. Which of the following gas when combines with Hb of the blood forms a toxic substance

a. CO_2
b. CH_4
c. O_2
d. CO

Ans. (d) CO

297. Attacks of asthma in certain seasons may be due to

a. Eating of some seasonal vegetables
b. Exposure to cold temp.
c. Inhalation of certain air borne pollens
d. Absence of oxygen in the air, due to increased rate of photosynthesis

Ans. (c) Inhalation of certain air borne pollens

298. The maximum biological magnification of DDT through food web is seen in

a. Algae
b. Bacteria
c. Higher plants
d. Man

Ans. (d) Man

299. Which one of the following groups of plants can caused as indicators of SO_2 pollution of air

a. Ferns
b. Horn works
c. Epiphytic lichens
d. Liverworts

Ans. (c) Epiphytic lichens

300. Which of the following groups of parts of electromagnetic radiations are listed in increasing order of wavelengths

a. Cosmic rays-> infra red ->radio waves -> ultraviolet -> X rays -> gamma rays
b. infra red ->radio waves -> ultraviolet -> X rays -> gamma rays -> Cosmic rays
c. Cosmic rays -> gamma rays -> X rays -> ultraviolet -> infra red radiations -> radio waves
d. Light -> infra red radiations -> Cosmic rays -> radio waves -> gamma rays -> ultraviolet

Ans. (c) Cosmic rays -> gamma rays -> X rays -> ultraviolet -> infra red radiations -> radio waves

301. Which of the following enhances BOD of water

a. Sand
b. Moss
c. Algae
d. Sugar mill effluent

Ans. (d) Sugar mill effluent

302. Which of the following when inhaled dissolve in blood Hb more rapidly than

a. CO
b. SO_2
c. O_3
d. Nitrous oxide

Ans. (a) CO

303. Thermocline refers to

a. Vegetation of alpine region
b. Region in a lake where there is maximum fall in temp.
c. Transitional zone between two vegetational types
d. Region in a lake where there is freezing temp.

Ans. (b) Region in a lake where there is maximum fall in temp.

304. It is said that Taj may be destroyed due to

a. Air pollutants released from oil refinery of Mathura
b. Decomposition of marble as aresult of high temp.
c. Flood in Yamuna river
d. All

Ans. (a) Air pollutants released from oil refinery of Mathura

305. Pollutant from motor car exhaust that causes mental disease is

a. Pb
b. Hg
c. SO_2
d. NO_2

Ans. (a) Pb

306. Smog is a common pollutant in places having

a. Low temp.
b. High temp.
c. Excessive ammonia in the air
d. Excessive SO_2 in the air

Ans. (c) Excessive ammonia in the air

307. Which causes water pollution

a. 2, 4 D and pesticides
b. Smoke
c. Automobile exhaust
d. Aeroplanes

Ans. (a) 2,4 D and pesticides

308. Pollution can be controlled by

a. Sewage treatment
b. Manufacturing electrically operated vehicles
c. By checking atomic blasts
d. All

Ans. (d) All

309. Air pollution is not caused by

a. Thermal power plant
b. Diesel engine
c. Hydro electric power station
d. Pollen grain

Ans. (c) Hydro electric power station

310. CO is harmful to human being because

a. It decreases CO_2 conc.
b. It completes O_2 to combine with Hb
c. It is carcinogenic
d. It depletes O_3

Ans. (d) It depletes O_3

311. Which pf the following is the cheap source of water and soil pollution

a. Mining
b. Agroindustry
c. Thermal power station
d. All

Ans. (d) All

312. Spraying of pesticides is an example of

a. Point sources water pollution
b. Defuse water pollution
c. Both
d. None

Ans. (b) Defuse water pollution

313. The effect of gaseous pollutant on human health depends mainly on

a. Their ionisation potential
b. Their atomic size
c. Their solubility in water
d. All

Ans. (c) Their solubility in water

314. Acid rain occurs in areas where

a. Citrus plant are grown
b. There are large plantation of eucalyptus
c. There are large plantation of pine plants
d. There are big industry and the atmosphere is polluted with SO_2

Ans. (d) There are big industry and the atmosphere is polluted with SO_2

315. As compared to tape water, BOD of water pollution with sewage

a. High
b. Plane area
c. Deserts
d. None

Ans. (a) High

316. Terracing is technique of farming in

a. Hilly area
b. Plane area
c. Deserts
d. None

Ans. (a) Hilly area

317. Presence of SO_2 in atmosphere is indicated by

a. Moss
b. Liverworts
c. Lichen
d. Fern

Ans. (c) Lichen

318. Checking of reradiation heat by atmospheric dust, water vapour, ozone, CO_2 etc. Is known as

a. Green house effect
b. Radioactive effect
c. Ozone layer effect
d. Solar effect

Ans. (a) Green house effect

319. Photochemical smog is related to pollution of

a. Soil
b. Water
c. Noise
d. Air

Ans. (d) Air

320. Existence of coal and petroleum may be detected with the study of

a. Palaeobotany b. Ecology
c. Bacteriology d. Economic botany

Ans. (a) Palaeobotany

321. Most imp causative pollutant of soil may be

a. Plastics b. Iron junks
c. Detergents d. Glass junks

Ans. (c) Detergents

322. Sounds above what level considered hazardous noise pollution

a. Above 120 dB b. Above 30 dB
c. Above 100 dB d. Above 80 dB

Ans. (d) Above 80 dB

323. Often in water bodies subjected to sewage pollution, fishes die because of the

a. Pathogens released by the sewage
b. Clogging of their gills by solids substances
c. Reduction in dissolved oxygen caused by microbial activity
d. Foul smell

Ans. (c) Reduction in dissolved oxygen caused by microbial activity

324. Which one is the major sources of pollution in metropolitan cities

a. Radioactive substances b. Automobiles
c. Industries d. Pesticides

Ans. (b) Automobiles

325. Which one among the following is lightly to have the highest levels of DDT deposition on its body

a. Eel b. Crabs
c. Seagull d. Phytoplanktons

Ans. (c) Seagull

326. Which one of the following isotopes is most dangerous to Homo sapiens

a. Cs-137 b. I-131
c. P-32 d. Sr-90

Ans. (d) Sr-90

327. In mineral bay, Japan which of the following animals remained free from minamata disease

a. Cats b. Rabbits
c. Dogs d. Pigs

Ans. (b) Rabbits

328. Taj mahal is threatened due to the effect of

a. Chlorine b. SO_2
c. O_2 d. H_2

Ans. (b) SO_2

329. Which of the following radioactive isotopes is used in the detection thyroid cancer

a. I-131 b. C-14
c. Ur-238 d. P-32

Ans. (a) I-131

330. When huge amount of sewage is dumped into the river the BOD will

a. Increase b. Remain unchanged
c. Slightly decrease d. Decrease

Ans. (a) Increase

331. CO is a pollutant because it

a. Inactivates nerves
b. Combine with oxygen
c. Inhibit glycolysis
d. Combines with haemoglobin

Ans. (d) Combines with haemoglobin

332. Which of the following is responsible for atmospheric pollution

a. C^{14} b. Sr^{90}
c. P^{32} d. S^{35}

Ans. (b) Sr^{90}

333. Which is the cause of air pollution

a. Pesticides
b. Smoke
c. Noise
d. Chemical discharge

Ans. (b) Smoke

334. It is advised to consume iodised salt to escape a disease called

a. Tuberculosis b. Goitre
c. Measles d. Hydrophobia

Ans. (b) Goitre

335. Increase asthamatic attacks in certain seasons are related to

a. Expose to cold temperature
b. Inhalation of certain air borne pollens
c. Eating of some seasonal vegetables
d. Absence of O_2 in air due to increased rate of photosynthesis

Ans. (b) Inhalation of certain air borne pollens

336. Which of these is mismatched

a. Fossil fuel burning - CO_2 gives off
b. Biomass burning - CO_2 gives off
c. Solar energy - green house effect
d. Nuclear power - radio active wastes

Ans. (c) Solar energy - green house effect

337. Photocopying machines and other electrical equipment produce one of the following

a. Methane
b. Nitrogen dioxide
c. Ozone
d. Hydrogen sulphide

Ans. (c) Ozone

338. Tropical rain forest destruction is extremely serious because

a. Tropical soil cannot support agriculture for long
b. Large tracts of forest absorb CO_2, reducing the threat of global warming
c. It will lead to global warming biological diversity
d. All of these

Ans. (d) All of these

339. Acid deposition causes

a. Acid indigestion in humans
b. Lakes and forests to die
c. The green house effect to lesson
d. All

Ans. (b) Lakes and forests to die

340. Nuclear radiation can caused one of the following disease to eyes when expose to them

a. Trachoma
b. Retinitis
c. Cataract
d. All

Ans. (c) Cataract

341. Which disease in children is caused by the intensive use of nitrate fertilizer

a. Jaundice
b. Septicaemia
c. Mumps
d. Nathemoglobinemia

Ans. (d) Nathemoglobinemia

342. Sound pollution can be controlled by

a. Sound proof buildings
b. Traffic control
c. Adequate urban planning and road design
d. All

Ans. (d) All

343. Which of the following metals causes systemic poisioning in man

a. Pb
b. Zn
c. Mn
d. Se

Ans. (a) Pb

344. Which of the following damages WBC, bone marrows and lymph nodes

a. Cs
b. Sr^{90}
c. Ca^{40}
d. I^{131}

Ans. (d) I^{131}

345. Excessive inhalation of maganese cause

a. Anaemia
b. Gout
c. Diphtheria
d. Pneumonia

Ans. (d) Pneumonia

346. Harmful UV radiations coming from the sun cause

a. Skin cancer
b. Lung cancer
c. Mouth cancer
d. Liver cancer

Ans. (a) Skin cancer

347. Which of the following is non renewable source

a. Forest
b. Coal
c. Sunlight
d. Water

Ans. (b) Coal

348. In big cities, air pollution is due to

a. Burning of fossil fuels
b. Thermal power plants
c. Sewage
d. Suspended particles

Ans. (a) Burning of fossil fuels

349. Which one of the following is most poisonous

a. C
b. CO_2
c. SO_2
d. CO

Ans. (d) CO

350. Biodegradable pollutants is

a. Sewage
b. Asbestos
c. Plastic
d. All

Ans. (a) Sewage

351. Minamata disease is caused by

a. Air pollution
b. Water pollution
c. Soil pollution
d. All

Ans. (b) Water pollution

352. In social forestry programme which slogan was adopted

a. Society for clean environment
b. A tree for each child
c. Save globe
d. Save environment

Ans. (b) A tree for each child

353. The congress grass/carrot grass that causes allergy arrived in an India is 1956. It is

a. Opuntia dilleri
b. Parthenium hysterophorus
c. Eichornia crassipes
d. Sorghum halepens

Ans. (b) Parthenium hysterophorus

354. Excess atmospheric CO_2 increases green house effected as

a. Reduce cloud formation
b. Ppt. Dust
c. Reduces atmospheric pressure
d. Is opaque to infrared rays

Ans. (d) Is opaque to infrared rays

355. The newspaper contains one of the following toxic material

a. Pb b. Cd
c. Mg d. Hg

Ans. (a) Pb

356. One of the best method to reduce air pollution is growing of plants capable of fixing oxides of N, C and S and radioactivity. Which plants has maximum power of absorbing CO_2 and oxide of N in a polluted areas

a. Daucos carrota
b. Robinia pseudoacacia
c. Phaseolus vulgaris
d. Coleus indica

Ans. (b) Robinia pseudoacacia

357. Which aquatic animals has been released on a large scale in the Ganga to rid it of waste flesh

a. Dolphin b. Gharial
c. Turtle d. Fishes

Ans. (c) Turtle

358. Pheumoconiosis caused by

a. CO b. SO_2
c. Industrial dust d. Air dust

Ans. (c) Industrial dust

359. CO can be absorbed by plants like

a. Carrot b. Bean
c. Coleus d. All

Ans. (d) All

360. Which of the following is not produce by motor vehicle

a. CO_2 b. SO_2
c. Fly ash d. Hydrocarbon gases

Ans. (c) Fly ash

361. Radioactivity is absorbed by plants like

a. Ginkgo b. Lichens
c. Both a and b d. Pines

Ans. (c) Both a and b

362. Nitrogen oxide can be absorbed by plants like

a. Quercus b. Pinus
c. Junipes d. All

Ans. (d) All

363. It is advised not to have brick kiln near fruit orchard to

a. Protect the orchard from operation of trunks and used for transporting fruits
b. Save trees from soil erosion
c. Save trees from poisonous fumes (H_2F_2) of smoke from brick kiln chimneys
d. Save guard trees from large labour pollution

Ans. (c) Save trees from poisonous fumes (H_2F_2) of smoke from brick kiln chimneys

364. Harmful UV radiations cause

a. Lung cancer b. Mouth cancer
c. Liver cancer d. Skin cancer

Ans. (d) Skin cancer

365. Xeroderma pigmentation is

a. Tanning of skin to light
b. Spots formed by rays
c. Sensitivity of skin to UV rays
d. Both a and b

Ans. (c) Sensitivity of skin to UV rays

366. An isotope that causes damage to RBC, bone marrow. Spleen, lymph nodes and causes skin cancer is

a. Cs^{137} b. I^{127}
c. I^{131} d. Sr^{90}

Ans. (a) Cs^{137}

367. Fish eating birds like sea gulls are endangered because

a. DDT in them is carcinogenic
b. Chlorinated hydrocarbons interfere with their reproduce ability
c. Chlorinated hydrocarbons like DDT cause mutations
d. All

Ans. (d) All

368. The conc. of DDT is maximum in the breast muscles of birds that eat

a. Sea fish
b. Flesh
c. Sea plants
d. All

Ans. (a) Sea fish

369. Lichens have disappeared from cities because they are highly susceptible to

a. NO_2
b. SO_2
c. N_3
d. CO_2

Ans. (b) SO_2

370. Which disease in children are due to intensive use of nitrate fertilizers

a. Mumps
b. Cyanosis (blue baby)
c. Methaemoglobianaemia
d. Both b and c

Ans. (d) Both b and c

371. Which harmful item was discussed in Rachel Carson's 'Silent spring' book on damage of wildlife

a. DDT
b. CO_2
c. CFC
d. PCB

Ans. (a) DDT

372. Forests are destroyed mainly by

a. Acid rains
b. Soil pollutions
c. Water borne pollutants
d. Air pollution

Ans. (a) Acid rains

373. Deficiency of fluoride in drinking water caused

a. Goiter
b. Skeletal fluorosis
c. Dental caries
d. Dental fluoris

Ans. (c) Dental caries

374. The chrnobyl disaster in USSR was caused on 26.4.1986 by a

a. Nuclear weapon accident
b. Nuclear test
c. Nuclear reactor
d. Nuclear waste disposal leak

Ans. (c) Nuclear reactor

375. Taj mahal is being destroyed by

a. Nuclear pollution
b. Water pollution
c. Air pollution
d. Both b and c

Ans. (c) Air pollution

376. Electrostatic scrubbers meant to absorb pollutants also produce

a. CO_2
b. SO_2
c. Ozone
d. Dust

Ans. (c) Ozone

377. What is the major source of harmful radiations in the house

a. Colour TV
b. Oven
c. Heater
d. Tube light

Ans. (a) Colour TV

378. Which of the following is not a water pollutant but present in ordinary tap water

a. Cr
b. F
c. Cl
d. Ba

Ans. (c) Cl

379. Noise is unwanted sound above 80 dB. It is slow poison causing

a. Dialates cerebrall blood vessels and eyes
b. High blood pressure and deafness
c. Headache and high cholesterol level
d. All

Ans. (d) All

380. Water pollutant gas has adversely affected the flower growing industry in Los Angeles

a. N_2O
b. CO_2
c. SO_2
d. Ozone

Ans. (d) Ozone

381. Coal burning heaters or stoves produce a hazardous gas which suffocates living being even to death

a. CO
b. CO_2
c. SO_2
d. H_2S

Ans. (a) CO

382. Which gas is pollutant and beneficial to life

a. CO_2 b. O_2
c. CH_4 d. Ozone

Ans. (d) Ozone

383. Photocopying and other electrical equipment produce

a. H_2S b. Ozone
c. CH_4 d. N_2O

Ans. (b) Ozone

384. Sometimes secondary pollutants like ozone, PAN, HNO_2, H_2SO_4 formed from primary pollutants are more toxic than primary pollutants. This phenomenon of increased toxicity in pollutants is called

a. Green house effect b. Synergism
c. Biomagnifications d. Eutrophication

Ans. (b) Synergism

385. Ceramic crokery of substandard quality could become a source of pollutant if food taken in it. This pollutant is

a. Cr b. Hg
c. Pb d. Cd

Ans. (d) Cd

386. Which satellite recorded the presence of an ozone hole

a. LANDSAT-3 b. GOES
c. NIMBUS-7 d. TIROS-N

Ans. (c) NIMBUS-7

387. Fly ash is the pollutant generated by

a. Oil refinery
b. Fertilizer plant
c. Thermal power plant
d. Mining

Ans. (c) Thermal power plant

388. The incomplete combustion of fossil fuel and motor vehicles produce large amount of CO. Which city has maximum conc. of CO in India?

