

Contents

<i>Foreword</i>	<i>vii</i>
<i>Preface to the Fourth Edition</i>	<i>ix</i>
<i>Preface to the Third Edition</i>	<i>x</i>
<i>Contributors</i>	<i>xvii</i>
<i>Commonly Used Abbreviations in Medical Laboratories</i>	<i>xix</i>

SECTION 7: CLINICAL BIOCHEMISTRY

29. Biochemical Processes of the Body Under Normal and Pathogenic Conditions	901
<i>Vissagan Gopalakrishnan and Piyali Basu</i>	
Normal and Abnormal Biochemical Processes of the Body	901
Basic Physiology and Biochemistry of the Body	902
Interrelated Metabolic Processes of the Body	908
Functions of Various Organs	909
Biochemical Changes in the Body Under Pathologic Conditions	912
Basic Clinical Biochemistry	914
Diagnostic Biochemical Profiles	914
Review Questions	919
30. Specimen Collection and Processing for Biochemical Analyses	920
<i>Chhotelaal Pandey and Anant Kumar Pande</i>	
Specimens of Biochemistry and their Handling	920
Types of Specimens	921
Review Questions	931
31. Techniques of Analytical Chemistry	932
<i>Kanai L Mukherjee and Ishita Bhattacharya</i>	
Introduction to Analytical Chemistry	932
Analytical Chemistry and Clinical Chemistry	933
Applications of the Principles of Analytical Chemistry	934
Instrumentation for Proteomics	956
Osmometry	957
Analytic Techniques for Point-of-Care Testing (POCT)	958
Review Questions	960
32. Automation in Clinical Biochemistry	961
<i>Aurin Chakravarty, Dipto Chakravarty and Chhotelaal Pandey</i>	
Introduction	962
History of Laboratory Automation	962
Present State of Laboratory Automation	963
Benefits of Automation in Clinical Laboratories	963
Classification of Automated Systems	964

Steps of Automation in Biochemical Analysis	965
Quality Control and Preventive Maintenance	968
Automated 'Stat' Testing	968
Computers in Clinical Laboratories	968
Automation in the Clinical Laboratories of Developing Countries	976
Point-of-Care Testing: A New Approach	983
Time-Saving Devices and Kits	983
Conclusion	983
<i>Review Questions</i>	984

33. Routine Biochemical Test Procedures 985

Kanai L Mukherjee, Chhotelaal Pande and Rohini Chakravarthi

Introduction	986
Routine Diagnostic Tests in Clinical Chemistry	987
Blood Glucose	988
Serum Protein	998
Blood Urea Nitrogen (BUN)	1006
Uric Acid	1010
Creatinine	1012
Bilirubin	1015
Diagnostic Enzymology	1021
Brain Natriuretic Peptide (BNP)	1045
Lipid Profile	1048
Thyroid Function Tests	1053
Electrolytes	1064
Acid-Base Balance and Blood Gases	1073
<i>Review Questions</i>	1079

34. Biochemical Test Profiles 1081

Ashoke Khanwalkar

Diagnostic Clinical Chemistry	1082
Analytes Commonly Tested in Chemistry Profiles	1083
Kidney (Renal) Function Tests	1085
Liver Function Tests	1086
Cardiac Function Tests	1089
Lipid Metabolism	1089
Carbohydrate Metabolism	1090
Thyroid Function Tests	1090
Other Tests of Organ Functions	1090
Gastric Function Tests	1093
Pancreatic Function Tests	1096
Test for Malabsorption	1098
<i>Review Questions</i>	1101

35. Therapeutic Drug Monitoring and Clinical Toxicology 1102

Kanai L Mukherjee and Piyali Basu

Drug and Drug Addiction	1103
Diagnostic Screening in Emergency	1104
Comments on Commonly used Drugs	1105
Classification of Illegal Drugs and Their Uses	1106
Toxicology Laboratory and Forensic Medicine	1108
Drug Screening in Clinical Chemistry Laboratory	1108
Laboratory Assay of Drugs and Poisoning	1109
Laboratory Investigation of Drug Abuse	1116

Investigation for New Illegal Drugs	1118
Popularity of Immunoassay	1119
Laboratory Screening for Heavy Metal Poisoning	1120
Point-of-Care Testing	1123
<i>Review Questions</i>	1124

