

CONTENTS

<i>About the Author</i>	<i>iii</i>
<i>Preface</i>	<i>v</i>
<i>Special Features of the Book</i>	<i>vii</i>
<i>Syllabus</i>	<i>xi</i>

Chapter 1 Cell Biology	1–16
• Cell Kinetics	1
• Prokaryotic Cell Structure.....	2
• Eukaryotic Cell Structure	3
• Absorption.....	5
• Intracellular Organelles and their Functions	11
Chapter 2 Biophysics	17–22
• Acids	18
• Bases	18
• Amphoteric Substances.....	18
• Henderson-Hasselbalch Equation	19
• Buffers	19
• Acid-Base Equilibrium	20
• Osmotic Pressure	20
Chapter 3 Chemistry of Carbohydrates	23–38
• Classification of Carbohydrates	23
▪ Monosaccharides.....	23
▪ Disaccharides.....	28
▪ Oligosaccharides	30
▪ Polysaccharides.....	30
Chapter 4 Lipid Chemistry	39–54
• Importance of Lipids.....	39
• Classification of Lipids	40
• Fatty Acids	40
• Triacylglycerols	45

• Phospholipids	46
• Cholesterol	50
• Lipoproteins	51
Chapter 5 Amino Acid Chemistry	55–73
• Classification of Amino Acids	56
• Peptide Bonds	60
• Proteins	62
• Denaturation, Coagulation, Isoelectric pH and its Significance.....	69
Chapter 6 Enzymes	75–98
• Active Site.....	76
• Interaction of the Enzyme with the Substrate: Formation of the Enzyme-Substrate Complex.....	76
• Cofactors and Coenzymes	78
• Proenzyme	79
• Classification of Enzymes	80
• Factors Affecting Enzyme Activity	81
• Isoenzymes.....	89
• Diagnostic Enzymology.....	91
• Clinical Significance of Enzymes	94
Chapter 7 Bioenergetics	99–115
• Exergonic and Endergonic Reactions.....	100
• Energy-Rich Compounds	101
Respiratory Chain.....	103
• Reducing Equivalents	103
• Components of the Electron Transport Chain	105
• Oxidative Phosphorylation	109
• Substrate Level Phosphorylation.....	112
Chapter 8 Nucleotide and Nucleic Acid Chemistry	117–139
• Nucleosides	120
• Nucleotides	122
• Nucleic Acids	126
• Deoxyribonucleic Acid	127
• Ribonucleic Acids.....	131
• Catabolism of Purines	134

Contents

Chapter 9 Digestion and Absorption	141–150
• Digestion and Absorption of Carbohydrates	142
• Digestion and Absorption of Lipids	143
• Digestion and Absorption of Proteins	145
Chapter 10 Carbohydrate Metabolism	151–175
• Glycolysis.....	152
• Hexose Monophosphate Shunt.....	155
• Citric Acid Cycle.....	156
• Glycogen Metabolism.....	158
• Gluconeogenesis	162
• Cori Cycle.....	167
• Disorders of Carbohydrate Metabolism	169
Chapter 11 Lipid Metabolism	177–201
• Lipolysis	177
• Oxidation of Fatty Acids	179
• Lipogenesis.....	182
• Triacylglycerols Synthesis	187
• Ketone Bodies Metabolism	189
• Cholesterol Metabolism	191
• Diseases Associated with Lipid Metabolism.....	194
• Lipid Profile	198
Chapter 12 Amino Acid and Protein Metabolism	203–224
• Transamination.....	203
• Deamination.....	204
• Fate of Ammonia.....	206
• Formation of Urea	206
• Plasma Proteins	209
• Specialized Products Formed from Amino Acids	211
Chapter 13 Vitamins	225–253
• Fat Soluble Vitamins.....	225
• Water Soluble Vitamins.....	236
Chapter 14 Mineral Metabolism	255–280
• Calcium.....	256

• Phosphorus	258
• Iron	261
• Magnesium.....	265
• Manganese.....	266
• Zinc	267
• Chloride	268
• Fluoride	269
• Iodine	271
• Selenium.....	273
• Molybdenum.....	274
• Copper.....	275