a. Calcutta b. Delhi
c. Chennai d. Mumbai

Ans. (a) Calcutta

389. Protists are least sensitive to nuclear radiations but more sensitive are

a. Toads b. Birds
c. Reptiles d. Mammals

Ans. (d) Mammals

390. Most polluted city of India and world are

a. Mumbai in India and Paris in world
b. Kolkata in India and Tokyo in world
c. Delhi in India and New York in world
d. None

Ans. (b) Kolkata in India and Tokyo in world

391. Which part of the body is first be affected by nuclear radiation

a. Brain b. Liver
c. Bone marrow d. Lunges

Ans. (c) Bone marrow

392. The most serious pollutant to rubber tyres is

a. CO b. O_3
c. CO_2 d. NO_2

Ans. (b) O_3

393. Of the following different occupations of women workers, tell which were first to die of cancer from nuclear radiations

a. Air hostesses
b. Nurses handling X-rays machines
c. Painters of luminous watch dials
d. Assemblers of colour TV parts

Ans. (c) Painters of luminous watch dials

394. Mumbai shows highest level of ..... in air

a. Oxides of nitrogen b. Smog
c. Oxides of carbon d. Oxides of sulphur

Ans. (d) Oxides of sulphur

395. Osteoporosis will be caused by pollutant

a. F b. Cl
c. Br d. None

Ans. (a) F

396. Highest level of oxides of nitrogen (NO and NO_2) in air is recorded in

a. Mumbai b. Chennai
c. Bangalore d. Calcutta

Ans. (d) Calcutta

397. When was NEPA (National Environmental Policy Act) enforce in India

a. 1959
b. 1970
c. 1969
d. 1968

Ans. (c) 1969

398. When did the water (prevention and control of pollution) Act came into operation in India

a. 1976 b. 1974
c. 1972 d. 1969

Ans. (b) 1974

399. Ganga Action Plan to restore the quality of the river Ganga was launched in

a. 1981 b. 1982
c. 1985 d. 1998

Ans. (c) 1985

400. The example of natural pollution is

a. DDT b. SO_2
c. Smoke d. Volcanoes

Ans. (d) Volcanoes

401. Ecological backlash (ecological bomerang) is

a. Heat emission due to bomb explosion
b. Production of adverse ecological effect by a previously useful chemical
c. Production of useful ecological effect by a previously useful chemical
d. None

Ans. (b) Production of adverse ecological effect by a previously useful chemical

402. Cadmium damages

a. Liver and kidneys b. Stomach
c. Heart d. Lungs

Ans. (a) Liver and kidneys

403. Of the four following metropolitan Indian cities, where polluted air hanges above like a cloud

a. Delhi b. Chennai
c. Mumbai d. Calcutta

Ans. (a) Delhi

404. Which causes fibrosis in lungs

a. Asbestos b. DDT
c. CFC d. Lead

Ans. (a) Asbestos

405. Where did the first recoreded incident of release of hazardous waste occur in India

a. Kanpur (UP)
b. Bhopal (MP)
c. Thane (Maharashtra)
d. Monghyr (Bihar)

Ans. (c) Thane (Maharashtra)

406. Of the following types of microbes, which one has been genetically altered to protect crops from frost, marine pollution, organic wastes, etc.

a. Thiobacillus b. Klebsilla
c. Escherichia d. Pseudomonas

Ans. (d) Pseudomonas

407. Leaking of methyl isocyanate (MIC) caused the biggest industrial disaster of the recent times in 1984 (Bhopal tragedy), what did the industrial plant manufacture when the leakage occurred

a. Pesticides b. Cement
c. Explosives d. Fertilizers

Ans. (a) Pesticides

408. In polluted water, index of pollution is

a. Daphnia b. BOD
c. MPN d. All

Ans. (a) Daphnia

409. Which organism in cases of colour changes after the industrial revolution is quoted as the most striking example of Industrial melanism and natural selections as result of environment change

a. Dot moth
b. Speckled wood
c. Spotted lady bird
d. Peppered moth

Ans. (d) Peppered moth

410. Match the following-

A. Acid rain	i. Biological amplification
B. DDT	ii. Mineral pollution
C. BOD	iii. Smog
D. Eutrophication	iv. Sewage pollution
E. PAN	v. SO_2

Codes:

	A	*B*	*C*	*D*	*E*
a.	v	i	iv	ii	iii
b.	iii	i	v	iv	ii
c.	ii	iv	v	i	iii
d.	iv	v	i	ii	iii

Ans. (a) v i iv ii iiI

411. Sewage and garbage in water kill fish due to

a. High BOD
b. Increase in bacteria and decrease in oxygen
c. Increase in bacterial activity
d. Decrease in bacteria and Increase in BOD

Ans. (b) Increase in bacteria and decrease in oxygen

412. Sewage water can be made fit drinkable/recycling with the help of

a. Micro-organisms
b. Hydrophytes
c. Fishes
d. Alum and sodium hypochlorite

Ans. (a) Micro-organisms

413. Eutrophication is maximum in

a. Bottom layers of deep lakes
b. Upper layers of deep lakes
c. Bottom layers of shallow lakes
d. Upper layers of shallow lakes

Ans. (a) Bottom layers of deep lakes

414. Sewage stimulates activity of osmotrophs (decomposers). A high content of which refers to water pollution

a. Fungi
b. *E. coli* and Beggiatoa
c. Diatoms and Oscillatoria
d. All

Ans. (d) All

415. The increased productivity of lakes and streams brought about by nutrient enrichment particularly by NO_3^- and PO_4^- of detergents is known as

a. Biochemical oxygen demand
b. Biomagnification
c. Green house effect
d. Eutrophication

Ans. (d) Eutrophication

416. The amplification of DDT in the various trophic level is known as

a. Pollution
b. Biomagnification
c. Green house effect
d. Eutrophication

Ans. (b) Biomagnification

417. A disease caused by eating fish contaminated by industrial waste containing mercury compounds is known as

a. Minamata disease
b. Hiroshima disease
c. Osteoschlerosis
d. Bright's disease

Ans. (a) Minamata disease

418. Which oil tanker accident (occurred in march 1967) first alerted the public of the grave problem of oil spills in oceans

a. Torrey Canyon
b. Ocean Eagle
c. Beagle
d. Agromerchant

Ans. (a) Torrey Canyon

419. In a photochemical smog which gas causes eye and mucous membrane irritant

a. O_3
b. SO_2
c. CO
d. N_2O

Ans. (a) O_3

420. The major source of pollution upto 80% of total air pollution in metropolitan cities is due to

a. Pesticides
b. Radioactivity and noise
c. Industries
d. Automobiles

Ans. (d) Automobiles

421. Which pollutant gas is released by Cud chewing ruminants

a. CO_2
b. CO
c. NO_2
d. CH_4

Ans. (d) CH_4

422. Which regions of seas or oceans are the most polluted

a. Coastal
b. Sea depths
c. Estuarine
d. Coral reefs

Ans. (a) Coastal

423. Most abundant pollutant in the atmosphere among hydrocarbons is

a. Butane
b. Benzpyrene
c. Propane
d. Methane

Ans. (d) Methane

424. Fluorides stop or reduce photosynthesis and cause chlorosis of tip and margin of leaves by

a. Combining with phytol tail of chlorophyll
b. Combining with Mg^{++} of chlorophyll
c. Combining with CHO group of chlorophyll
d. Combining with CH_3 of chlorophyll

Ans. (b) Combining with Mg^{++} of chlorophyll

425. Peeling of ozone umbrella (which protects us from UV rays) is made by

a. CO_2
b. PAN
c. CFMs
d. Coal burning

Ans. (c) CFMs

426. The most published oil disaster is

a. Release of petrochemicals in Goa by Zuari chemicals
b. Wreck of Tanker in 1967
c. Blow out of an oil well at Santa Barbara
d. Explosion in Brauni oil refinery

Ans. (b) Wreck of Tanker in 1967

427. PAN is a secondary pollutant and is found in

a. Herbicide
b. Pesticide
c. Fertilizer
d. Smog

Ans. (d) Smog

428. Ozone increases

a. Respiration
b. Transpiration
c. Photosynthesis
d. Both a and b

Ans. (d) Both a and b

429. Eutrophication of water bodies leading to the killing of fishes is mainly due to

a. Nonavailability of essential minerals
b. Nonavailability of oxygen
c. Nonavailability of light
d. Nonavailability of food

Ans. (b) Nonavailability of oxygen

430. In stratosphere, bulk of the UV rays are absorbed by

a. CO_2
b. N_2
c. O_3
d. Water vapours

Ans. (c) O_3

431. The compound mainly responsible for pollution which caused the ill famed Bhopal gas tragedy was

a. NH_4OH
b. CH_3NH_2O
c. CH_3NCO
d. $CHCl_3$

Ans. (c) CH_3NCO

432. Among the following environment pollutants, which has the problem of biomagnification

a. SO_2
b. O_3 and CO_2
c. NO_3
d. Hg fungicides

Ans. (d) Hg fungicides

433. An increase in atmospheric level of automobile exhaust gases does not lead to

a. Pb pollution
b. Particulate air pollution
c. O_3 pollution
d. O_3 depletion

Ans. (d) O_3 depletion

434. Which of the following gases was primarily responsible for the 1984 Bhopal gas tragedy

a. Methane
b. Methyl cyanide
c. Hydrogen cyanide
d. Methyl isocyanate

Ans. (d) Methyl isocyanate

435. Depletion of the ozone layer in the stratosphere is caused by

a. Hydrocarbons
b. Nitrogen dioxide
c. Carbon monoxide
d. Polychlorobiphenyls

Ans. (d) Polychlorobiphenyls

436. When exposed to sulphur dioxide gas, teh green colour of the plant leaves will be changed into

a. Red
b. Violet
c. Indigo
d. Yellow

Ans. (a) Red

437. How does acid ppt affect plants

a. It releases H^+ ions , thereby increasing the rate of photophosphorylation in green cells
b. It ppt organic acids in palisade cells of leaves, thereby inhibiting respiration
c. It injures foliage leading to reduction in photosynthesis, biomass and occasionally death
d. It ppt toxic nutrients in soil leading to growth inhibition in trees

Ans. (c) It injures foliage leading to reduction in photosynthesis, biomass and occasionally death

438. Which one of the following statement is correct

a. Up to 15 km above the earth's surface ozone is beneficial to life but CFCs are harmful
b. Beyond about 20 km above the earth's surface presence of ozone is vital to life on earth and CFCs are beneficial
c. Beyond about 20 km above the earth's surface presence of ozone is vital to life on earth, but CFC are harmful
d. Up to 15 km above the earth's surface both ozone and CFCs are harmful to life

Ans. (c) Beyond about 20 km above the earth's surface presence of ozone is vital to life on earth, but CFC are harmful

439. The protective ozone shield is to found in the

a. Hydrosphere
b. Ionosphere
c. Stratosphere
d. Iroposphere

Ans. (c) Stratosphere

440. Which of the following statement regarding the maintenance of carbon cycle in the biosphere are correct

i. Plants utilise solar energy to convert CO_2 and water into cellular materials and produce oxygen that animals consume
ii. Oxygen produced by the plants during carbon assimilation is not a by product
iii. Energy used by an animal comes from the oxidation plant material releasing CO_2 and water
iv. All decaying organic matter on the earth is ultimately degraded by molds and bacteria to yield CO_2 that escape into the atmosphere

Select the correct answer:

a. i, iii and iv
b. i, iii and iv
c. i and ii
d. i, ii, iii and iv

Ans. (b) i, iii and iv

441. Water pollution is best assessed by determining

a. DO and acidity
b. DO and BOD
c. BOD and turbidity
d. Hardness and alkalinity

Ans. (c) BOD and turbidity

442. Green house gases are called such because they

a. Are produced in green house
b. Prevent the escape of heat waves reradiated from the earth's surface
c. Are used in warming plants growth chambers
d. Help in maintaining atmospheric O_2 and CO_2 balance

Ans. (b) Prevent the escape of heat waves reradiated from the earth's surface

443. Measurement of the rate of O_2 consumption in unit volume of water over a period of time is done to find out

a. Biogas generation
b. BOD
c. Biosynthetic pathways
d. Fermentation

Ans. (b) BOD

444. CO is a major pollutant of

a. Water
b. Air
c. Noise
d. Soil

Ans. (b) Air

445. The worst environment hazards were created by accidents in nuclear power plant and MIC gas tragedy respectively in

a. Russia in 1990 and Bhopal in 1986
b. Ukraine in 1998 and USA in 1994
c. Bhopal in 1984 and Russia in 1990
d. Ukraine in 1986 and Bhopal in 1984

Ans. (d) Ukraine in 1986 and Bhopal in 1984

446. Increasing skin cancer and higher mutation rates are generally the consequences of

a. CO_2
b. Ozone depletion
c. Ozone biome
d. Acid rains

Ans. (b) Ozone depletion

447. Sudden mass death of fishes from oxygen depletion is more likely in case of

a. Eutrophic lake
b. Mesotrophic lake
c. Oligotrophic lake
d. Oxalotrophic lake

Ans. (a) Eutrophic lake

448. Acid rains occur when atmosphere is heavily polluted with

a. CO, CO_2
b. SO_2, NO_2
c. Ozone
d. Smoke particles

Ans. (b) SO_2, NO_2

449. Sewage drained into water bodies kill fishers because

a. Excessive CO_2 is added in water
b. It gives off a bad smell
c. It removes the competition with fishes to dissolved oxygen
d. It increase competition with fishes to dissolved oxygen

Ans. (d) It increase competition with fishes to dissolved oxygen

450. The basic component of the smog may be

a. O_3
b. PAN
c. O_3 and PAN
d. PPN and PBN

Ans. (c) O_3 and PAN

451. Which of the following type of pollution causes the out break of jaundice

a. Air
b. Thermal
c. Water
d. Land

Ans. (c) Water

452. Man made radioactive element Sr^{90} accumulates in the body through

a. Breathing
b. Drinking water
c. Food chain
d. Contaminated soil

Ans. (c) Food chain

453. Ozone day is observed on

a. January 30
b. April 21
c. September 16
d. December 25

Ans. (c) September 16

454. Air pollution effects are usually found on

a. Leaves
b. Stems
c. Roots
d. Flowers

Ans. (a) Leaves

455. Water pollution

a. Increases oxygenation
b. Decreases turbidity
c. Increases turbidity and deoxygenation
d. Increases photosynthesis

Ans. (c) Increases turbidity and deoxygenation

456. Most harmful types of environment pollutants are

a. Non biodegradable chemicals
b. Human organic wastes
c. Wastes from feed lots
d. Natural nutrients present in excess

Ans. (a) Non biodegradable chemicals

457. Phosphate pollution is caused by

a. Phosphate rocks only
b. Agricultural fertilizer only
c. Sewage and phosphate rocks
d. Sewage and Agricultural fertilizers

Ans. (d) Sewage and Agricultural fertilizers

458. Formation of ozone hole is maximum over

a. India
b. Europe
c. Antartica
d. Africa

Ans. (c) Antartica

459. The carbon dioxide contents in atmospheric air is about

a. 0.034%
b. 0.34%
c. 3.34%
d. 6.5%

Ans. (a) 0.034%

460. In coming years skin related disorders will be more common due to

a. Pollution in air
b. Depletion of ozone layer
c. Use of detergents
d. Water pollution

Ans. (b) Depletion of ozone layer

461. The most common indicator organisms that represents polluted water is

a. *E. coli*
b. *P. Typhi*
c. *C. vivrio*
d. Entamoeba

Ans. (a) *E. coli*

462. An environmentalist associated with Chipko movement is

a. Sunder lal Bahuguna
b. Medha Patekar
c. Acharya Vinoba Bhave
d. Baba Amte

Ans. (a) Sunder lal Bahuguna

463. Which of the following are the nature's cleaner

a. Producers
b. Consumers
c. Symbionts
d. Decomposers

Ans. (d) Decomposers

464. Noise pollution is meqasured in

a. Decibels
b. Tonns
c. Pikograms
d. Kilograms

Ans. (a) Decibels

465. The term biomagnifications refers to

a. Increase in the conc. of nondegradable pollutants as they pass through food chain
b. Increase in population size
c. Growth of organisms due to food consumption
d. Blowing up of environmental issues by man

Ans. (a) Increase in the conc. of nondegradable pollutants as they pass through food chain

466. One of the imp. effects of SO_2 and its transformation products on plants is

a. Plasmolysis
b. Destruction of chlorophyll
c. Destruction of Golgi bodies
d. Destruction of cell wall

