



Contents

Preface vi

Acknowledgments ix

1. INTRODUCTION

1

Skeletal System 1

- I. Bones 1
- II. Joints 2

Muscular System 4

- I. Muscle 4
- II. Structures Associated with Muscles 4

Nervous System 5

- I. Nervous System 5
- II. Neurons 5
- III. Central Nervous System 6
- IV. Peripheral Nervous System 7
- V. Autonomic Nervous System 9

Circulatory System 10

- I. Vascular System 10
- II. Lymphatic System 12

Organ Systems 12

- I. Digestive System 12
 - II. Respiratory System 13
 - III. Urinary System 13
 - IV. Reproductive System 13
 - V. Endocrine System 14
 - VI. Integumentary 14
- High-Yield Topics 14

Review Test 17

2. BACK

21

Vertebral Column 21

- I. General Characteristics 21
- II. Typical Vertebra 23
- III. Intervertebral Disks 25

IV.	Regional Characteristics of Vertebrae	26
V.	Ligaments of the Vertebral Column	28
VI.	Vertebral Venous System	29
Soft Tissues of the Back 30		
I.	Superficial Tissues	30
II.	Deep Tissues	32
III.	Suboccipital Area	33
Spinal Cord and Associated Structures 34		
I.	Spinal Cord	34
II.	Spinal Nerves	36
III.	Meninges	36
IV.	Structures Associated with the Spinal Cord	37
V.	Dermatome, Myotome, and Sclerotome	38
VI.	Development of Back Structures	39
High-Yield Topics 40		

Review Test 43

3. THORAX 50

Thoracic Wall 50		
I.	Skeleton of the Thorax	50
II.	Articulations of the Thorax	52
III.	Breasts and Mammary Glands	53
IV.	Muscles of the Thoracic Wall	53
V.	Nerves and Blood Vessels of the Thoracic Wall	53
VI.	Lymphatic Drainage of the Thorax	54
VII.	Thymus	54
VIII.	Diaphragm and Its Openings	55
Mediastinum, Pleura, and Organs of Respiration 55		
I.	Mediastinum	55
II.	Trachea and Bronchi	56
III.	Pleurae and Pleural Cavities	58
IV.	Lungs	60
V.	Respiration	62
VI.	Lymphatic Vessels of the Lung	62
VII.	Blood Vessels of the Lung	63
VIII.	Nerve Supply to the Lung	65
IX.	Development of the Respiratory System	65
Pericardium and Heart 66		
I.	Pericardium	66
II.	Heart	67
III.	Great Vessels	76
IV.	Development of the Heart	76
V.	Development of the Arterial System	79
VI.	Development of the Venous System	79
VII.	Fetal Circulation	80
Structures in the Posterior Mediastinum 81		
I.	Esophagus	81
II.	Blood Vessels and Lymphatic Vessels	82

- III. Autonomic Nervous System in the Thorax 84
- High-Yield Topics 87

Review Test 93

4. ABDOMEN

104

Anterior Abdominal Wall 104

- I. Abdomen 104
- II. Muscles of the Anterior Abdominal Wall 105
- III. Fasciae and Ligaments of the Anterior Abdominal Wall 106
- IV. Inguinal Region 108
- V. Spermatic Cord, Scrotum, and Testis 109
- VI. Inner Surface of the Anterior Abdominal Wall 110
- VII. Nerves of the Anterior Abdominal Wall 111
- VIII. Lymphatic Drainage of the Anterior Abdominal Wall 112
- IX. Blood Vessels of the Anterior Abdominal Wall 112

Peritoneum and Peritoneal Cavity 113

- I. Peritoneum 113
- II. Peritoneal Reflections 113
- III. Peritoneal Cavity 115

Gastrointestinal (GI) Viscera 116

- I. Esophagus (Abdominal Portion) 116
- II. Stomach 116
- III. Small Intestine 119
- IV. Large Intestine 120
- V. Accessory Organs of the Digestive System 121
- VI. Spleen 126
- VII. Development of Digestive System 127
- VIII. Celiac and Mesenteric Arteries 129
- IX. Hepatic Portal Venous System 132