SECTION 8: HISTOLOGY AND CYTOLOGY

36. Introduction to Histotechnology and Cytotechnology	1127
<i>Venk Mani and Surajit Ghosh</i>	
Introduction to Histopathology and Exfoliative Cytology	1128
Basic Terminology	1129
Histopathology Laboratory Equipment	1130
Laboratory Supplies	1139
Reagents	1140
Routine and Special Staining: A Review	1143
<i>Review Questions</i>	1145
37. Laboratory Techniques in Histology	1147
<i>Venk Mani and Kanai L Mukherjee</i>	
Overview	1148
Logging in of Specimens	1148
Preparation of Tissues	1149
Processing of Tissues	1156
Routine Staining Procedure in Histology	1166
Post Staining Processes	1170
Special Stains and Staining Techniques	1170
Stains for Particular Substances	1178
Stains for Microorganisms	1186
Staining Kits from Commercial Companies	1193
Frozen Section Technique	1202
Handling and Embedding Small Tissue Fragments	1205
<i>Review Questions</i>	1205
38. Laboratory Techniques in Diagnostic Exfoliative Cytology	1206
<i>Krishna Mallik and Kanai L Mukherjee</i>	
Introduction to Exfoliative Cytology	1206
Four Phases of Exfoliative Cytology	1207
Collection of Specimens	1208
Preparation of Specimens	1210
Cytological Stains and Staining Techniques	1213
Identifying Characteristics of Benign and Malignant Cells	1220
<i>Review Questions</i>	1221
39. Basics of Immunohistochemistry	1222
Evolution of Tissue/Cellular Level Diagnostics	1222
Preanalytical Phases of IHC	1223
Drying of Paraffin Sections	1226
Postanalytical Phase of IHC	1233
Panel Markers in IHC	1238
40. Polymerase Chain Reaction in Clinical Diagnosis	1240
Evolution of PCRs	1240
Principles of PCR	1241

Application of PCR	1246
Point of care PCR for Clinical Diagnosis	1247

SECTION 9: MISCELLANEOUS INFORMATION

Medical Terminology	1251
<i>Maya Chatteraj and Kanai L Mukherjee</i>	
Suffixes and Prefixes in Medical Terminology	1251
Glossary of Technical Terms	1254
<i>Maya Chatteraj and Kanai L Mukherjee</i>	
Appendices	1284
<i>Maya Chatteraj and Kanai L Mukherjee</i>	
Appendix A: Sources of Information and Readings	1284
Appendix B: Comments on Reporting of Test Results	1288
Appendix C: Miscellaneous Information	1291
Appendix D: Conversion of Conventional Units to International (SI) Units	1293
Appendix E: Table of Panic Values	1294
Appendix F: Diagnostic Test Panels	1295
Appendix G: Professional Organizations Connected with Indian Clinical Laboratories	1296
Appendix H: Suppliers of Clinical Laboratory Products	1296

Index

I.1–I.8

CONTENTS OF VOLUME I

SECTION 1: INTRODUCTION

1. Human Health and Clinical Diagnosis in Developing Countries	3
2. Introduction to Clinical Laboratories	16
3. Laboratory Safety and First Aid	29
4. Introduction to Laboratory Equipment and Basic Laboratory Operations	54
5. Specimen Handling and Laboratory Records	140
6. Units of Measurement and Preparation of Reagent Solutions	196
7. Good Laboratory Practices and Statistical Quality Control	212

SECTION 2: HAEMATOLOGY AND COAGULATION

8. Introduction to Haematology	229
9. Basic Laboratory Procedures in Haematology	236
10. Routine Haematological Tests	242
11. Special Haematological Tests	306
12. Interpretation of Laboratory Findings in Haematology	332

13. Introduction to Haemostasis and Haemostatic Disorders	338
14. Laboratory Investigation of Bleeding Disorders	348

SECTION 3: IMMUNOHAEMATOLOGY OR BLOOD BANKING

15. Introduction to Blood Transfusion Therapy	373
16. Collection and Processing of Blood for Transfusion	393
17. Routine Laboratory Procedures in Blood Bank	420
18. Blood Transfusion Services and Clinical Approach to Haemolytic Disease of the Newborn	459
Laboratory Information Systems	i
Phlebotomy/Venipuncture Procedure	ix
<i>Index</i>	<i>I.I</i>

CONTENTS OF VOLUME II

SECTION 4: MICROBIOLOGY AND VIROLOGY

19. Introduction to Diagnostic Microbiology	471
20. Identification of Pathogenic Bacteria	544
21. Laboratory Diagnosis of Mycotic Infections	644
22. Laboratory Diagnosis of Parasitic Infections	678

SECTION 5: SEROLOGY

23. Introduction to Immunology and Principles of Serodiagnosis	729
24. Laboratory Procedures in Serology	750

SECTION 6: CLINICAL PATHOLOGY

25. Urine Analysis	805
26. Laboratory Examination of Miscellaneous Body Fluids	845
27. Semen Analysis	872
28. Stool Examination	882
Molecular Pathology	i
Morphology and Life Cycles of Human Parasites	xi
<i>Index</i>	<i>I.I</i>