Ans. (b) Destruction of chlorophyll

467. Major pollutant present in the jet plaqne emission is

a. CCl_4 b. SO_2
c. CO d. FC

Ans. (d) FC

468. Sewage water is purified for recycling by the action of

a. Light b. Micro-organisms
c. Aquatic plants d. Fishes

Ans. (b) Micro-organisms

469. Spraying of DDT on crops produces pollution of

a. Soil and water b. Air and soil
c. Crops and air d. Air and water

Ans. (b) Air and soil

470. Which one is not dangerous not for life

a. Biopollutants
b. Ozone layers
c. Nuclear blast
d. Deforestation

Ans. (b) Ozone layers

471. If there was no CO_2 in the earth's atmosphere, the temp of earth's surface would be

a. Dependent on the amount of oxygen in the atmosphere
b. Higher than the present
c. Less than the present
d. The same

Ans. (c) Less than the present

472. Which one of the following organism is used as indicator of water quality

a. Beggiota b. Chlorella
c. Azospirillum d. Escherichia

Ans. (d) Escherichia

473. A sewage treatment process in which a portion in the waste is recycled into the beginning of the process is called

a. Cyclic treatment
b. Primary treatment
c. Activated sludge treatment
d. Tertiary treatment

Ans. (c) Activated sludge treatment

474. Life can not originate from inorganic materials at present because of

a. High degree of environment pollution
b. A very high amount of oxygen in the atmosphere
c. Very low atmospheric temp.
d. Absence of raw material

Ans. (b) A very high amount of oxygen in the atmosphere

475. Photochemical smog always contain

a. O_3 b. CH_4
c. CO d. None

Ans. (a) O_3

476. The depletion of ozone layer is due to the

a. Oxides of N_2 b. Oxides of C
c. Oxides of S d. None

Ans. (a) Oxides of N_2

477. Central Arid Zone Research Institute (CAZRI) is situated in

a. Jaiselmer b. Hisar
c. Jodhpur d. Karnal

Ans. (c) Jodhpur

478. The following may be used as an index of pollution in water body

a. Daphnia b. Typha
c. Trapa d. All

Ans. (a) Daphnia

479. Ozone hole refers to

a. Reduction in thickness of ozone layer in stratosphere
b. Reduction in ozone thickness in troposphere
c. Hole in the ozone layer
d. Increased conc. of ozone

Ans. (a) Reduction in thickness of ozone layer in stratosphere

480. Grambusia fish is an example by

a. Biocontrol b. Parasitism
c. Hyperparasitism d. None

Ans. (a) Biocontrol

481. Ozone umbrella is affected by

a. CFM b. CO_2
c. CH_4 d. CH_3NC

Ans. (a) CFM

482. In 1984, the Bhopal gas tragedy was caused by the leaking of

a. CO b. CO_2
c. NO_2 d. CH_3NC

Ans. (d) CH_3NC

483. Which one of the following is secondary air pollutant

a. SO_2 b. CO_2
c. PAN d. Aerosol

Ans. (c) PAN

484. A labour working in a cement factory may have chances of suffering from

a. Bone marrow cancer
b. Cardiac disease
c. Asbestosis
d. Cystosilicosis

Ans. (d) Cystosilicosis

485. Acid rain

a. Is due to excess SO_2
b. Is due to excess CO_2
c. Is due to excess O_2
d. Is a natural phenomenon

Ans. (a) Is due to excess SO_2

486. Smog is a combination of

a. Air and water b. Fire and water
c. Smoke and fog d. Water and smoke

Ans. (c) Smoke and fog

487. Pollution caused by persistent pesticides is relatively more dangerous to which type of organisms

a. Top carnivores b. Producres
c. Herbivores d. First level carnivores

Ans. (a) Top carnivores

488. At present the most significant cause dwindling biodiversity is probably

a. Biological magnification of DDT
b. Global warming
c. The deterioration of ozone layer
d. The destruction of habitat

Ans. (d) The destruction of habitat

489. Which of this is a pollution related occupational health hazard

a. Fluorosis b. Silicosis
c. Pneumoconiosis d. Asthma

Ans. (c) Pneumoconiosis

490. Ozone layer is disturbed by

a. Super bonic jets
b. Large no. of automobiles
c. Large no. of factories
d. None

Ans. (a) Super bonic jets

491. Pollution is an unavoidable consequence of

a. Industrialization b. Population
c. Urbanisation d. Deforestation

Ans. (c) Urbanisation

492. Which of the following does not cause pollution

a. CO_2 b. SO_2
c. H_2 d. CO

Ans. (a) CO_2

493. Water pollution is caused by

a. Ammonia b. Phytoplankton
c. Industrial effluents d. Smoke

Ans. (c) Industrial effluents

494. Relative biological effectiveness (RBE) is usually referred to damages caused by

a. High temp. b. Low temp.
c. Radiation d. Pollution

Ans. (c) Radiation

495. The indiscriminate use of chemical fertilisers and pesticides may cause pollution of

a. Air b. Soil
c. Water d. All

Ans. (d) All

496. Air pollution is caused by excess of

a. Dinitrogen b. Hydrogen
c. Water vapour d. None

Ans. (d) None

497. Large quantities CO produced by gas heaters, charcoal stoves, coal mines etc. Usually prove fatal as the pollutant

a. Is carcinogenic b. Impairs respiration
c. In combustible d. None

Aas. (b) Impairs respiration

498. The removal of lead and its products from petrol used in automobiles is necessary because lead

a. Causes cancer of skin
b. Impairs respiration
c. Hampers Hb formation
d. All

Ans. (c) Hampers Hb formation

499. Photochemical combination of hydrocarbons and nitrogen oxides emitted by automobiles produces health threatening

a. Acid rains b. CFC
c. Fly ash d. Smog

Ans. (d) Smog

500. Water becomes polluted due to presence or addition of

a. Inorganic substances b. Organic substances
c. Biological agents d. All

Ans. (d) All

501. Which the pollutant flow is conveyed in well defined channels as municipal or industrial waste it is called

a. Diffuse source b. Non point source
c. Point source d. All

Ans. (c) Point source

502. the polluting strength of community waste water is usually characterised by its

a. BOD b. CFC
c. MIC d. ABS

Ans. (a) BOD

503. BOD stands for

a. Biological growth database
b. Biological oxygen demand
c. Biological and organic diversity
d. None

Ans. (b) Biological oxygen demand

504. Municipal waste, containing human and animal excreta, food residues, detergents etc. And rich in bacteria and organic substances, is called

a. Sewage b. Sewar
c. Sewerage d. None

Ans. (a) Sewage

505. Eutrophication of water bodies is associated with water

a. Hole b. Hyacinth
c. Lily d. None

Ans. (b) Hyacinth

506. Nuclear reactor malfunction in any country is a case of concern for

a. The reactor's employees and neighbours
b. The entire human population
c. Some enlightened persons world wide
d. Some developed and developing countries

Ans. (a) The reactor's employees and neighbours

507. An American plant which has become a troublesome aquatic weed in India is

a. *Typha latifolia* b. *Trapa bispinosa*
c. *Cyperus rotundus* d. *Eicchornia crassipes*

Ans. (b) Trapa bispinosa

508. Most inhabitants of calcutta suffer from bronchitis. It is due to excess

a. Polluted soil b. Polluted air
c. Impurity of water d. Adulteration of food

Ans. (d) Adulteration of food

509. Which one of the following is not pollutant

a. CO b. CO_2
c. SO_2 d. NO_2

Ans. (b) CO_2

510. Peeling of ozone umbrella is due to

a. Coal burning b. PAN
c. CFCs d. CO_2

Ans. (b) PAN

511. Pollutant released by jet planes is

a. Fog b. Aerosol
c. Smog d. Colloid

Ans. (b) Aerosol

512. Anxiety and stress are caused by

a. Noise pollution b. Water pollution
c. Air pollution d. Nuclear pollution

Ans. (a) Noise pollution

513. Environmental pollution affects

a. Man only
b. Plants only
c. Biotic components
d. Biotic and abiotic components of environment

Ans. (d) Biotic and abiotic components of environment

514. Green muffler is related to pollution of

a. Soil
b. Water
c. Noise
d. Air

Ans. (c) Noise

515. Water pollution is due to

a. Industrial effluents
b. Sewage and other wastes
c. Agricultural discharges
d. All

Ans. (d) All

516. CFCs are polluting agents. They are produced by

a. Thermal power plant
b. Diesel trucks
c. Acid batteries
d. Jet planes

Ans. (d) Jet planes

517. Water is treated with chlorine to

a. Kill germs
b. Remove hardness
c. Remove suspended particles
d. Increase oxygen content

Ans. (a) Kill germs

518. Water blooms are formed by

a. Water Hyacinth
b. Planktonic algae
c. Hydrilla
d. Lemna

Ans. (b) Planktonic algae

519. Mottling of teeth is due to presence of an element in drinking water

a. B
b. Cl
c. F
d. Hg

Ans. (c) F

520. Aerosols decrease primary productivity by

a. Competing with CO_2
b. Preventing N_2 fixation
c. Reducing photosynthesis
d. Decreasing O_2 conc.

Ans. (c) Reducing photosynthesis

521. Methane gas producing field is

a. Cotton field
b. Ground nut field
c. Paddy field
d. Wheat field

Ans. (c) Paddy field

522. A person has impaired nervous system and signs of madness due to continued intake of metal contaminated water. The metal is

a. Mn
b. Pb
c. Ca
d. Hg

Ans. (b) Pb

523. As it passes into food chain, the conc. of DDT

a. Remains same
b. Increases
c. Decreases
d. Unpredictable

Ans. (b) Increases

524. Acid rain is caused due to

a. Sulphur dioxide and nitrous oxide emission from the combustion of fossil fuel
b. High conc. of carbon dioxide in the atmosphere which forms carbonic acid
c. High conc. of Cl which forms hydrochloric acid
d. None

Ans. (a) Sulphur dioxide and nitrous oxide emission from the combustion of fossil fuel

525. Electrostatic precipitators are extensively employed to control

a. Water pollution
b. Air pollution
c. Radioactive pollution
d. None

Ans. (b) Air pollution

526. Cyclone collectors are nowadays commonly used to control

a. Air pollution with special reference to dust particles
b. Radioactive pollution
c. Water pollution in general
d. Water pollution with special reference to Ganga Action plan

Ans. (a) Air pollution with special reference to dust particles

527. Air pollution causing photochemical oxidants production include

a. Oxygen, chlorine, fuming nitric acid
b. Ozone, peroxyacetyl nitrate, aldehydes
c. Nitrous oxide, nitric acid fumes, nitric oxide
d. Carbon monoxide, sulphur dioxide

Ans. (b) Ozone, peroxyacetyl nitrate, aldehydes

528. The protective ozone layer of stratosphere itself requires protection from indiscriminate use of

a. Fungicides, insecticides, bactericides and medicines
b. Aerosols and high flying jets
c. Ballons and turboprop aeroplanes
d. Atomic explosions and industrial wastes

Ans. (b) Aerosols and high flying jets

529. The effect of today's radioactive fall out probably be more harmful to children of future generation than to children now living because

a. Mutated genes are frequently recessive
b. Susceptibility to radiation increases with age
c. Infant are more susceptible to radiation
d. Contamination of milk supply is not cumulative

Ans. (a) Mutated genes are frequently recessive

530. In cities like Mumbai and Calcutta the major air pollutants are

a. Algal spores and marsh gas
b. Hydrocarbons and hot air
c. CO and oxides of sulphur
d. Ozone

Ans. (c) CO and oxides of sulphur

531. SO_2 and NO_2 cause pollution by increasing

a. Buffer action b. Alkalinity
c. Acidity d. None

Ans. (c) Acidity

532. Threat for the existence of human beings is

a. Deforestation
b. High population and pollution
c. Low forest
d. High population

Ans. (b) High population and pollution

533. Acid rains are caused by- Or. recent reports of acid rain in some industrial cities are due to the effect of atmospheric pollution by

a. Excessive release of CO in atmosphere by incomplete combustion of coke, charcoal and other carbonaceous fuels in paucity of oxygen
b. Excessive release of NH_3 by industrial plants and coal gas
c. Excessive release of CO_2 by burning of fuels like wood and charcoal cutting of forests and increased animal population
d. Excessive release of NO_2 and SO_2 in atmosphere by burning of fossil fuels

Ans. (d) Excessive release of NO_2 and SO_2 in atmosphere by burning of fossil fuels

534. Indicator plant which can be used to indicate atmospheric pollution by SO_2 are

a. Climbers like Cucurbia
b. Moss plants like Sphagnum
c. Grasses like Deschampsia
d. Lichens like Usnea

Ans. (d) Lichens like Usnea

535. One of the most dangerous radioactive pollutant is which is a radioactive pollutant that accumulates in bones

a. Ca -40 b. S -35
c. P -3 d. Sr -90

Ans. (d) Sr -90

536. Generally speaking, the atmosphere in big cities is polluted most by

a. Pesticides residues b. Automobile exhaust
c. Household waste d. Radioactive fall out

Ans. (b) Automobile exhaust

537. Which of the following disease caused or agrevated by pollution

a. Haemophilia b. Rheumatism
c. Scurvy d. Bronchitis

Ans. (d) Bronchitis

538. Ozone layer in stratosphere is destroyed by or which one of the chemical is responsible for the reduction of ozone content of the atmosphere

a. SO_2 b. CFC
c. Photochemical smog d. HCl

Ans. (b) CFC

539. Which of the following changes would be likely to make terrestrial life on this planet impossible

a. Disappearance of moon
b. Change in the orbit of the earth from an ellipse to a circle
c. Change in atmosphere permitting all the solar radiation reaching the upper atmosphere to penetrate to the surface of the earth
d. Decrease in mean annal temp. By 10°C

Ans. (c) Change in atmosphere permitting all the solar radiation reaching the upper atmosphere to penetrate to the surface of the earth

540. Sewage water can be purified for recycling with the action of

a. Fishes b. Micro-organisms
c. Penicillium d. Aquatic plants

Ans. (b) Micro-organisms

541. Biologist celebrate 5th June as

a. World population day
b. World environment day
c. World hygiene day
d. Darwin birthday

Ans. (b) World environment day

542. Gas released during Bhopal gas tragedy was

a. Methyl isocyanate
b. Potassium isothiocyanate
c. Ethyl isothiocyanate
d. Sodium isothiocyanate

Ans. (a) Methyl isocyanate

543. Which one of the following element is the critical limiting factor in the function of ecosphere because of its irretrievable loss into the ocean

a. Fe b. Mg
c. Ca d. P

Ans. (d) P

544. Major aerosol pollutant present in the jet plane emission is

a. CO b. CCl_4
c. FC d. SO_2

Ans. (c) FC

545. Minamata disease is a pollution related disease which results from

a. Release human organic waste into drinking water
b. Release of industrial waste mercury into fishing water
c. Accumulation of arsenic into atmosphere
d. Oil spills into sea

Ans. (b) Release of industrial waste mercury into fishing water

546. The presence of O_3 in the atmosphere of earth

a. Hinders higher rate of phothosynthesis
b. Helps in checking and penetration of ultra violet rays to earth
c. Has been responsible for increasing the average global temperature in recent
d. Is advantageous since it supplies O_2 for people travelling in jets

Ans. (b) Helps in checking and penetration of ultra violet rays to earth

547. Which of the following is non renewable resource

a. Wild life b. Water
c. Coal deposits d. Forests

Ans. (c) Coal deposits

548. From the following which is the best source of renewable energy

a. Cattles b. Trees
c. Petroleum d. Coal

Ans. (b) Trees

549. Of the following sources of energy which one is the non-conventional source

a. Coal
b. Petroleum
c. Solar radiation
d. Electricity from nuclear power plants

Ans. (c) Solar radiation

550. There is no life on moon because there is no

a. Water
b. Oxygen
c. Nitrogen
d. Carbon

Ans. (a) Water

551. A depleting source of energy is

a. Water
b. Wind
c. Sun light
d. Fossil fuels

Ans. (d) Fossil fuels

552. Geothermal energy is

a. Renewable, conventional source of energy
b. Non renewable, non-conventional source of energy
c. Renewable, non conventional source of energy
d. Non-renewable, conventional source of energy

Ans. (b) Non renewable, non-conventional source of energy

553. Today concentration of green house gases is high because is

a. Use of refrigeration
b. Increased combustion of oil and coal
c. Deforestation
d. All of the above

Ans. (d) All of the above

554. Green house effect is

a. To grow vegetable is green
b. To grow more and more green plants in green garden
c. To maintain heat of radiation by CO_2
d. To reduce the green light from sun light which is received by the earth

Ans. (c) To maintain heat of radiation by CO_2

555. Green house effect is

a. Moisture layer in the atmosphere
b. Ozone layer in the atmosphere

c. Infra red waves reaches to earth
d. Increased in temperature due to increased in CO_2 concentration of atmosphere or CO_2 layer in the atmosphere

Ans. (d) Increased in temperature due to increased in CO_2 concentration of atmosphere or CO_2 layer in the atmosphere

556. Phytotron is a device by which

a. Electrons are bombarded
b. Plants are grown in controlled environment
c. Proton are librated
d. Mutations are produced in plants