Retroperitoneal Viscera, Diaphragm, and Posterior Abdominal Wall 134

- I. Kidney, Ureter, and Suprarenal Gland 134
- II. Development of Kidney, Urinary Bladder, and Suprarenal Gland 137
- III. Posterior Abdominal Blood Vessels and Lymphatics 138
- IV. Nerves of the Posterior Abdominal Wall 139
- V. The Diaphragm and Its Openings 142
- VI. Muscles of the Posterior Abdominal Wall 144

High-Yield Topics 144

Review Test 151

5. PERINEUM AND PELVIS

164

Perineal Region 164

- I. Perineum 164
- II. Urogenital Triangle 164
- III. Anal Triangle 168
- IV. External Genitalia and Associated Structures 169
- V. Nerve Supply of the Perineal Region 172
- VI. Blood Supply of the Perineal Region 173

Pelvis 175

- I. Bony Pelvis 175
- II. Joints of the Pelvis 177
- III. Pelvic Diaphragm 178
- IV. Ligaments or Folds and Pouches of the Pelvis 178
- V. Ureter and Urinary Bladder 180
- VI. Male Genital Organs 184
- VII. Female Genital Organs 187
- VIII. Rectum and Anal Canal 190
- IX. Blood Vessels of the Pelvis 192
- X. Nerve Supply to the Pelvis 195
- XI. Development of the Lower Gastrointestinal Tract and Urinary Organs 196
- XII. Development of the Reproductive System 198
High-Yield Topics 198

Review Test 204**6. LOWER LIMB****217****Bones of the Lower Limb 217**

- I. Hip (Coxal) Bone 217
- II. Bones of the Thigh and Leg 219
- III. Bones of the Ankle and Foot 221

Joints and Ligaments of the Lower Limb 223

- I. Hip (Coxal) Joint 223
- II. Knee Joint 225
- III. Tibiofibular Joints 229
- IV. Ankle (Talocrural) Joint 229
- V. Tarsal Joints 230

Cutaneous Nerves, Superficial Veins, and Lymphatics 231

- I. Cutaneous Nerves of the Lower Limb 231
- II. Superficial Veins of the Lower Limb 232
- III. Lymphatics of the Lower Limb 233

Muscles of the Lower Limb 234

- I. Muscles of the Gluteal Region 234
- II. Posterior Muscles of the Thigh 235
- III. Muscles of the Anterior and Medial Thigh 236
- IV. Anterior and Lateral Muscles of the Leg 238
- V. Posterior Muscles of the Leg 239
- VI. Muscles of the Foot 239

Nerves of the Lower Limb 243

- I. Branches of the Lumbar and Sacral Plexuses 243

Blood Vessels of the Lower Limb 247

- I. Arteries of the Lower Limb 247
- II. Deep Veins of the Lower Limb 251
- III. Development of the Lower Limb 252
High-Yield Topics 252

Summary 256**Review Test 258**

7. UPPER LIMB**273****Bones and Joints of the Upper Limb 273**

- I. Bones of the Shoulder Girdle 273
- II. Bones of the Arm and Forearm 275
- III. Bones of the Hand 278
- IV. Joints and Ligaments of the Upper Limb 278

Cutaneous Nerves, Superficial Veins, and Lymphatics 282

- I. Cutaneous Nerves of the Upper Limb 282
- II. Superficial Veins of the Upper Limb 283
- III. Superficial Lymphatics of the Upper Limb 284

Axilla and Breast 284

- I. Fasciae of the Axilla and Pectoral Regions 284
- II. Axilla (Armpit) 285
- III. Breast and Mammary Gland 286

Muscles of the Upper Limb 291

- I. Muscles of the Pectoral Region and Axilla 291
- II. Muscles of the Shoulder Region 292
- III. Muscles of the Arm and Forearm 294
- IV. Muscles of the Hand 296

Nerves of the Upper Limb 302

- I. Brachial Plexus 302
- II. Nerves of the Arm, Forearm, and Hand 304
- III. Functional Components of the Peripheral Nerves 307