Chapter 15 Nutrition 281–312

• Importance of Nutrition	282
• Calorific Values	283
• Respiratory Quotient.....	284
• Energy Requirement.....	285
• Metabolism in Exercise and Injury	290
• Balanced Diet	291
• Recommended Dietary Allowance	292
• Role of Carbohydrates in Diet.....	296
• Role of Lipids in Diet.....	298
• Role of Proteins in Diet.....	301
• Diet for Chronically Ill and Terminally Ill Patients	303
• Diets for Patients in Some Specific Diseases	305
• Protein-Energy Malnutrition	309

Chapter 16 Neuromuscular Biochemistry 313–323

• Contractile Elements in Skeletal Muscles	314
• Biochemistry of Muscle Contraction and Relaxation	320
• Energy Metabolism in Muscle Contraction	321

Chapter 17 Biochemistry of Connective Tissue 325–333

• Collagen.....	325
• Elastin.....	327
• Glycoproteins	328
• Proteoglycans	329
• Bone	329
• Teeth.....	331

Contents

Chapter 18 Hormone Action	335–348
• Definition.....	335
• Classification of Hormones.....	335
• Mechanism of Action of Hormones	338
• Hormone Receptors	338
• Second Messengers.....	343
• Signal Transduction	345
• Cellular Functions of Hormones.....	345
Chapter 19 Acid-Base Balance	349–358
• Buffer Systems of the Body	350
• Role of Lungs and Kidneys in Acid-Base Balance.....	351
• Acid-Base Imbalance	354
• Acidosis	354
• Alkalosis.....	355
• Biochemical Evaluation of Acid-Base Balance	356
• Measurement of Parameters of Acid-Base Balance	357
Chapter 20 Water and Electrolyte Balance	359–372
• Fluid Compartments of the Body with their Water and Electrolyte Contents.....	359
• Body Water.....	361
• Electrolytes.....	365
• Distribution of Electrolytes in Body Fluids	367
• Electrolyte Balance.....	368
• Ideal Daily Intake and Output.....	370
Chapter 21 Hemoglobin	373–383
• Structure of Hemoglobin.....	373
• Synthesis of Heme.....	374
• Heme Degradation	377
• Synthesis of Bilirubin	377
• Jaundice	380
Chapter 22 Immunoglobulins	385–394
• Structure of Immunoglobulin	385
• Classification of Immunoglobulins	390
• Functions of Immunoglobulins.....	391
• Mechanism of Action of Immunoglobulins	392

• Antigen	392
• Autoimmune Diseases.....	393

Chapter 23 Organ Function Tests 395–416

Renal Function Tests	395
• Functions of the Kidneys	395
• Biochemical Parameters for the Evaluation of Kidney Functions.....	399
Liver Function Tests	409
• Commonly used Biochemical Parameters for the Evaluation of Liver Functions	410
• Normal Values of Some Biochemical Parameters of Liver.....	411
Thyroid Function Tests.....	412
• Thyroid Hormones.....	412
• Commonly used Biochemical Parameters for the Evaluation of Thyroid Functions.....	414
• Normal Values of Some Biochemical Parameters of Thyroid Function	415

Chapter 24 Clinical Biochemistry 417–429

• Blood Glucose	418
• Blood Urea	421
• Serum Creatinine.....	422
• Serum Proteins.....	423
• Calcium and Phosphorous.....	425
• Serum Bilirubin.....	426
• Serum Glutamic-Oxaloacetic Transaminase and Serum Glutamic Pyruvic Transaminase	427
• Alkaline Phosphatase	427
• Uric Acid	428

Chapter 25 Sample Collection and Normal Values 431–436

• Difference between Whole Blood, Serum and Plasma	431
• Anticoagulants.....	432
• Normal Levels of Blood and Urine Constituents	434

Glossary..... **437–444**

Answers to MCQs Asked in Chapters **445–445**

Index..... **447–460**