Ans. (b) Plants are grown in controlled environment

557. The race gas which is produced in rice paddies and is associated with global warming is

a. Chlorine
b. Methane
c. CO_2
d. Hydrogen sulphide

Ans. (b) Methane

558. Which is not a green house gas

a. CO_2 b. CH_4
c. Freon d. Hydrogen

Ans. (d) Hydrogen

559. Green house effect is related to

a. Global warming
b. Global green algae
c. Cultivation of green plants
d. Cultivation of vegetable in house

Ans. (a) Global warming

560. Carbon dioxide in atmosphere air amount to about

a. 0.3% b. 3%
c. 0.03% d. 0.003%

Ans. (c) 0.03%

561. Earth summit at Rio dejanerio was related

a. Soil fertility
b. Conservation of genetic resource of plants and animals
c. Survey of the land
d. None of the above

Ans. (b) Conservation of genetic resource of plants and animals

562. The stratospheric ozone depletion leads to

a. Increased in the incidence of skin cancer
b. Forest fire
c. Global warming
d. None of the above

Ans. (a) Increased in the incidence of skin cancer

563. Which of the following country hosted the first world earth summit on conservation of environment

a. India b. Spain
c. Peru d. Brazil

Ans. (d) Brazil

564. Which one of the following is a renewable source of energy

a. Petroleum b. Coal
c. Nuclear fuel d. Trees

Ans. (d) Trees

565. Which of the following is non conventional source of energy

a. Tidal energy b. Wind energy
c. Solar energy d. All of the above

Ans (d) All of the above

566. Inexhaustible but limited source of energy is

a. Nuclear fuels b. Products of lakes
c. Products of oceans d. Fossil fuels

Ans. (a) Nuclear fuels

567. Petroleum is a

a. Non renewable source b. A rebewable source
c. A synthetic product d. A unconvenient source

Ans. (a) Non renewable source

568. Which of the following is non renewable source

a. Mineral b. water
c. forest d. solar energy

Ans. (a) Mineral

569. Ozone layer is disturbed by

a. Supersonic jets
b. Large number of automobiles
c. Large number of factories
d. None of the above

Ans. (a) Supersonic jets

570. Phytotron is a facility to

a. Induce mutation
b. Grow plants under disease free conditions
c. Conserve endangered species
d. Grow plants under controlled condition

Ans. (d) Grow plants under controlled condition

571. L.P.G cooking gas is

a. Law pressure gas
b. Biogas
c. Fossil fuel
d. Low price gas

Ans. (c) Fossil fuel

572. Green house effect is enhanced in the environment by the gas

a. CO_2
b. CO
c. Fluorocarbon
d. Methane

Ans. (a) CO_2

573. Which of the following gases can deplete the ozone layer in the upper atmosphere

a. Sulphur dioxide
b. Methane
c. Carbon monoxide
d. Ammonia

Ans. (b) Methane

574. Which of the following gases contributes maximum to the green house effect on the earth

a. Freon
b. Methane
c. Carbon dioxide
d. Chlorofluorocarbon

Ans. (c) Carbon dioxide

575. Which of these is a true statement

a. Global warming is of no immediate concern
b. Since gases not derived from fossile fuel combustion are involved, reduction in fossile fuel burning will not help the green house effect
c. Global warming is so imminent that nothing can be done
d. Reduction in fossile fuel burning will lessen the green house effect

Ans. (d) Reduction in fossile fuel burning will lessen the green house effect

576. Heating of earth surface is due to

a. Air pollution
b. Water
c. Soil
d. All of the above

Ans. (a) Air pollution

577. Layer of ozone is present in

a. Stratosphere
b. Trophosphere
c. Thermosphere
d. Mesosphere

Ans. (a) Stratosphere

578. Earth is protected from dangerous U.V radiation by

a. Oxygen layer
b. CO_2 layer
c. Ozone layer
d. Photochemical smog layer

Ans. (c) Ozone layer

579. A natural resource that has inherent capacity to replenish is called

a. Non renewable resource
b. Renewable resource
c. Exhaustible resource
d. Inexchaustible resource

Ans. (b) Renewable resource

580. Which of the following resources is going to be exhausted by the end of this century

a. Tin
b. Gold
c. Lead
d. All of the above

Ans. (d) All of the above

581. For the production of biogas, the biogas plant requires

a. Agriculture waste
b. Cattle dung
c. Kerosene
d. Fire wood

Ans. (b) Cattle dung

582. The inexhaustive non conventional source of energy is/are

a. Sun tides
b. Solar radiation
c. Wind power
d. All of the above

Ans. (d) All of the above

583. Minerals, metals and fossile fuels are

a. Renewable resources
b. Biodegradable resources
c. Non renewable resources
d. Renewable as well as non-renewable resources

Ans. (c) Non renewable resources

584. Which of the following is most non renewable source

a. Water
b. Wild life
c. Coal and minerals
d. Forest

Ans. (c) Coal and minerals

585. Which of the following is a renewable resource

a. Soil
b. Water
c. Forest and wild life
d. All of the above

Ans. (d) All of the above

586. The renewable source is

a. Wild life species
b. Agriculture products
c. Trees
d. Both b and c

Ans. (d) Both b and c

587. Nitrogen fixation occurs in

a. Some herbaceous plant and legumes
b. Legumes and some bacteria
c. Some bacteria, cyanobacteria and legumes
d. All green plants

Ans. (c) Some bacteria, cyanobacteria and legumes

588. Both power and manure is provided by

a. Biogas plants
b. Thermal plants
c. Nuclear plants
d. Hydroelectric plants

Ans. (a) Biogas plants

589. Excess atmospheric CO_2 increases green house effect as CO_2

a. Reduce cloud formation
b. Precipitate dust
c. Reduces atmospheric pressure
d. Is opaque to infrared rays

Ans. (d) Is opaque to infrared rays

590. Green house gases are CO_2, CH_4,CFC,NO_2 and halons. These are

a. Transparent to emission from earth fro passage into spaces
b. Absorber of long wave radiation like infrared emitted from earth surface
c. Transparent to solar infrared radiation earth
d. Absorber of solar radiation for warming of atmosphere

Ans. (b) Absorber of long wave radiation like infrared emitted from earth surface

591. Where is NEERI located at

a. Cochin
b. Shimla
c. Nagpur
d. Banglore

Ans. (c) Nagpur

592. Green house effect is due to

a. CO_2
b. CO
c. NO_2
d. None of these

Ans. (a) CO_2

593. Which is most effective in warming atmosphere

a. CFCs
b. Methane
c. CO_2
d. Nitrogen oxide

Ans. (b) Methane

594. A biogeochemical cycle without an atmospheric component is

a. Carbon
b. Phosphorus
c. Nitrogen
d. Sulphur

Ans. (c) Nitrogen

595. Beijerinck discovered

a. Nodule formation in legume
b. Nitrogen fixation
c. Bacillus radicicola
d. Both a and c

Ans. (d) Both a and c

596. The source of methane pollution is

a. Marshes
b. Paddy field
c. Cattle and other herbiovores
d. All of the above

Ans. (d) All of the above

597. One hectare of good forest picks up CO_2 and release O_2 respectively

a. 30000 kg and 60000 kg
b. 30000 kg and 10000 kg
c. 10000 kg and 25000 kg
d. 8000 kg and 10000 kg

Ans. (b) 30000 kg and 10000 kg

598. Carbondioxide content of atmosphere has increased in the past 150 years from

a. 0.2 to 0.3 PPM
b. 0.027 to 0.034 PPM
c. 20 to 35 PPM
d. 270 to 340 PPM

Ans. (d) 270 to 340 PPM

599. Fertiliser obtained from sea birds along the coast of chile and peru is

a. Guano
b. Dung
c. Bone meal
d. Urea

Ans. (a) Guano

600. Which has a sedimentary cycle

a. Sulphur
b. Carbon
c. Water
d. Nitrogen

Ans. (a) Sulphur

601. Pseudomonas is an important component of nitrogen cycle. It

a. Changes ammonium nitrogen to nitrate state
b. Fixes elemental nitrogen
c. Produces elemental nitrogen
d. Transfers nitrogen

Ans. (c) Produces elemental nitrogen

602. Which one of the following statement is correct

a. Upto about 15 km above the earth's surface ozone is beneficial to life but CFC are harmful
b. Beyond about 20 km above the earth's surface, presence of ozone is vital to life on the earth and CFC are beneficial
c. Beyond about 20 km above the surface1 of earth, ozone vital to life on the earth but CFC are harmful
d. Upto about 15 km above the earth surface both ozone and CFC are harmful to life

Ans. (c) Beyond about 20 km above the surface of earth, ozone vital to life on the earth but CFC are harmful

603. Rise of atmosphere temperature because of high concentration of CO_2 is known as

a. Pollution
b. Green house effect
c. Ecotone
d. Biomagnifications

Ans. (b) Green house effect

604. Nonbiological nitrogen fixation is

a. Rhizobial
b. Electrochemical and photochemical
c. Cyanobacterial
d. None of these

Ans. (b) Electrochemical and photochemical

605. Lithosphere is reservoir of

a. CO_2
b. N_2
c. Phosphorus
d. Carbon

Ans. (c) Phosphorus

606. Water cycle is made up of two overlapping cycles

a. Oceanic and fresh water cycles
b. Global and biological cycles
c. Ground water and atmospheric cycle
d. Surface water and atmospheric cycle

Ans. (b) Global and biological cycles

607. Sedimentary cycle having a small gaseous component is found is

a. Carbon
b. Sulphur
c. Nitrogen
d. Phosphorus

Ans. (b) Sulphur

608. Of the total fresh water, ground water constitutes

a. 44.2%
b. 10%
c. 22.4%
d. 90%

Ans. (c) 22.4%

609. Percentage of fresh water in the hydrosphere is

a. 33%
b. 30%
c. 13%
d. 3%

Ans. (d) 3%

610. Percentage of fresh water found in lakes, pounds swamps, streams and rivers is

a. 0.36%
b. 7.7%
c. 22.4%
d. 77.2%

Ans. (a) 0.36%

611. Maximum energy in world is used by the country

a. U.K.
b. Japan
c. America
d. China

Ans. (c) America

612. Peak concentration of ozone in the tratosphere lies at a height of sphere

a. 50 km
b. 40 km
c. 25 km
d. 10 km

Ans. (c) 25 km

613. Guano is the major source

a. Sulphur
b. Nitrogen
c. Phosphorus
d. Zinc

Ans. (c) Phosphorus

614. Stratosphere is characterised by

a. Rise in temperature with height
b. Fall in temperature
c. Lack of water vapours and dust particle
d. Both a and c

Ans. (d) Both a and c

615. Under ground water is

a. Renewable resource
b. International resource
c. Non-renewable resource
d. Mixed resource

Ans. (a) Renewable resource

616. Green house effect refers to

a. Global warming caused by increasing CO_2
b. Ozone hole

c. Increased chlorofluorocarbon
d. Plant grown in green houses

Ans. (a) Global warming caused by increasing CO_2

617. Green house effect with respect to global climate change refers to

a. Cooling of the earth
b. Warming of earth
c. Increased rainfall and greenery
d. Desertification

Ans. (b) Warming of earth

618. NEERI is

a. National Environmental Engineering Research Institute
b. National Ecological Engineering Research Institute
c. National Eugenics Engineering Research Institute
d. National Ethological Engineering Research Institute

Ans. (a) National Environmental Engineering Research Institute

619. The region of earth comprising water forms

a. Hydrosphere
b. Lithosphere
c. Biosphere
d. None of the above

Ans. (a) Hydrosphere

620. The organisms which live in the bottom of lake are called

a. Phytoplankton
b. Zooplankton
c. Nekton
d. Benthos

Ans. (d) Benthos

621. Species that have small total numbers of individuals often due to limited geographical ranges or low population densities are known as

a. Insufficiently known
b. Rare
c. Critical
d. None of these

Ans. (b) Rare

622. Species that may become endangered in the near future because the populations of species are decreasing in size throughout its range is known as

a. Extinct
b. Endangered
c. Vulnerable
d. None of these

Ans. (c) Vulnerable

623. Beta diversity refers to

a. Percent to which species composition changes along an environmental gradient
b. Degree to which species composition changes along an environmental gradient
c. Both a and b
d. None of these

Ans. (b) Degree to which species composition changes along an environmental gradient

624. Alpha diversity refers to

a. Number of species in many communities
b. Number of species in single community
c. Number of species in two communities
d. None of the above

Ans. (b) Number of species in single community

625. Conservation biology rates on certain ethical principles. These are

a. The diversity of organism is good
b. Biological diversity has intrinsic value
c. Ecological complexity is good
d. All of the above

Ans. (d) All of the above

626. Which of the following is concerned with environmental pollution?

a. IUCN
b. ITES
c. UNEP
d. WWF

Ans. (c) UNEP

627. The first global conference on depletion of ozone layer was held in

a. Austria
b. Australia
c. Kathmandu
d. Japan

Ans. (a) Austria

628. With the biological communities, some species may be important in determining the ability of the large number of other species to persist in the community. These crucial species have been termed

a. Species diversity
b. Keystone species
c. Species keystone
d. None of these

Ans. (b) Keystone species

629. The measuring of geographical scales of the biodiversity

a. Gamma diversity
b. Beta diversity
c. Alpha diversity
d. All of these

Ans. (d) All of these

630. Which of the following is the earliest set up biosphere reserve in India?

a. Sunderbans b. Nilgiri
c. Both a and b d. None of these

Ans. (b) Nilgiri

631. The international trade of endangered species

a. MAB b. IUCN
c. CITES d. WWF

Ans. (c) CITES

632. The terminal stabilized stage of a plant succession is called

a. Aggregation b. Climax
c. Migration d. None of these

Ans. (b) Climax

633. The earliest stage in plant succession

a. Nudation b. Reaction
c. Coaction d. Invasion

Ans. (a) Nudation

634. Stratification is one of the characteristics features of a

a. Ecads b. Community
c. Population d. None of these

Ans. (b) Community

635. The scientific study of seasonal changes in life cycle of the plants is known as

a. Synecology b. Teratology
c. Phenology d. None of these

Ans. (c) Phenology

636. Buds, organs or seeds are protected most in a

a. Chamaephyte b. Therophyte
c. Cryptophyte d. None of these

Ans. (b) Therophyte

637. Which of the following is suitable for study of forest community?

a. Belt transect b. Quadrat
c. Point-farm d. None of these

Ans. (a) Belt transect

638. Seasonal plants completing their life cycle in a single season are called

a. Chamaephytes b. Therophytes
c. Geophytes d. None of these

Ans. (b) Therophytes

639. Aerenchyma tissue develops on the leaves and stem of

a. Patamogeton b. Eichhornia
c. Nymphaea d. All of these

Ans. (d) All of these

640. Sunken stomata are the characteristic feature of leaves of

a. Nelumbo b. Nymphaea
c. Azolla d. None of these

Ans. (d) None of these

641. Pneumatophores are characteristic of

a. Helliophytes b. Psammophytes
c. Oxylophytes d. None of these

Ans. (d) None of these

642. Which of the following is an example of commensalism?

a. Lichens b. Epiphytes
c. Zooxanthellae d. None of these

Ans. (b) Epiphytes

643. The microhabitat of leaf surface is known as

a. Caulosphere b. Phyllosphere
c. Rhizosphere d. None of these

Ans. (b) Phyllosphere

644. The chemical basis of competition between plants is referred to as

a. Allelopathy b. Parasitism
c. Predation d. None of these

Ans. (a) Allelopathy

645. National research center on high altitude physiology is situated at

a. Jodhpur b. Jaipur
c. Almora, H. P. d. None of these

Ans. (c) Almora, H. P.