Blood Vessels of the Upper Limb 308

- I. Branches of the Subclavian Artery 308
 - II. Axillary Artery 308
 - III. Brachial Artery 309
 - IV. Radial Artery 310
 - V. Ulnar Artery 311
 - VI. Veins of the Upper Limb 313
 - VII. Development of the Limbs 313
- High-Yield Topics 314

Summary 317**Review Test 319****8. HEAD AND NECK****337****Structures of the Neck 337**

- I. Major Divisions and Bones 337
- II. Muscles 339
- III. Nerves 340
- IV. Blood Vessels 342
- V. Lymphatics 347

Deep Neck and Prevertebral Region 348

- I. Deep Structures of the Neck 348
- II. Deep Cervical Fasciae 351
- III. Prevertebral or Deep Neck Muscles 352
- IV. Development of Thyroid and Parathyroid Gland 352

Face and Scalp 353

- I. Muscles of Facial Expression 353
- II. Nerve Supply to the Face and Scalp 353
- III. Blood Vessels of the Face and Scalp 357
- IV. Scalp 359

Temporal and Infratemporal Fossae 360

- I. Introduction 360
- II. Muscles of Mastication 362
- III. Nerves of the Infratemporal Region 362
- IV. Blood Vessels of the Infratemporal Region 364
- V. Parotid Gland 365
- VI. Joints and Ligaments of the Infratemporal Region 366

Skull and Cranial Cavity 367

- I. Skull 367
- II. Bones of the Cranium 368
- III. Sutures of the Skull 369
- IV. Foramina in the Skull 370
- V. Structures in the Cranial Fossae 372
- VI. Meninges of the Brain 373
- VII. Cranial Venous Channels 375
- VIII. Blood Supply of the Brain 377
- IX. Development of the Skull 378

Nerves of the Head and Neck 379

- I. Cranial and Autonomic Nerves 379
- II. Autonomic Nerves 379

Orbit 379

- I. Bony Orbit 379
- II. Nerves 381
- III. Blood Vessels 383
- IV. Muscles of Eye Movement 385
- V. Lacrimal Apparatus 387
- VI. Eyeball 388
- VII. Development of the Eye 390

Oral Cavity and Palate 391

- I. Oral Cavity 391
- II. Palate 392
- III. Tongue 393
- IV. Teeth and Gums or Gingivae 394
- V. Salivary Glands 396
- VI. Development of the Palate 397
- VII. Development of the Tongue 397
- VIII. Development of Teeth 398
- IX. Development of Salivary Glands 398

Pharynx and Tonsils 398

- I. Pharynx 398
- II. Subdivisions of the Pharynx 399
- III. Innervation and Blood Supply of the Pharynx 399
- IV. Muscles of the Pharynx 400
- V. Swallowing (Deglutition) 401
- VI. Tonsils 402
- VII. Fascia and Space of the Pharynx 403
- VIII. Pharyngeal (Branchial) Apparatus 403

Nasal Cavity and Paranasal Sinuses 404

- I. Nasal Cavity 404
- II. Subdivisions and Mucous Membranes 406
- III. Blood Supply to the Nasal Cavity 406
- IV. Nerve Supply to the Nasal Cavity 407
- V. Paranasal Sinuses 407
- VI. Development of the Nasal Cavity 409

Pterygopalatine Fossa 409

- I. Boundaries and Openings 409
- II. Contents 410

Larynx 411

- I. Introduction 411
- II. Cartilages 411
- III. Ligaments of the Larynx 413
- IV. Cavities and Folds 413
- V. Muscles 414
- VI. Innervation 414
- VII. Development of the Larynx 416

Ear 417

- I. External Ear 417
 - II. Middle Ear 418
 - III. Inner Ear 421
 - IV. Hearing and Equilibrium 422
 - V. Development of the Ear 423
- High-Yield Topics 423

Review Test 435**9. CRANIAL AND AUTONOMIC NERVES****451**

-
- I. Cranial Nerves 451
 - II. Autonomic Nerves of the Head 464
- High-Yield Topics 468

Review Test 471**Comprehensive Examination 477****Index 498**