

Contents



<i>Foreword by Prof Goutam Buddha Sural</i>	<i>vii</i>
<i>Preface</i>	<i>ix</i>

1. Introduction	1–10
1.1 Importance of Biodiversity 2	
<i>Short Answer Questions 10</i>	
<i>Long Answer Questions 10</i>	
2. Species Diversity	11–55
2.1 Species-based Diversity Indices 12	
2.2 Variation in Taxonomic Distinctness 13	
2.3 Latitudinal Gradients in Species Diversity 14	
2.4 Species Richness Index 15	
2.5 Hypotheses for Pattern 15	
2.6 Global Distribution of Species Richness 19	
2.7 Keystone Species 21	
2.8 Centres of Diversity 23	
2.9 Endemic Bird Areas 25	
2.10 Major Wilderness Areas 27	
2.11 Diversity Zones 28	
2.12 Global Distribution 28	
2.13 Threats to Species Diversity 33	
2.14 Extinction 34	
2.15 Body Size and Longevity 38	
2.16 Extinction Probability and Persistence Time 39	
2.17 Microbial Diversity 40	
2.18 Species Diversity in India 41	
2.19 Taxonomic Research in India 44	
2.20 Classification of Life Forms 46	
2.21 Extinction Rates and Threatened Species: A Comparative Overview 46	
<i>Short Answer Questions 54</i>	
<i>Long Answer Questions 55</i>	

3. Ecosystem Diversity	56–133
3.1 Ecosystems and the Laws of Thermodynamics	57
3.2 Carrying Capacity	57
3.3 Ecosystem Types	57
3.4 Terrestrial Ecosystem	58
3.5 Freshwater Ecosystem	65
3.6 Freshwater Wetlands	68
3.7 Domesticated Ecosystems	69
3.8 Techno-ecosystems	70
3.9 Marine Ecosystems	70
3.10 Estuaries and Seashore	72
3.11 Ecosystem Vulnerability to Climate Change	72
3.12 Coastal Zones and Marine Ecosystems	75
3.13 Dynamics of Marine Ecosystems	76
3.14 Agriculture and Commercial Fisheries	77
3.15 Ecotone	78
3.16 Major Ecosystems of India	80
3.17 Landscape Ecology	118
3.18 Biodiversity Hotspot	127
<i>Short Answer Questions</i>	132
<i>Long Answer Questions</i>	132
4. Genetic Diversity	134–148
4.1 Concept of Genetic Diversity	136
4.2 Genetic Drift	140
4.3 Use of Genetic Resources	141
4.4 Conservation of Genetic Resources	142
4.5 Landscapes to Gene	142
4.6 Heavy Metals, PCBs, and PAHs	143
4.7 Shrimp Aquaculture and Genetic Diversity	144
4.8 Genetically Modified Shrimp	145
4.9 Genetic Diversity in India	145
<i>Short Answer Questions</i>	147
<i>Long Answer Questions</i>	148
5. Values of Biodiversity	149–182
5.1 Component Values	150
5.2 Biodiversity, Agriculture, and Food Products	153
5.3 Biodiversity and Energy	154
5.4 Biodiversity and Water	154
5.5 Biodiversity and Health Care	156

5.6 Prospects of Plant-based Medicines and Health Care Products 162	
5.7 Medical Research Value 166	
5.8 Ecosystem Services 168	
5.9 Recreation and Aesthetics 176	
5.10 Biodiversity and Other Services 177	
5.11 Total Economic Value 178	
<i>Short Answer Questions</i> 182	
<i>Long Answer Questions</i> 182	
6. Threats to Biodiversity	183–207
6.1 Habitat Destruction and Habitat Fragmentation 183	
6.2 Introduction of Exotic Species 185	
6.3 Overharvesting/Overexploitation 187	
6.4 Pollution 188	
6.5 Knock-on Effects 189	
6.6 Climate Change 189	
6.7 International Trade 189	
6.8 Parasites/Pathogens/Predator/Diseases 190	
6.9 Translocation 191	
6.10 Small Population 192	
6.11 Demographic Change 192	
6.12 Information and Action 192	
<i>Short Answer Questions</i> 207	
<i>Long Answer Questions</i> 207	
7. Biodiversity Conservation	208–246
7.1 Biodiversity Conservation Goals 209	
7.2 Economic Costs and Benefits of Conservation 209	
7.3 Conservation of Tropical Forests 210	
7.4 Economic Incentives for Biodiversity Conservation 210	
7.5 Reviewing and Redesigning Incentive Measures 210	
7.6 Species Survival Commission Action Plans 211	
7.7 Protected Areas 216	
7.8 Management of Protected Areas 222	
7.9 Numbers and Extent of Protected Areas 223	
7.10 Natural Heritage Programmes 226	
7.11 Impact of Pollution (Article 14) 227	
7.12 Biodiversity Conservation in India 229	
7.13 India and the Global Environment 235	
<i>Short Answer Questions</i> 245	
<i>Long Answer Questions</i> 246	

8. Biodiversity, Biotechnology, Sustainable Development and Biofuture	247–283
8.1 Biotechnology in Agriculture 248	
8.2 Intellectual Property Rights (IPRs) 249	
8.3 Patent 249	
8.4 Copyright 251	
8.5 Trademark 251	
8.6 Geographical Indication 252	
8.7 Design 252	
8.8 India's IPR System 252	
8.9 Traditional Knowledge and Intellectual Property Rights 253	
8.10 Investing in Biotechnology 254	
8.11 Applications of Plant Biotechnology 254	
8.12 Concept of Sustainable Development 258	
8.13 Sustainability and Sustainable Living 266	
8.14 Create a Global Alliance 270	
8.15 Perspectives of Sustainability 271	
8.16 Conflicting Issues and Challenges 273	
8.17 Biodiversity and Our Biofuture 275	
8.18 Environmental and Societal Challenges 278	
<i>Short Answer Questions</i> 283	
<i>Long Answer Questions</i> 283	
9. Biodiversity in India	284–312
9.1 Crop Genetic Diversity 291	
9.2 Medicinal Plants 296	
9.3 Livestock Diversity 296	
9.4 Endemic Species in India 297	
9.5 Genetic Degeneration 298	
9.6 Biodiversity Contribution to Indian Economy 298	
9.7 Heritage for the Future 299	
<i>Short Answer Questions</i> 311	
<i>Long Answer Questions</i> 312	
<i>References</i>	313–337
<i>Index</i>	339–344