646. Generally growth of plants is best supported by

a. Clay b. Silt
c. Loam soil d. Sandy soil

Ans. (c) Loam soil

647. Plants growing in sandy soil are called

a. Psammophytes b. Lithophytes
c. Halophytes d. None of these

Ans. (a) Psammophytes

648. Effects of topographic factors on plant can be best seen in a

a. Pond
b. Mountain
c. Desert
d. None of these

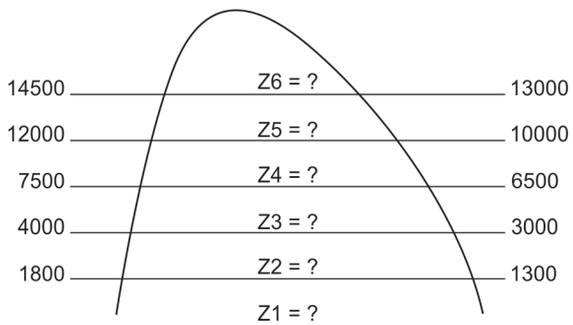
Ans. (b) Mountain

649. Incoming solar radiation is known as

a. Convection
b. Insolation
c. Terrestrial radiation
d. None of the above

Ans. (b) Insolation

650. Altitude zonation of vegetation on mountains is presented below. Write the different types of vegetation with increasing altitude



a. Z1 = Tropical rain forest, Z2 and Z3 = Deciduous forest, Z4 = Coniferous forest, Z5 = Tundra, Z6 = Snow
b. Z1 = Tropical rain forest, Z2 = Grassland or desert, Z3 = Deciduous forest, Z4 = Coniferous forest, Z5 = Tundra, Z6 = Snow
c. Z1 = Tropical rain forest, Z2 = Deciduous forest, Z3 = Grassland or desert, Z4 = Coniferous forest, Z5 = Tundra, Z6 = Snow
d. None of the above

Ans. (b) Z1 = Tropical rain forest, Z2 = Grassland or desert, Z3 = Deciduous forest, Z4 = Coniferous forest, Z5 = Tundra, Z6 = Snow

651. Vegetation dominated by tropical rain forest with thigh temperature prevailing throughout the year is included among

a. Microterm
b. Megatherm
c. Mesotherm
d. None of these

Ans. (c) Mesotherm

652. Plants growing best in full sunlight are called

a. Therophytes
b. Heliophytes
c. Sciophytes
d. None of these

Ans. (a) Therophytes

653. Bioenergetics approach for ecological studies was made by

a. E. Haeckel
b. A. G. Tansley
c. F. T. Clements
d. None of these

Ans. (b) A. G. Tansley

654. Species content of plants growing in an area is referred as

a. Community
b. Flora
c. Vegetation
d. None of these

Ans. (a) Community

655. Which of the following is known as ecology of individuals?

a. Autoecology
b. Population ecology
c. Community ecology
d. None of the above

Ans. (b) Population ecology

656. The most important strategy for the conservation of biodiversity is the establishment of

a. National Parks
b. Botanical Gardens
c. Wildlife sanctuaries
d. Biosphere reserve

Ans. (d) Biosphere reserve

657. In ..... the first patient for a higher category of animal was granted for the 'oncomouse'

a. 1984
b. 1985
c. 1986
d. 1987

Ans. (b) 1985

658. ..... refers to protection of habitat and ecosystem, conservation of the plants and animals in their native habitat or even in man-made ecosystem where they naturally occur, e.g. National parks, Sanctuaries, National Monuments, Native Reserve, Cultural landscape, Biosphere Reserves, etc.

a. *Ex situ* conservation
b. *In situ* conservation
c. Both a and b
d. None of these

Ans. (b) *In situ* conservation

659. ..... refers to conservation of samples of genetic diversity way from their field habitats and done through botanic and zoological gardens, banks of germplasm, seed, pollen, seedling, gene, DNA, tissue culture and culture collection

a. *Ex situ* conservation
b. *In situ* conservation
c. Both a and b
d. None of these

Ans. (a) *Ex situ* conservation

660. The use of ..... and ..... help indicate about the rate of species extinction in given habitats/patches

a. Endemics are relationship
b. Species-area relations
c. Both a and b
d. None of these

Ans. (c) Both a and b

661. India is one of the ..... megadiversity countries in the world

a. 15 b. 14
c. 13 d. 12

Ans. (d) 12

662. ..... is represented by turnover of species across space

a. ψ-diversity b. Point or α-diversity
c. β-diversity d. None of these

Ans. (c) β-diversity

663. ..... represents number of species in a specified area/region

a. ψ- diversity b. Point or α-diversity
c. β-diversity d. None of these

Ans. (b) Point or α-diversity

664. Biodiversity includes diversity of right from molecular level through

a. Lanscaping b. Individual
c. Ecosystems d. All of the above

Ans. (d) All of the above

ENVIRONMENTAL SCIENCE

1. A compilation of bar graphs of the ratio of one age group to another in a population is called

a. Age distribution
b. Innate capacity
c. Age pyramid
d. Carrying capacity

Ans. (c) Age pyramid

2. The specific position of a species within a community including utilization of resources both in qualitative and quantitative terms is referred to as

a. Biome
b. Niche
c. Ecotone
d. Habitat

Ans. (b) Niche

3. A commensalistic relationship in which one kind of animal attaches to another and thereby gains a mode of transportation, is called

a. Philopatry b. Migration
c. Phoresy d. Amensalism

Ans. (c) Phoresy

4. The increase in concentration of a substance (usually a pesticide) in animal tissue is related to the animal higher in position in the food chain. This is

a. Biomagnification
b. Biolignification
c. Bioaccumulation
d. Biointensification

Ans. (a) Biomagnification

5. A population of pest species that differs from other populations of the species in its ability to attach a particular cultivar

a. Biospecies b. Biotypic
c. Biotopic d. Biotype

Ans. (d) Biotype

6. A simplified linear depiction of trophic relationship that illustrates the flow of energy from producers to herbivores to carnivores

a. Food web b. Trophic chain
c. Food chain d. None of the above

Ans. (c) Food chain

7. A situation in which a pest population after having been suppressed rebounds to numbers higher than before suppression occurred

a. Pest outbreak
b. Pest resurgence
c. Secondary outbreak of pest
d. Pest resistance

Ans. (b) Pest resurgence

8. An interaction where one of the organisms is harmed by associated unaffected organisms is called

a. Commensalism b. Phoresy
c. Amensalism d. Mutualism

Ans. (c) Amensalism

9. The complete dependence of one organism over another is called

a. Proto cooperation b. Mutualism
c. Amensalism d. Commensalism

Ans. (b) Mutualism

10. A symbiotic association in which one individual derives benefits and the other is neither helped nor harmed

a. Mutualism
b. Communalism
c. Parasitism
d. Commensalism

Ans. (d) Commensalism

11. Speciation without geographic isolation is called

a. A sympatric speciation
b. Sympatric speciation
c. Non sympatric speciation
d. None of the above

Ans. (b) Sympatric speciation

12. Study of association of organisms in relation to a particular area or habitat is

a. Bioecology
b. Autoecology
c. Syneacology
d. None of the above

Ans. (c) Syneacology

13. The response of insects to environment rhythms of light and darkness is known as

a. Phototropism
b. Photoperiodism
c. Photropic
d. None of the above

Ans. (b) Photoperiodism

14. The following is an example of cannibalism in insects

a. Helicoverpa armigera
b. Praying mantids
c. Earwigs
d. All of the above

Ans. (d) All of the above

15. Genetic changes in population caused by random phenomenon rather than by selection

a. Gene flow
b. Genetic drift
c. Gene pool
d. None of the above

Ans. (b) Genetic drift

16. Any unit that includes the organisms in a given area interacting with the physical environment is called

a. Ecological balance
b. Ecosystem
c. Ecotype
d. Ecological pyramid

Ans. (b) Ecosystem

17. The type of diapause in which every individual in every generation enters diapauses is called

a. Saprophytic diapauses
b. Facultative diopauses
c. Obligate diapauses
d. None of the above

Ans. (c) Obligate diapauses

18. Obligate diapauses is usually seen in

a. Multivoltine sp.
b. Univoltine sp.
c. Bivolatine sp.
d. None of the above

Ans. (b) Univoltine sp.

19. Adult diapauses is seen in which of the following insects

a. *Leptinotarsa decemlineata*
b. *Epilachna corrupta*
c. *Habrobracon brevicornis*
d. All the above

Ans. (d) All the above

20. Pupal diapause is seen in

a. Castor hairy caterpillar
b. Rice stem borer
c. Red hairy caterpillar
d. All of the above

Ans. (b) Rice stem borer

SCIENTOLOGY

1. Anthropology refers to

a. The science of man and mankind
b. The study of organic chemicals
c. The science of diseases and their management
d. The systematic development of simulation models of biological systems

Ans. (a) The science of man and mankind

2. The science that deals with the structure, function and uses of microbes is called .....

a. Virology
b. Microbiology
c. Cytology
d. Entomology

Ans. (b) Microbiology

3. Pharmacology is the science that deals with

a. The knowledge of treatment of diseases
b. The knowledge of drugs and preparation of medicine
c. The knowledge of physical operation of diseases
d. The knowledge of blood typing, DNA technique and identification of narcotics, etc.

Ans. (b) The knowledge of drugs and preparation of medicine

4. Virology is the

a. Study of bacteria
b. Study of fungi
c. Study of viruses
d. Study of protozoans

Ans. (c) Study of viruses

5. Pathology the science of

a. Nature of plant animal diseases, their causes symptoms, effects and managements
b. Bacteria, virus and fungi
c. Functional process associated with plant
d. Work of various organs of animal body

Ans. (a) Nature of plant animal diseases, their causes symptoms, effects and managements

6. The science of dealing with the structure, habits classification and management of insects is called

a. Genetic engineering
b. Entomology
c. Pathology
d. Molecular biology

Ans. (b) Entomology

7. Bryology is the study of

a. Cells
b. Liverworts and mosses
c. Plants and animals interaction with man
d. Fungi

Ans. (b) Liverworts and mosses

8. Exobiology: A recent branch of biology deals with

a. Life may exist in outer space
b. Life outside of the solar system
c. Life in moon
d. Life in planet earth

Ans. (a) Life may exist in outer space

9. Pteridology is the study of

a. Animals
b. Bryophytes
c. Pteridophytes and ferns
d. Plants

Ans. (c) Pteridophytes and ferns

10. Mammalogy—the field of

a. Study of mammals
b. Study of animals
c. Study of plants
d. Study of insects

Ans. (a) Study of mammals

11. Ichthyology is concerned with the study of

a. Microorganisms
b. Aquatic animals
c. Fish
d. Reptiles

Ans. (c) Fish

12. Parasitology is the

a. Study of microorganisms
b. Study of parasitic organisms
c. Study of unicellular organism
d. Study of amphibians

Ans. (b) Study of parasitic organisms

13. Protozoology is the science of studying

a. One celled animals
b. Multi celled animals
c. Single celled plants
d. Multi celled Plants

Ans. (a) One celled animals

14. Bacteriology means

a. Bacterial physiology
b. Bacterial genetics
c. Study of bacteria
d. All of the above

Ans. (d) All of the above

15. Palynology is the study of

a. Flowers and their parts
b. Fruits and vegetables
c. Plant reproduction
d. Pollen grains and spores

Ans. (d) Pollen grains and spores

16. Ethology mainly deals with study of

a. Animal behavior with respect to physiological ecological and evolutionary aspects
b. Plants behavior with respect to light
c. Animal behavior with respect to stimuli
d. Plants behavior with respect to external environment

Ans. (a) Animal behavior with respect to physiological ecological and evolutionary aspects

17. The scientific knowledge of studying molluscs is referred to as

a. Morphology
b. Museology
c. Conchology
d. Histology

Ans. (c) Conchology

18. Phycology is the study of

a. Phenomena of life which are governed by physical laws
b. Algae
c. DNA
d. Birds

Ans. (b) Algae

19. The study of fungi is called

a. Molecular biology
b. Physiology
c. Mycology
d. Autecology

Ans. (c) Mycology

20. Embryology deals with

a. Fertilization of eggs and development of embryo
b. Change of physical structure of plants
c. Change of physical structure of animals
d. Determination of sex

Ans. (a) Fertilization of eggs and development of embryo

21. Cytology is the

a. Study of cysteine a protein
b. Study of cell structure of plants and animals
c. Study of eggs
d. Study of growth

Ans. (b) Study of cell structure of plants and animals

22. Synecology is the

a. Study of single organism
b. Study of groups of organism
c. Study of ocean plants and animals
d. Study of distribution of organisms in land and water

Ans. (b) Study of single organism

CHECK YOUR GRASP

1. Component of living cell affected by pollutant SO_2 is

a. Cell wall
b. All cell membrane system
c. Nucleus
d. None of these

2. The threshold of normal human hearing lies between

a. 50–60 db
b. 120–140 db
c. 30–40 db
d. 160–180 db

3. Landfill sites can be useful in which of following ways?

a. As a source of organic fertilizers
b. As a source of methane gas
c. Reclamation of derelict sites to develop
d. All of the above

4. In case of water quality, the quality parameter of biological properties includes which of the following?

a. Total coccus form bacteria
b. Faccal streptococci counts
c. Clorela count
d. All of the above

5. Bioremediation of inorganic contaminants is

a. Microorganisms
b. Plant species
c. Xerophytic species
d. None of the above

6. Pulmonary oedema is caused by

a. Hydrocarbon
b. Carbon oxide
c. Nitrogen oxide
d. SO_2

7. The blue baby syndrome result from

a. Excess of dissolved oxygen
b. Methaemoglobin
c. Excess of TDS
d. Excess of chloride

8. Common indicator organism of water pollution is

a. *Cholera vibro*
b. *Salmonella typhi*
c. *E. coli*
d. None of the above

9. Smog is the product of the which of the following?

a. Smoke + fog
b. Fog + carbon
c. Smoke + water
d. Water + carbon

10. Green house effect is related to which of the following?

a. Global warming
b. Noise pollution
c. Water pollution
d. Global afforestation

11. The national Institute of Oceanography is presently situated at

a. Kerala
b. Calicut
c. Goa
d. Cochin

12. Mycorrhizae help in the uptake of

a. Potassium
b. Phosphorus
c. Nitrate
d. Boron

13. Water pollution is caused by

a. Ammonia
b. Phytoplankton
c. Industrial effluents
d. Smoke

14. Peeling of ozone umbrella is due to

a. Coal burning
b. PAN
c. CFCs
d. CO_2

15. Pneumatophores are characteristic of

a. Helliophytes
b. Psammophytes
c. Oxylophytes
d. None of these

16. Both power and manure is provided by

a. Biogas plants
b. Thermal plants
c. Nuclear plants
d. Hydroelectric plants

17. Which of the following is not an example of physical pollutants?

a. Heavy metal
b. Radiation
c. Mechanical stress
d. Sound pollution

18. Harmful UV radiations coming from the sun cause

a. Skin cancer
b. Lung cancer
c. Mouth cancer
d. Liver cancer

In case of less than 80% score, go through brief review and glance once again from chapter

Key: 1-b 2-b 3-c 4-b 5-b 6-a 7-b 8-c 9-a 10-a 11-c 12-b 13-c 14-b 15-d 16-a 17-a 18-a

16

Biostatistics

1. We can transform the original data before applying the ANOVA technique using change of

a. Origin
b. Scale
c. Origin and scale both
d. All the three

Ans. (d) All the three

2. Who is considered as father of statistics?

a. Pearson
b. Boddington
c. RA fisher
d. AL Bowley

Ans. (c) RA fisher

3. When statistics is used in plural sense it means

a. Statistical method
b. Collect statistics
c. Both a and b
d. None of these

Ans. (b) Collect statistics

4. Select the two dimension diagrams of data representation

a. Cubes
b. Pictures
c. Squares
d. Rectangular bodies

Ans. (c) Squares

5. Which measure of central tendency is applied for calculation of regression and correlation coefficient?

a. Mode
b. Median
c. Geometric mean
d. Arithmetic mean

Ans. (d) Geometric mean

6. Which measure of central tendency requires data arrangement in ascending or descending order for its estimation?

a. Median
b. Mode
c. Arithmetic mean
d. None of these

Ans. (a) Median

7. The intelligency, ability or efficiency can be measured by use of

a. Mode
b. Median
c. Weighted HM
d. Geometrc mean

Ans. (b) Median

8. Which measure of central tendency is especially suited in the field of business?

a. Mode
b. Median
c. Arithmetic
d. Harmonic mean

Ans. (a) Mode

9. The result drawn from ANOVA based on transformed data is

a. Same as based on original data
b. Different from original data
c. More efficient than based on original data
d. Less efficient than based on original data

Ans. (a) Same as based on original data

10. For two factors A and B being dependent, the statistical model with one observation per cell can be written as

a. $Y_{ij} = \mu + \alpha_{ij} + r_{ij} + e_{ij}$
b. $Y_{ij} = \mu + \beta_i + r_{ij} + e_{ij}$
c. $Y_{ij} = \mu + \alpha_l + \beta_j + r_{ij} + e_{ij}$
d. $Y_{ij} = \mu + \alpha_l + \beta_j + e_{ij}$

Ans. (c) $\mathbf{Y_{ij} = \mu + \alpha_l + \beta_j + r_{ij} + e_{ij}}$

11. Estimation is the process of estimating parameters on the basis of

a. Parameters
b. Statistics
c. A and B
d. None of the above

Ans. (a) Statistics

12. The commonly used design is

a. LSD
b. CRS
c. RBD
d. None of the above

Ans. (c) RBD

13. A variable which has some chance or probability of its occurrence is known as

a. Simple variable
b. Qualitative variable
c. Quantitative variable
d. Random variable

Ans. (d) Random variable

14. The sample mean is known as the point estimator of the population

a. Median
b. Mode
c. Variance
d. Mean

Ans. (d) Mean

15. If Ho ($\alpha_i^2 = 0$), is found to be non significant then E. (M.S.A.) will

a. Give an unbiased estimate of σ_e^2
b. Not give an unbiased estimate of σ_e^2
c. Not give a biased estimate of σ_e^2
d. Give a biased estimate of σ_e^2

Ans. (a) Give an unbiased estimate of σ_e^2

16. If in two way classified data, Ho: $\beta_j = 0$ is found non significant then E. (M.S.B.) will

a. Give an unbiased estimate of σ_e^2
b. Not give an unbiased estimate of σ_e^2
c. Not give a biased estimate of σ_e^2
d. Give a biased estimate of σ_e^2

Ans. (a) Give an unbiased estimate of σ_e^2

17. Out of three designs, C.R.D., R.C.B.D. and L.S.D., the simplest design is

a. L.S.D. b. R.C.B.D.
c. C.R.D. d. None

Ans. (c) C.R.D.

18. To apply C.R.D. the experimental material should

a. Not be homogenous
b. Be homogenous
c. Not be non homogenous
d. Both (b) and (c)

Ans. (d) Both (b) and (c)

19. Two basic principles followed C.R.D. are

a. Randomization and local control
b. Randomization and replication
c. Randomization and local control
d. Randomization and regularity

Ans. (b) Randomization and replication

20. C.R.D. permits the complete flexibility in

a. No. of randomization replications
b. No of treatment and replication
c. No of treatment and randomization
d. All the above three

Ans. (d) All the above three

21. The most frequent occurred value of data or whose frequency is maximum is known as

a. Median b. GM
c. AM d. Mode

Ans. (d) Mode

22. In a symmetrical distribution of data which pair s correct

a. Mean = median > mode
b. Mean > median > mode
c. Mean = median = mode
d. None of these

Ans. (c) Mean = median = mode

23. Geometric mean of a given series is always less than its

a. Arithmetic mean
b. Weighed harmonic mean
c. Weighted mean
d. Harmonic mean

Ans. (a) Arithmetic mean

24. If any items of the series is zero, which mean of central tendency become zero

a. Arithmetic mean b. Geometric mean
c. Harmonic mean d. None of these

Ans. (b) Geometric mean

25. When we want average of rates f change or ratios or index number, which measure of central tendency is suitable

a. Mode
b. Median
c. Geometric mean
d. Arithmetic mean

Ans. (c) Geometric mean

26. To calculate the average woud be suitable to calculate the size of agriculture holding

a. Mode
b. Median
c. Weighted HM
d. Weighed AM

Ans. (a) Mode

27. Which type of average would be suitable to calculate the size of agricultural holding?

a. Median
b. Arithmetic mean
c. Geometric mean
d. Mode

Ans. (d) Mode

28. Which is the simplest measure of dispersion?

a. Range
b. Mean deviation
c. Variance
d. Standard deviation

Ans. (a) Range

29. The principle which assures that extraneous factors do not influence continuously one factor is

a. Replication
b. Randomization
c. Local control
d. Regularity

Ans. (b) Randomization

30. The design which provides maximum number of possible d.f to estimate is the

a. R.C.B.D.
b. C.R.D.
c. L.S.D.
d. B.I.B.D.

Ans. (b) C.R.D.

31. The sensibility or precision of an experiment in case of a small experiment is permitted in

a. L.S.D.
b. C.R.D.
c. R.C.B.D.
d. Both a and c

Ans. (b) C.R.D.

32. In methodological studies like physics chemistry cookery, in same green house experiment the design applicable is

a. L.S.D.
b. R.C.B.D.
c. C.R.D.
d. B.I.B.D.

Ans. (c) C.R.D

33. Sampling is the process of drawing samples from the population, when the chance or probability of each member of the population is equal than such sampling design known as

a. Simple random sampling
b. Not random sampling
c. Judgment sampling
d. None of these

Ans. (a) Simple random sampling

34. The number of basic principles followed in R.C.B.D. is equal to

a. 1
b. 2
c. 3
d. 5

Ans. (c) 3

35. Analysis of R.C.B.D. is analogous to the analysis of

a. One way classified data
b. Two way classified data with one observation per cell
c. Incomplete three way classified data
d. None of the above

Ans. (b) Two way classified data with one observation per cell

36. In R.C.B.D., the randomization is done

a. Separately within each block
b. Independently within each block
c. Not independently within each block
d. As a and b both

Ans. (d) As a and b both

37. In R.C.B.D. the object is to keep the experimental error

a. Within each block as high as possible
b. Within each block as small as possible
c. Between two adjacent block as small as possible
d. Both b and c

Ans. (d) Both b and c

38. Mean deviation is the least when calculated about

a. Median
b. Mode
c. Arithmetic mean
d. Geometric mean

Ans. (a) Median

39. If all the variate values are the same (e.g. 8,8,8), the standard deviation will be

a. 0
b. 1
c. 2
d. 3

Ans. (a) 0

40. The coefficient of variation can be calculated by using the formula

a. Square root of standard deviation/Arithmetic mean × 100
b. Standard deviation/arithmetic mean × 100
c. Standard deviation/geometric mean × 100
d. None of these

Ans. (b) Standard deviation/ arithmetic mean × 100

41. Unit less measure of dispersion is

a. CV
b. Range
c. Mean deviation
d. Mode deviation

Ans. (a) CV

42. The first central moment is always

a. 4
b. 2
c. 0
d. 1

Ans. (c) 0

43. The second central moment (about the arithmetic mean) is always equal to

a. Mean deviation
b. Variance
c. Standard deviation
d. Both b and c

Ans. (b) Variance

44. When a frequency distribution is not symmetrical about the mean it is said to be

a. Kurtosis
b. Skewed
c. Moment
d. None of these

Ans. (b) Skewed

45. When the distribution of data continuous, which distribution is applicable

a. Binomial
b. Normal distribution
c. Poisson
d. Both b and c

Ans. (b) Normal distribution

46. The curves which are very highly peaked and have the value of b2 > 3 are called

a. Patykurtic
b. Mesokurtic
c. Eptokurtic
d. All of the above

Ans. (c) Eptokurtic

47. In case of m observation missing in R.C.B.D., with the number of treatments and replications as (t, r) respectively the error d.f. will be equal to

a. (r–1) (t–1) + m
b. (r–1) (t–1) – m
c. (rt–1–m)
d. (rt–1) – (m–1)

Ans. (b) (r–1) (t–1) – m

48. If R.C.B.D. is conducted as R.C.D. with the same experimental material then M.S. (C.R.D.) will be worked out from the expression

a. $\frac{n_r s_t^2 + (n_r n_e) se^2}{(n_r + n_t + n_e)}$

b. $\frac{n_r s_r^2 + (n_t n_e) se^2}{(n_r + n_t + n_e)}$

c. $\frac{n_r s_r^2 + (n_r n_e) se^2}{(n_r + n_t + n_e)}$

d. $\frac{n_t s_r^2 + (n_r n_e) se^2}{(n_r + n_t + n_e)}$

Where (n_r, n_t, s_e^2) have usual meaning.

Ans. (c) $\frac{n_r s_r^2 + (n_r n_e) se^2}{(n_r + n_t + n_e)}$

49. For more than two observations missing in R.C.B.D., to estimate them, the technique used is known as

a. Bartllet's missing plot technique
b. Fisher's missing plot technique
c. Kemthorn's missing plot technique
d. Cochran and cox's missing plot technique

Ans. (a) Bartllet's missing plot technique

50. In R.C.B.D., the treatment M.S. will give an unbiased estimate of σ_e^2 when

a. Block effect is declared significant
b. Treatment effect is declared non-significant
c. Treatment effect is declared significant
d. Block effect is declared non significant

Ans. (b) Treatment effect is declared non-significant

51. In R.C.B.D. the block M.S. will provide an unbiased estimate of σ_e^2 when

a. Block effect is declared significant
b. Treatment effect is declared non-significant
c. Treatment effect is declared significant
d. Block effect is declared non significant

Ans. (d) Block effect is declared non significant

52. If in case of some extra replication in R.C.B.D., the two treatments (t_1 and t_2) are replicated (r_1 and r_2) time with error M.S. as s_e^2 then S.E. ($\tilde{t}_1 - \tilde{t}_2$) will be estimated by

a. $s_e^2\sqrt{\left[\frac{1}{r_1} + \frac{1}{r_2}\right]}$
b. $2s_e\sqrt{\left[\frac{1}{r_1} + \frac{1}{r_2}\right]}$
c. $s_e^2\sqrt{\left[\frac{1}{r_1} + \frac{1}{r_2}\right]}$
d. $\sqrt{2s_e^2\left[\frac{1}{r_1} + \frac{1}{r_2}\right]}$

Ans. (a) $s_e^2\sqrt{\left[\frac{1}{r_1} + \frac{1}{r_2}\right]}$

53. In agricultural field experiment where fertility contour map is not known then a suitable design applicable is the

a. R.C.B.D. b. C.R.D.
c. L.S.D. d. B.I.B.D.

Ans. (c) L.S.D.

54. In L.S.D., the experimental material of heterogeneous nature is controlled simultaneously in

a. Two parallel directions
b. Two perpendicular directions
c. Incomplete three way classifications
d. Both (b) and (c)

Ans. (d) Both (b) and (c)

55. Normal distribution is due to the work of

a. SD poisson
b. Demoivre
c. LAPACE and Gauss
d. None of these

Ans. (b) Demoivre

56. Binomial distribution is very useful distribution for dealing with which variates?

a. Continuous b. Discrete
c. CV d. None of these

Ans. (b) Discrete

57. The mean of the binomial distribution is

a. np b. pn
c. npq d. none of these

Ans. (a) np

58. The arithmetic mean of the poisson distribution is

a. m b. 1/m
c. 4/m d. 8/m

Ans. (a) m

59. Arithmetic mean and variance are always equal in

a. Binomial
b. Normal distribution
c. Poisson distribution
d. All of these

Ans. (c) Poisson distribution

60. The hypothesis of no difference is known as

a. Composite hypothesis
b. Null hypothesis
c. Alternative hypothesis
d. Simple hypothesis

Ans. (b) Null hypothesis

61. The probability of committing type I error is known as

a. Test of significance
b. Composite hypothesis
c. Level of significance
d. Sampling

Ans. (c) Level of significance

62. The statiscal procedure for estimating whether the difference under standard deviation is significant or non significant is known

a. Standard error
b. Test of significance
c. Level of significance
d. Sampling

Ans. (a) Standard error

63. Which test is used to test of significance of the difference between two mean?

a. t-test b. z-test
c. f- test d. None of these

Ans. (b) z-test

64. In a m x m, L.S.D. the number of experimental units is equal to

a. m b. m^2
c. m^3 d. (m-1) (m-2)

Ans. (b) m^2

65. In case of four treatments being A, B, C, D for L.S.D. the following layout plan is correct

a. A B C D
D A B C
B C D A
C D A B

b. A B C D
D A B C
C D A B
D A B C

c. D A B C
A B C D
B C D A
C B C D

d. Both a and b

Ans. (d) Both a and b

66. The number of basic principle followed in L.S.D. is equal to

a. 1 b. 2
c. 3 d. 4

Ans. (c) 3

67. L.S.D. is arranged in

a. One way classified in
b. Two way classified data
c. Incomplete three way classified in
d. The way classified data

Ans. (c) Incomplete three way classified in

68. In an incomplete 3 way layout plan of order m x m, the number of experimental unit is

a. m
b. m^2
c. m^3
d. (m-1) (m-2)

Ans. (b) m^2

69. In L.S.D., a suitable approximate number of treatment is from

a. (4 to 10)
b. (5 to 10)
c. (7 to 10)
d. (5 to 8)

Ans. (b) (5 to 10)

70. In m x m, L.S.D., the error d.f. is equal to

a. (m-1) (m+1)
b. m (m-1)
c. (m-1) (m-2)
d. m (m-2)

Ans. (c) (m-1) (m-2)

71. The suitable linear model for m × m, L.S.D. is

a. $y_{ijk} = \mu + \alpha_i + \beta_j + e_{ijk}$
b. $y_{ijk} = \mu + \alpha_i + t_k + e_{ijk}$ $(i = j = k = 1,2.....m)$
c. $y_{ijk} = \mu + \alpha_i + \beta_j + t_k + e_{ij}$
d. $y_{ijk} = \mu + \alpha_i + \beta_j + t_k + e_{ijk}$

Ans. (d) $y_{ijk} = \mu + \alpha_i + \beta_j + t_k + e_{ijk}$

72. In an incomplete 3 way layout experiment, the three factors responsible for variation in observation are

a. Row, Column and Blocks
b. Row, Column and replication
c. Row, Column and treatment
d. Row, treatment and blocks

Ans. (c) Row, Column and treatment

73. In 7 × 7, L.S.D., the error d.f. is equal to

a. 42
b. 36
c. 35
d. 30

Ans. (d) 30

74. Error S.S. in L.S.D. using the same experimental material will be

a. Less than that in C.R.D.
b. Same as in C.R.D. and R.C.B.D.
c. Less than that in R.C.B.D.
d. Both a and c

Ans. (d) Both a and c

75. The error M.S. in L.S.D. using the same experimental material will be

a. Less than that in R.C.B.D.
b. Same as in R.C.B.D. and R.C.R.D.
c. Less than that in C.R.D. and R.C.B.D.
d. Greater than that in R.C.B.D.

Ans. (c) Less than that in C.R.D. and R.C.B.D.

76. For the validity of probability statements about the treatment differences in an experimental design, the suitable principles used is

a. Local control
b. Randomization
c. Replication
d. None

Ans. (b) Randomization

77. S.S. due to contrast $Y = T_1 - T_2 + T_4 - T_3$ where each treatment total (Ti) is the sum of 5 observations is equal to

a. $Y^2/16$
b. $Y^2/25$
c. $Y^2/20$
d. $Y^2/15$

Ans. (b) $Y^2/25$

78. In an I.B.D., the number of treatments under study is

a. Less than block size
b. Equal to block size
c. Greater than block size
d. Equal to number of blocks

Ans. (c) Greater than block size

79. Student's t-test is used when sample size is ..... and population standard deviation is not known

a. Large
b. Small
c. Both
d. None of these

Ans. (b) Small

80. For paired observation, which test is used for testing the significance of a mean difference

a. t-test
b. f-test
c. z-test
d. Paired t-test

Ans. (d) Paired t-test

81. the comparison of two means from independent samples which test is applicable

a. f-test
b. z-test
c. t-test
d. None of the above

Ans. (c) t-test

82. The value of χ^2 ranges from which range and s always positive

a. –1 to +1
b. 0 to 2
c. 0 to ∞
d. None of these

Ans. (c) 0 to ∞

83. For calculation of χ^2, N should be at least

a. 10
b. 20
c. 50
d. 100

Ans. (c) 50

84. For χ^2 test no theoretical cell frequency should be small, it should be at least

a. 8
b. 5
c. 7
d. 10

Ans. (b) 5

85. χ^2 test is applied for

a. Testing the expectation of ratio
b. Genetic problem and detection of linkage
c. Testing of independence of attribute
d. All of the above

Ans. (d) All of the above

86. The validity of correlation coefficient is tested by

a. Z-test
b. χ^2 test
c. t-test
d. f-test

Ans. (c) t-test

87. The range of correlation coefficient lies between

a. +1 to –1
b. –1 to +1
c. 0 to 1
d. None of the above

Ans. (b) –1 to +1

88. The validity of regression coefficient is tested by

a. χ^2-test
b. t-test
c. z-test
d. Both b and c

Ans. (d) both b and c

89. A set of parameters of B.I.B.D. is

a. v, b , r, λ
b. v, b, k, λ
c. v, b , r, k, λ
d. v, b, λ, k

Ans. (c) v, b , r, k, λ

90. In B.I.B.D., each pair of treatment (say t_i, t_j, $i \neq j$) occurs together in

a. λ number of block
b. (λ –1) number of block
c. (λ +1) number of block
d. None of the three

Ans. (a) λ number of block

91. The inequality b >2˜ k is known as

a. Kemthorn's in equality
b. Fisher's in equality
c. Cochran 8 cox inequality
d. Neyman's inequality

Ans. (b) Fisher's in equality

92. For the existence of B.I.B.D., the parametric relations are

a. Only sufficient conditions
b. Only necessary conditions
c. Necessary and sufficient conditions
d. Not necessary conditions

Ans. (b) Only necessary conditions

93. In case of λ = r in B.I.B.D., then B.I.B.D. reduces to

a. Complete block design
b. Randomized block design
c. Complete randomized design
d. Both a and b

Ans. (d) Both a and b

94. For any B.I.B.D., if λ = r, k will be

a. Equal to number of blocks
b. Equal to number of replications
c. Equal to number of treatments
d. Both a and b

Ans. (c) Equal to number of treatments

95. If in a B.I.B.D., any two blocks intersect at a constant number of treatment (say λ), then design is said to be

a. Asymmetrical
b. Symmetrical
c. Complete design
d. Unconfounded design

Ans. (b) Symmetrical

96. A given I.B.D., is also a

a. Balanced design
b. Connected design
c. Confounded design
d. Both a and b

Ans. (d) Both a and b

97. For a given B.I.B.D., there exists

a. Complementary design
b. Residual design
c. Both a and b
d. None

Ans. (c) Both a and b

98. The designs R.C.B.D. and L.S.B., both are

a. Balanced designs
b. Connected designs
c. Orthogonal designs
d. All the three

Ans. (d) All the three

99. Coefficient of determination is a square of

a. Regression coefficient
b. Correlation coefficient
c. Both a and b
d. None of the above

Ans. (b) Correlation coefficient

100. The range of multiple correlation coefficient lies between

a. 0 to ∞
b. –1 to +1
c. 0 to +1
d. –∞ to +∞

Ans. (c) 0 to +1

101. The significance of multiple correlation is tested by

a. F-test
b. Z-test
c. T-test
d. None of these

Ans. (a) F-test

102. The repetition of the treatment under investigation is know is

a. Local control
b. Randomization
c. Replication
d. None of the above

Ans. (c) Replication

103. The allocation of the treatment to the different experimental units in a random manner is knows as

a. Replication
b. Randomization
c. Local control
d. None of these

Ans. (b) Randomization

104. The principle of making use of greater homogeneity in groups of experimental units to reduce the experimental error is referred as

a. Local control
b. Replication
c. Randomization
d. Sampling

Ans. (a) Local control

105. What are the basic principles of field experimentation

a. Replication
b. Randomization
c. Local control
d. All of these

Ans. (d) All of these

106. The completely randomized design is appropriate when the experimental material is

a. Unlimited and homogenous
b. limited and heterogeneous
c. Unlimited and heterogeneous
d. None of the above

Ans. (c) Unlimited and heterogeneous

107. Local control is not applied for the design

a. SPD
b. LSD
c. RBD
d. CRD

Ans. (d) CRD

108. When the fertility gradient of the field is in one direction, which design is appropriate

a. RBD
b. SPD
c. LSD
d. CRD

Ans. (a) RBD

109. When the fertility gradient of the field goes in two directions, which design is most appropriate

a. RBD
b. LSD
c. SPD
d. CRD

Ans. (b) LSD

110. The efficiency factor of a B.I.B.D. is

a. Less than 1.0
b. Greater than 1.0
c. Greater than 2.0
d. None of three

Ans. (a) Less than 1.0

111. The basic purpose of ANOVA technique is to test the homogeneity of several

a. Population means
b. Population correlation
c. Population variances
d. None of the three

Ans. (a) Population means

112. The ANOVA technique was introduced first time in agricultural data by

a. Prof. P.C. Mahalanobis
b. Prof. R.A. Fisher
c. Prof. P.V. Suchatme
d. Prof. C.R. Rao

Ans. (b) Prof. R.A. Fisher

113. The ANOVA technique is now frequently used in testing the linearity of

a. Fitted correlation coefficient
b. Fitted regression line
c. Fitted regression coefficient
d. Correlation ratio n

Ans. (b) Fitted regression line

114. ANOVA technique is also used in testing in significance of

a. Correlation ratio
b. Correlation coefficient
c. Regression coefficient by
d. Homogeneity of variance

Ans. (a) Correlation ratio

115. In ANOVA model, the different components of variance should follow

a. Multiplicative law
b. Additive law
c. Probabilistic law
d. Large sample theory

Ans. (b) Additive law

116. In ANOVA model the error term e_{ij} should be distributed as

a. Randomly
b. Independently
c. Normally
d. All the three

Ans. (d) All the three

117. The error term e_{ij} in ANOVA model have

a. Mean zero
b. Constant variance σ_e^2
c. Same variance
d. All the three

Ans. (d) All the three

118. In ANOVA model, the constant error variance σ_e^2 is estimated unbiasedly by

a. Error M.S.
b. Treatment M.S.
c. Replication M.S.
d. Both (a) and (c)

Ans. (a) Error M.S.

119. In ANOVA model, the variates y_{ij} should be

a. Homosedastic
b. Heterogeneous
c. Of equal variance
d. Both (a) and (c)

Ans. (d) Both (a) and (c)

120. The normality of variates y_{ij} in ANOVA model is necessary to apply the

a. The t statistic
b. F statistic
c. π^2 statistic
d. Z statistic

Ans. (b) F statistic

121. The d.f. due to various sources of variation in ANOVA model, should follow the

a. Probabilistic law
b. Multiplicative law
c. Additive law
d. None

Ans. (c) Additive law

122. If the Ho is true then theoretically the value of F statistic becomes

a. Equal to 1.0
b. Greater than 1.0
c. Less than 1.0
d. Equal to as

Ans. (a) Equal to 1.0

123. If the null hypothesis Ho in ANOVA is declared significant then theoretically the value of F statistic becomes

a. Equal to 1.0
b. Greater than 1.0
c. Less than 1.96
d. Greater than 1.96

Ans. (b) Greater than 1.0

124. If s^2_t and σ_e^2 are the treatment and error M.S. in ANOVA model then the ratio s^2_t / σ_e^2 follow

a. X^2 distribution with (t–1)d.f
b. F distribution with (t–1) and (n–1) d.f
c. Student's t distribution with (t–1) d.f
d. Z distribution

Ans. (a) X^2 distribution with (t–1)d.f

125. If (s_e^2 σ_e^2) are the error M S with (n–t) d.f and error variance respectively then the ratio will follow

a. Student's t distribution with (t–1) d.f
b. F distribution with (t–1) and (n–1) d.f
c. X^2 distribution with (t–1) d.f
d. Normal distribution with mean zero and variance unity

Ans. (c) X^2 distribution with (t–1) d.f

126. If (s^2_e σ_e^2) are treatment and error M.S. with (t–1), (n–1) d.f respectively than the ratio (s^2_t/s^2_e) will follow

a. F distribution with (t–1) and (n–1) d.f
b. X^2 distribution with (t–1) d.f
c. Student's t distribution with (t–1) d.f
d. Normal distribution as N (0,1)

Ans. (b) X^2 distribution with (t–1) d.f

127. In ANOVA model, to define the F statistic, the effect due to treatment and error term must follow the

a. Normal distribution
b. X^2 distribution
c. Mean X^2 distribution
d. Z distribution

Ans. (a) Normal distribution

128. F statistic is defined as the ratio of two

a. Dependent mean X^2 statistics
b. Independent mean X^2 statistics
c. Two independent sample mean squares
d. Both (a) and (c)

Ans. (b) Independent mean X^2 statistics

129. In randomized block design, how many treatments can be adopted without any loss of efficiency

a. 10 b. 15
c. 20 d. 25

Ans. (c) 20

130. How many number of treatments can be adopted in LSD

a. 5 to 8 b. 5 to 12
c. Both a and b d. None of the above

Ans. (c) Both a and b

131. When there are several factors with different levels to be experimented simultaneously with the same level of precision, which design is most appropriate

a. LSD b. CRD
c. RBD d. Factorial factor

Ans. (d) Factorial factor

132. When the experimental material is very less and number of genotypes are very large, which design is most suited

a. RBD b. LSD
c. Split plot design d. Augmented design

Ans. (d) Augmented design

133. In the experiment, a treatment requires large area and b treatment requires smaller area, which design is most appropriate

a. RBD b. LSD
c. Split plot design d. Augmented design

Ans. (c) Split plot design

134. The minimum error degree of freedom should be at least

a. 5 b. 10
c. 12 d. 18

Ans. (c) 12

135. The values of regression coefficient lies between

a. –1 to +1 b. $-\infty$ to $+\infty$
c. $-\infty$ to +1 d. 0 to +1

Ans. (b) $-\infty$ to $+\infty$

136. The well known ANOVA technique is the technique in fact an analysis of

a. Variance b. Sum of square
c. Mean sum of square d. Both b and c

Ans. (d) Both b and c

137. A model in which each of the factor has fixed effect and only effect of error term is of random nature, is known as

a. Mixed effect model b. Random effect model
c. Fixed effect model d. Both a and c

Ans. (c) Fixed effect model

138. A model in which some factors have fixed effect and others have random effect, is known as

a. Mixed effect model b. Random effect model
c. Fixed effect model d. Both b and c

Ans. (a) Mixed effect model

139. A random effect model has

a. All factors along with error term are of random nature
b. Some factor are of random and others are of fixed effect
c. All factor are of random nature except error term
d. None of the term

Ans. (a) All factors along with error term are of random nature

140. The main objective of fixed effect model is to estimate the

a. Effect of different factors
b. Variability of different factors
c. Variance of different factors
d. Both b and c

Ans. (a) Effect of different factors

141. In random effect model, the main objective is to estimate the

a. Mean effect of different factors
b. The variability among the effects of different factors
c. The variance among effects due to different factors
d. Both b and c

Ans. (d) Both b and c

142. When a set of observations are classified over different levels of only one factor then such type of classification, is known as

a. Two way classification b. One way classification
c. Multi way classification d. Both a and c

Ans. (a) Two way classification

143. Complete randomized design is an example of

a. Two way classification
b. One way classification
c. Multi way classification
d. Both a and c

Ans. (b) One way classification

144. When a set of observations are classified with respect to two factors simultaneously at different levels then such classification is known as

a. Two way classification
b. Multi way classification
c. Both a and b
d. None of the three

Ans. (a) Two way classification

145. Randomized complete block design is an example of

a. One way classification
b. Two way classification
c. Multi way classification
d. Both a and b

Ans. (b) Two way classification

146. The model for one way classification is written as

a. $Y_{ij} = \beta_i + e_{ij}$, (i = 1,2,…..t, j= 1,2, ……, ni)
b. $Y_{ij} = \mu + \beta_i + e_{ij}$ (i = 1,2,…..t. j= 1,2, ……, ni)
c. $Y_{ij} = \mu + \beta_i + \alpha_i + e_{ij}$ (i= 1,2……t, j = 1,2, …….. ni)
d. None of the above

Ans. (b) $Y_{ij} = \mu + \beta_i + e_{ij}$ (i = 1,2,…..t. j= 1,2, ……, ni)

147. In question 29, the $\hat{a}_i$ can be estimated through

a. $\beta_i = \frac{1}{n_i}\sum_{j=1}^{n} y_{ij}$

b. $\beta_i = \frac{1}{t}\sum_{i=1}^{t} y_{ij}$

c. $\beta_i = \left\langle \frac{1}{n_i}\sum_{j=1}^{ni} y_{ij} - \frac{1}{n}\sum_{i}^{t}\sum_{j=1}^{ni} y_{ij} \right\rangle n_i$

d. $\beta_i = \frac{1}{n_i}\sum_{j=1}^{ni} y_{ij} - \square$

Ans. (d) $\beta_i = \frac{1}{n_i}\sum_{j=1}^{ni} y_{ij} - \square$

148. Let S_A^2 denotes the mean square due to factor A then we have

a. $E(S_A^2) = \sigma_e^2 + \varphi$ (Ai, i = 1,2, ……..t)
b. $E(S_A^2) = \sigma_e^2 - \varphi$ (Ai, i = 1,2, ……..t)
c. $E(S_A^2) = \sigma_e^2 + \mu$ (Ai, i = 1,2, ……..t)
d. Both (a) and (c) where φ and μ are variance like functions of (A is,)

Ans. (d) Both (a) and (c) where φ and μ are variance like functions of (A is,)

149. When the null hypothesis Ho is true in case of one way classified data, treatment mean square gives

a. An unbiased estimate of σ_e^2
b. A biased estimate of σ_e^2
c. A consistant estimate of σ_e^2
d. None of the above

Ans. (a) An unbiased estimate of σ_e^2

150. If in question 32, $E(S^2_A) = \sigma_e^2 + \varphi$ (Ai, i = 1,2, ……..t) is true in case of under Ho, then the value of φ (A_{is}) is

a. Equal to
b. Equal to zero
c. Greater than zero
d. Less than zero

Ans. (b) Equal to zero

151. In this question if Ho is declared significant then the value of ö (A_{is}) will be

a. Greater than zero
b. Less than zero
c. Equal to
d. Nothing can said with surety

Ans. (a) Greater than zero

152. In C.R.D. with r replication the C.D between two treatment means ($t\tilde{}_i$, $t\tilde{}_i$) will be given by

a. $C\,D\,(t_i, t_i) = t \propto \sqrt{\frac{s_e^2}{2r}}$

b. $C\,D\,(t_i, t_i) = t \propto \sqrt{\frac{2s_e^2}{r}}$

c. $C\,D\,(t_i, t_i) = t \propto \sqrt{\frac{rs_e^2}{2}}$

d. $C\,D\,(t_i, t_i) = t \propto \sqrt{\frac{s_e^2}{2r}}$

Ans. (b) $C\,D\,(t_i, t_i) = t \propto \sqrt{\frac{2s_e^2}{r}}$

153. In the split plot experiment, the main factor A and subfactor B are studied in the

a. Factorial experiment
b. Same experiment
c. Two simple experiment
d. Latin square design

Ans. (b) Same experiment

154. The main factor A requires

a. Smaller plot design
b. Squared plot design
c. Larger plot size
d. Sub plot

Ans. (c) Larger plot size

155. The sub plot treatment B requires

a. Larger plot size
b. Smaller plot size
c. Sub plots
d. Both b and c

Ans. (d) Both b and c

156. In split plot experiment, the subfactor B is allotted to the split plots

a. Within blocks
b. Between blocks
c. Between rows
d. Between columns

Ans. (a) Within blocks

157. In split plot experiment, the factors allotted to plots within blocks are known as

a. Subfactors
b. Split plot treatment
c. Interactions
d. Both a and b

Ans. (d) Both a and b

158. In split plot experiment, the factors allotted to blocks within replication, are known as

a. Main plot treatment
b. Whole plot treatment
c. Both a and b
d. Subplot treatment

Ans. (c) Both a and b

159. In factorial experiment, all the treatment combinations of two or more than two factors are allotted at random to the

a. Plots within blocks
b. Block within replications
c. Split plot within main
d. Split plots within replications

Ans. (a) Plots within blocks

160. In split plot experiment, the maximum importance is given to the

a. Main factor A
b. Sub factor B
c. Interaction A B
d. Interaction RA

Ans. (c) Interaction A B

161. In split plot experiment, the precision of interaction AB is

a. Equal to that of A
b. Equal to that of B
c. More than that of A and B both
d. Less than that of A and B

Ans. (c) More than that of A and B both

162. In ordinary 2^2 factorial experiment in R.C.B.D., the interaction effect AB will be estimated with precision

a. Equal to that of A
b. Less than that of A
c. Equal to that of A and B both
d. More than that of A and B both

Ans. (c) Equal to that of A and B both

163. In split plot experiment, the subplot treatment is

a. Different from main plot treatment
b. Different from whole plot treatment
c. Same as split plot treatment
d. All the a, b and c are correct

Ans. (d) All the a, b and c are correct

164. In split plot experiment if main plot error variance and sub plot error variance are as σ_a^2 and σ_b^2 respectively then the error term n_{ij} for the main factor A is distributed as

a. $n_{ij} \sim N(o, \sigma_b^2)$
b. $n_{ij} \sim N(\mu, \sigma_a^2)$
c. $n_{ij} \sim N(o, \sigma_a^2)$
d. $n_{ij} \sim N(\mu, \sigma_b^2)$

Ans. (c) $n_{ij} \sim N(o, \sigma_a^2)$

165. in question 12, the error term e_{ijk} occurring in subplot treatment B, is distributed as

a. $e_{ijk} \sim N(\mu, \sigma_b^2)$
b. $e_{ijk} \sim N(o, \sigma_a^2)$
c. $e_{ijk} \sim N(\mu, \sigma_a^2)$
d. $e_{ijk} \sim N(o, \sigma_b^2)$

Ans. (d) $e_{ijk} \sim N(o, \sigma_b^2)$

166. In a split plot experiment, between the main plot error Ea and subplot error Eb, the following relation exists

a. Ea < Eb
b. Ea = Eb
c. Ea > Eb
d. None

Ans. (c) Ea > Eb

167. The correlation coefficient remains unaffected by change of

a. Scale
b. Origin
c. Both a and b
d. None of these

Ans. (c) Both a and b

168. The regression coefficient are independent of change of

a. Origin
b. Scale
c. Both a and b
d. None of these

Ans. (a) Origin

169. When the value of correlation coefficient is 1 then two variable are

a. Highly correlated
b. Perfectly correlated
c. Partially correlated
d. Uncorrelated

Ans. (b) Perfectly correlated

170. The correlation coefficient is the geometric mean between two

a. Regression coefficient
b. Standard deviation
c. Median
d. Mode

Ans. (a) Regression coefficient

171. The R rank correlation was suggested by

a. C Spearman
b. SD poisson
c. Laplace and Gauss
d. James Bernoulli

Ans. (a) C Spearman

172. Poisson distribution deals with

a. Continuous
b. Discrete variable
c. Both a and b
d. None of these

Ans. (b) Discrete variable

173. The variation due to uncontrolled factor is spoken as

a. Experimental error
b. Standard error
c. Treatment effects
d. All of these

Ans. (a) Experimental error

174. In the field experimentation, local control is used for

a. Diminution of error
b. Validity of estimate of error
c. Validity of treatment effects
d. All of these

Ans. (a) Diminution of error

175. The accuracy of a measurement signifies the closeness with which a estimate approaches the

a. Average value
b. True value
c. Both a and b
d. None of the above

Ans. (b) True value

176. Which test is applied for the test of significance between the two variances

a. T-test
b. Z-test
c. χ^2-test
d. f-test

Ans. (d) f- test

177. Which transformation is most appropriate for percentages?

a. Arc sine
b. Logarithmic
c. Square root
d. None of these

Ans. (c) Square root

178. If there are 5 treatments with 4 replication to each, the error degree of freedom for CRD will be

a. 5
b. 10
c. 15
d. 20

Ans. (c) 15

179. Which design provides maximum number of degrees of freedom for the estimation of error as compared with other design for the given number of experimental

a. LSD
b. CRD
c. RBD
d. Augmented design

Ans. (b) CRD

180. Which design is most appropriate for the laboratory experiments?

a. RBD
b. LSD
c. CRD
d. None of these

Ans. (c) CRD

181. If there are 5 varieties and 4 replication to each, the error degree of freedom for RBD will be

a. 10
b. 14
c. 12
d. 16

Ans. (c) 12

182. If there are 6 levels of moisture regime and 6 replications each, the error degree of freedom for LSD will be

a. 10
b. 20
c. 30
d. 40

Ans. (b) 20

183. When we want to conduct a experiment on a long strip of land, which design will be preferred

a. SPD
b. CRD
c. RBD
d. LSD

Ans. (d) LSD

184. Which design gives precision high enough to reduce the standard error to less than 1%?

a. Strip plot design
b. CRD
c. RBD
d. LSD

Ans. (d) LSD

185. In confounding, the precision on the main effect and certain interaction of lower order

a. Increases
b. Decreases
c. Remain same
d. None of the above

Ans. (a) Increases

186. In confounding, generally which order of interaction is confounded

a. Higher order
b. First order
c. Lower order
d. Second order

Ans. (a) Higher order

187. If 4 levels of sowing dates are laid out in main plot, 5 levels of nitrogen applied in subplot and they are replicated three times, then what will be the degree of freedom from error

a. 16
b. 32
c. 64
d. 54

Ans. (b) 32

188. Selected the most appropriate design when all factor are not of equal importance in experimentation

a. Split plot design
b. Strip plot design
c. LSD
d. Augmented

Ans. (a) Split plot design

189. In split plot experiment, the d,f. for the error Ea is equal to

a. (r-1) (q-1)
b. (r-1) (p-1)
c. (p-1) (q-1)
d. (p-1)

Ans. (b) (r-1) (p-1)

190. In split plot experiment the d.f. for interaction AB is equal to

a. (r-1) (q-1)
b. (r-1) (p-1)
c. (p-1) (q-1)
d. p(q-1)

Ans. (c) (p-1) (q-1)

191. In split plot experiment the d.f for the error E_b is equal to

a. p (r-1) (q-1)
b. r (p-1) (q-1)
c. q (r-1) (p-1)
d. None

Ans. (a) p (r-1) (q-1)

192. The F_A statistic defined for main plot treatment A is distributed as

a. $F_A \sim {}^F$ (q-1), (r-1) (p-1)
b. $F_A \sim {}^F$ (p-1), (r-1) (p-1)
c. $F_A \sim {}^F$ (p-1), p(r-1) (p-1)
d. $F_A \sim {}^F$ (q-1), p(r-1) (q-1)

Ans. (b) $F_A \sim {}^F$ (p-1), (r-1) (p-1)

193. The F_B statistic defined for sub factor B is distributed as

a. $F_B \sim {}^F$ (q-1), (r-1) (p-1)
b. $F_B \sim {}^F$ (q-1), (p-1) (q-1)
c. $F_B \sim {}^F$ (q-1), p(r-1) (q-1)
d. $F_B \sim {}^F$ (p-1), (r-1) (q-1)

Ans. (c) $F_B \sim {}^F$ (q-1), p(r-1) (q-1)

194. F_{AB} statistic defined for interaction AB in split plot experiment is distributed as

a. $F_{AB} \sim {}^F$ (p-1) (q-1), p(r-1) (q-1)
b. $F_{AB} \sim {}^F$ (p-1) (r-1), r(p-1) (q-1)
c. $F_{AB} \sim {}^F$ (p-1) (q-1), q(r-1) (p-1)
d. $F_{AB} \sim {}^F$ (r-1) (q-1), p(r-1) (q-1)

Ans. (a) $F_{AB} \sim {}^F$ (p-1) (q-1), p(r-1) (q-1)

195. The estimate of S.E. (Between two A means) is equal to

a. $\sqrt{\frac{2E_a}{rp}}$
b. $\sqrt{\frac{2E_a}{rq}}$
c. $\sqrt{\frac{2E_a}{pq}}$
d. $\sqrt{\frac{2E_b}{pq}}$

Ans. (b) $\sqrt{\frac{2E_a}{rq}}$

196. The estimate of S.E. (Between two B means) is equal to

a. $\sqrt{\frac{2E_b}{rq}}$
b. $\sqrt{\frac{2E_b}{pq}}$
c. $\sqrt{\frac{2E_b}{rq}}$
d. $\sqrt{\frac{2E_b}{rq}}$

Ans. (c) $\sqrt{\frac{2E_a}{rp}}$

197. The estimate of S.E. (Between two B means are the same level of A) is

a. $\sqrt{\frac{2E_b}{r}}$
b. $\sqrt{\frac{2E_a}{r}}$
c. $\sqrt{\frac{2E_b}{p}}$
d. $\sqrt{\frac{2E_b}{q}}$

Ans. (a) $\sqrt{\frac{2E_b}{r}}$

198. S.E. (Different between two A means at the same level of B or different levels of B) is equal to

a. $\sqrt{2\left[\frac{(q-1)E_b + E_a}{rq}\right]}$ b. $\sqrt{2\left[\frac{(q-1)E_b + E_a}{rp}\right]}$

c. $\sqrt{\left[\frac{(p-1)E_b + E_a}{rp}\right]}$ d. $\sqrt{\left[\frac{(p-1)E_b + E_a}{rq}\right]}$

Ans. (a) $\sqrt{2\left[\frac{(q-1)E_b + E_a}{rq}\right]}$

199. The replicated experiment designed to compare a number of parent plants w.r.t. some attribute under study is known as

a. Progeny row trial
b. Compact family block design
c. Split plot design
d. Randomized complete block design

Ans. (a) Progeny row trial

200. The mass selection technique was adopted to select the plants showing superior genetic values in

a. Plant breeding experiment
b. Agronomy's experiment
c. Crop cutting experiment
d. Experiment on plant protection

Ans. (a) Plant breeding experiment

201. 'A progeny row trial' adopted as an improved technique over mass selection technique was investigated by

a. Agronomists b. Plant breeders
c. Entomologists d. Crop physiologists

Ans. (b) Plant breeders

202. In a progeny row trial each plot consists of a single row and all the seeds of the row belong to the

a. Same parent plant
b. Progeny plant
c. Different parent plant
d. Different plant of F2 generation

Ans. (a) Same parent plant

203. Let there be p progenies and r replications with ki plants in each plot. Then d.f. for progeny is equal to

a. (r-1) b. (p-1)
c. r(p-1) d. p(r-1)

Ans. (b) (p-1)

204. A progeny row trial is carried out in a simple

a. C.R.D.
b. R.B.D.
c. L.S.D.
d. Compact family block design

Ans. (b) R.B.D.

205. In question 122, the error (plot error) d.f. is equal to

a. (ki-1) b. r (p-1)
c. (r-1) (p-1) d. p (r-1)

Ans. (c) (r-1) (p-1)

206. In a layout described in question 5 the d.f. for pooled plant error is equal to

a. (ki-1) b. (ki-1)
c. p (ki-1) d. (r-1) (p-1)

Ans. (b) (ki-1)

207. A progeny row trial has been found suitable for the crop

a. Wheat
b. Cotton
c. Sorghum
d. All the three crop

Ans. (d) All the three crop

208. If the progenies tried in an experiment belong to a number of families then the type of comparison made in

a. The comparison between different families
b. Comparison between progenies within family
c. Comparison between families within progenies
d. Both (a) and (b)

Ans. (d) Both (a) and (b)

209. A layout suitable for studies as considered in question 10, is known as

a. R.B.D.
b. Split plot design
c. Progeny row trial
d. Compact family block design

Ans. (d) Compact family block design

210. In a compact family block design the progenies belonging to the same family are sown side by side in a family

a. Main plot
b. Sub plot
c. Row
d. Block

Ans. (a) Main plot

211. In a compact family block design, the family plots are randomized in

a. Each main plot
b. Each block
c. Each sub plot
d. Each row

Ans. (b) Each block

212. The progeny plots are randomized within the

a. Main plots
b. Family plots
c. Sub plots
d. Both a and b

Ans. (b) Family plots

213. Compact family block design is analogous to the

a. R.C.B.D.
b. L.S.D.
c. Split plot design
d. Strip plot design

Ans. (c) Split plot design

214. For families, p progenies in each family and r replications, in compact family block design the error d.f. for main plot is equal to

a. (r-1) (p-1)
b. (r-1) (f-1)
c. (p-1) (f-1)
d. p(r-1) (f-1)

Ans. (b) (r-1) (f-1)

215. In a compact family block design as discussed in question 16, the d.f. for progenies within family is equal to

a. p (f-1)
b. f (p-1)
c. r (p-1)
d. r (f-1)

Ans. (b) f (p-1)

216. As described in question 16, the d.f. for sub plot error is equal to

a. (fpr-1)
b. r (p-1) (f-1)
c. p (r-1) (f-1)
d. f (r-1) (p-1)

Ans. (a) (fpr-1)

217. In compact family block design, the subplot treatments are

a. Different for all the main plots
b. Same for all the main plots
c. Same for all the blocks
d. Different for all the blocks

Ans. (a) Different for all the main plots

218. S.E. (Difference between two progeny means taken from two different families) is equal to

a. $\sqrt{\frac{2}{r}\left[\frac{E_a+(p+1)E_b}{r}\right]}$
b. $\sqrt{2\left[\frac{E_a+(p+1)E_b}{r}\right]}$
c. $\sqrt{\frac{r}{2}\left[\frac{E_a+(p+1)E_b}{p}\right]}$
d. $\sqrt{\frac{2}{r}\left[\frac{E_a+(p+1)E_b}{p}\right]}$

Ans. (a) $\sqrt{\frac{2}{r}\left[\frac{E_a+(p+1)E_b}{r}\right]}$

219. To test the homogeneity of error variances obtained from family to family, the appropriate test has been suggested by

a. Prof. R.A. Fisher
b. Prof. Kemthorn
c. Prof. Bartlett
d. Prof. R.C. Mahalanobis

Ans. (c) Prof. Bartlett

220. The ANOVA is a tool by which total variation may be split up into several physically assignable components was defined by

a. Horace Secrist
b. R.A. Fisher
c. Karl Pearson
d. A.L. Bowley

Ans. (b) RA fisher

221. During experimentation, we lost some information and we want to get idea about these values, which technique will be useful

a. Seed plot technique
b. Uniformity
c. Missing plot technique
d. Field plot technique

Ans. (c) Missing plot technique

222. Indian Agricultural Statistical Research Institute is established at

a. Luck now
b. Kanpur
c. New Delhi
d. Kolkata

Ans. (c) New Delhi

223. A measure of the peakness or convexity of a curve is known as

a. Ogive
b. Kurtosis
c. Skewness
d. Histogram

Ans. (b) Kurtosis

224. The square of the standard deviation is known as the

a. Mean deviation
b. Variance
c. Standard deviation
d. Coefficient of variance

Ans. (b) Variance

225. Which measure of central tendency is appropriate for index number?

a. Mode
b. Arithmetic mean
c. Geometric mean
d. Median

Ans. (c) Geometric mean

226. The mean of the data a, a, a, a will be

a. Zero
b. a
c. 2
d. Non of the above

Ans. (b) a

227. The mean of the square deviation about mean is known as

a. Mean
b. Median
c. Variance
d. Standard deviation

Ans. (c) Variance

228. If sum of 20 values is 300 then mean of the data is

a. 15
b. 20
c. 30
d. 300

Ans. (a) 15

229. If we add or subtract any value in the original any value in the original data then this process is known as

a. Change of scale
b. Change of origin
c. Both a and b
d. None of the above

Ans. (b) Change of origin

230. The mean of the 10 values is 20, if we add a value 10 in each observation then mean for the new value will be

a. 20
b. 0
c. 30
d. 10

Ans. (c) 30

231. When two coins are tossed together then probability of getting no tail is

a. 0
b. 1/2
c. 1/4
d. 1

Ans. (c) 1/4

232. The mean value or central value of average value of a data are

a. All same value
b. All different value
c. None of these
d. Always negative

Ans. (c) None of these

233. When "n" is an odd number then median is defined as

a. Middle value
b. Median of two middle values
c. Sum of the values
d. Most repeated value

Ans. (a) Middle value

234. For a group data the class interval having maximum frequency is known as

a. Median class
b. Mode
c. Median
d. Model class

Ans. (d) Model class

235. The sum of the deviation about mean for the data 6, 8, 10, 2, and 4 is always

a. 1
b. 0
c. Negative
d. 30

Ans. (b) 0

236. If the calculated value of chi-square lies in the region of acceptance, then we

a. Accept H0
b. Reject H0
c. No conclusion
d. None of the above

Ans. (a) Accept H0

237. Chi-square test is always used to test

a. Population mean
b. Population median
c. Test of association
d. None of these

Ans. (c) Test of association

238. Pulse rate or weight of patient are known as

a. Nominal data
b. Continuous data
c. Discrete data
d. Random variable

Ans. (b) Continuous data

239. Classification of objects or persons into classes or groups in such a way that only one object or personal falls in only one group at a time is called as

a. Mutually exclusive
b. None mutually exclusive
c. Dependent
d. Independent

Ans. (a) Mutually exclusive

CHECK YOUR GRASP

1. A progeny row trial is carried out in a simple

a. C.R.D.
b. R.B.D.
c. L.S.D.
d. Compact family block design

2. If in case of some extra replication in R.C.B.D., the two treatments (t_1 and t_2) are replicated (r_1 and r_2) time with error M.S. as s_e^2 then S.E. ($t_1 - t_2$) will be estimated by

a. $s_e^2\sqrt{\left[\frac{1}{r_1}+\frac{1}{r_2}\right]}$
b. $2s_e\sqrt{\left[\frac{1}{r_1}+\frac{1}{r_2}\right]}$
c. $s_e^2\sqrt{\left[\frac{1}{r_1}+\frac{1}{r_2}\right]}$
d. $\sqrt{2s_e^2\left[\frac{1}{r_1}+\frac{1}{r_2}\right]}$

3. The result drawn from ANOVA based on transformed data is

a. Same as based on original data
b. Different from original data
c. More efficient than based on original data
d. Less efficient than based on original data

4. In L.S.D., a suitable approximate number of treatment is from

a. (4 to 10)
b. (5 to 10)
c. (7 to 10)
d. (5 to 8)

5. The number of basic principle followed in L.S.D. is equal to

a. 1
b. 2
c. 3
d. 4

6. In m x m, L.S.D., the error d.f. is equal to

a. (m-1) (m+1)
b. m (m-1)
c. (m-1) (m-2)
d. m (m-2)

7. In agricultural field experiment where fertility contour map is not known then a suitable design applicable is the

a. R.C.B.D.
b. C.R.D.
c. L.S.D.
d. B.I.B.D.

8. A model in which some factors have fixed effect and others have random effect, is known as

a. Mixed effect model
b. Random effect model
c. Fixed effect model
d. Both b and c

9. Out of three designs, C.R.D., R.C.B.D. and L.S.D., the simplest design is

a. L.S.D.
b. R.C.B.D.
c. C.R.D.
d. None

10. In a m x m, L.S.D. the number of experimental units is equal to

a. m
b. m^2
c. m^3
d. (m-1) (m-2)

11. When the value of correlation coefficient is 1 then two variable are

a. Highly correlated
b. Perfectly correlated
c. Partially correlated
d. Uncorrelated

12. The correlation coefficient is the geometric mean between two

a. Regression coefficient
b. Standard deviation
c. Median
d. Mode

13. The mass selection technique was adopted to select the plants showing superior genetic values in

a. Plant breeding experiment
b. Agronomy's experiment
c. Crop cutting experiment
d. Experiment on plant protection

14. Geometric mean of a given series is always less than its

a. Arithmetic mean
b. Weighed harmonic mean
c. Weighted mean
d. Harmonic mean

In case of less than 80% score, go through brief review and glance once again from chapter

Key: 1-b 2-a 3-a 4-b 5-c 6-c 7-c 8-a 9-c 10-b 11-b 12-a 13-a 14-a