Contents

PART 1: UPPER EXTREMITY

1. Some Essential Terms **3**
The Subject of Anatomy 3
Main Subdivisions of the Human Body 3
Some Commonly Used Descriptive Terms 3
Structures Constituting the Human Body 6
How Muscles are Named 7
Some Features of Joints 8

2. Bones of Upper Extremity **13**
Skeleton of the Upper Limb 13
The Skeleton of the Hand 34

3. Pectoral Region, Axilla and Breast **44**
The Pectoral Region 44
Cutaneous Nerves of the Pectoral Region 44
Muscles of the Pectoral Region 45
The Axilla 48
The Axillary Artery 49
The Axillary Vein 53
Lymph Nodes and Lymphatic Drainage 53
Lymph Nodes of Upper Limb 54
The Brachial Plexus and its Branches 56
The Mammary Glands (Breasts) 64

4. The Back and Scapular Region **68**
The Back 68
Muscles of the Back 69
Nerves of the Back 69
The Scapular Region 73
Nerves of Scapular Region 79
Arteries of Scapular Region 80

5. Cutaneous Nerves and Veins of the Free Upper Limb **84**
Cutaneous Nerves of the Free Upper Limb 84
Veins of the Upper Limb 86
Anterior Compartment of the Arm 88
The Brachial Artery 91
Nerves of the Front of the Arm 94
Cubital Fossa 96
Posterior Compartment of the Arm 97

6. The Forearm and Hand **100**
Front of Forearm and Hand 100
Muscles of the Front of the Forearm 100

Important Fascia in the Wrist and Hand 104
Muscles in the Palm 106
Nerves of the Forearm and Hand 109
Arteries of the Forearm 118
Back of the Forearm and Hand 128
Muscles of the Back of the Forearm 128
Nerves and Arteries on the Back of the Forearm and Hand 133

7. General Features of Joints and Joints of the Upper Limb 135
Classification of Joints 135
Classification of Joints on the Basis of Structure 135
Classification of Joints on the Basis of Movements 139
Joints of the Upper Limb 141
Joints Connecting the Scapula and Clavicle 141
The Sternoclavicular Joint 141
The Shoulder Joint 143
The Elbow Joint 149
The Radioulnar Joints 151
The Wrist Joint 153
Other Joints of the Upper Limb 154

8. Surface Marking and Radiological Anatomy of Upper Limb 157
Surface Marking 157
Radiological Anatomy 162

PART 2: LOWER EXTREMITY

9. Bones of Lower Extremity 167
The Hip Bone 167
Pelvis as a Whole 177
The Femur 180
The Patella 186
The Tibia 188
The Fibula 193
The Skeleton of the Foot 197

10. Cutaneous Nerves, Veins and Lymphatic Drainage: Front and Medial Side of Thigh 209
Cutaneous Innervation of the Lower Limb 209
Veins of the Lower Limb 214
Lymph Nodes and Lymphatic Drainage of the Lower Limb 216
General Review of the Front and Medial Side of Thigh 218
Muscles of Front of Thigh 224
Muscles of Medial Side of Thigh 229
The Femoral Artery 232
Femoral Vein 235
Nerves on Front and Medial Side of Thigh 238

11. Gluteal Region, Back of Thigh and Popliteal Fossa 245
Gluteal Region 245
Muscles of the Gluteal Region 245
Arteries of Gluteal Region 248
Muscles of the Back of the Thigh 250

Popliteal Fossa 253
Popliteal Vessels 254
Nerves in the Gluteal Region and Back of Thigh 256
Sacral Ventral Rami and Sacral Plexus 256
The Sciatic Nerve 258
The Tibial Nerve 259
The Common Peroneal Nerve 260

12. Front and Lateral Side of Leg and the Dorsum of Foot 263
Compartments of the Leg 263
Muscles of Anterior Compartment of Leg 263
Extensor and Peroneal Retinacula 265
Muscles of Lateral Compartment of Leg 268
Blood Vessels of the Region 270
The Tibial Nerve (in Popliteal Fossa) 273
The Common Peroneal Nerve 274
The Deep Peroneal (Fibular) Nerve 274
The Superficial Peroneal (Fibular) Nerve 276

13. Back of Leg and Sole 278
Muscles of the Back of the Leg 279
Arteries of the Back of the Leg 286
Muscles and Related Structures in the Sole 288
Arteries of the Sole 294
The Tibial Nerve 297
Medial Plantar Nerve 298
The Lateral Plantar Nerve 300

14. Joints of the Lower Limb 303
Joints and Ligaments of the Pelvis 303
The Hip Joint 304
The Knee Joint 306
The Ankle Joint 313
Intertarsal Joints 315
Other Joints of the Lower Limb 316
Arches of the Foot 316

15. Surface Marking and Radiological Anatomy of the Lower Limb 319
Surface Marking 319
Radiological Anatomy 323

PART 3: THORAX

16. Bones Seen in Relation to the Thorax 329
Introduction to the Vertebral Column 329
Introduction to Skeleton of the Thorax 329
Structure of a Typical Vertebra 329
The Sternum 334
The Ribs 337

17. Intervertebral Joints and Joints of Sternum and Ribs 345
Intervertebral Joints 345
Joints of the Sternum 347

Joints of Ribs with Vertebral Column 348
Joints between Ribs, Costal Cartilages and Sternum 349
Movements of Ribs 351

18. Walls of the Thorax 353
Muscles of Thorax 353
Some Muscles of Thorax seen on the Back 354
The Diaphragm 356
Arteries of Thoracic Wall 363
Veins of the Thoracic Wall 366
Nerves of Thoracic Wall 368

19. The Trachea, Bronchi and Lungs 374
Introduction to the Respiratory System 374
The Thoracic Cavity 377
The Trachea 379
The Principal Bronchi 382
The Lungs 383
The Pleura 395

20. The Heart and Pericardium 401
Introduction to Cardiovascular System 401
Some Elementary Facts about the Heart 401
Exterior of the Heart 402
Interior of the Heart 405
Conducting System of the Heart 413
The Pericardium 413
Surface Projection of the Heart 415

21. Blood Vessels of the Thorax 419
The Pulmonary Trunk and Arteries 419
The Aorta 420
Branches of Aorta 425
Branches of the Arch of the Aorta 430
Branches of Descending Thoracic Aorta 432
Veins of the Thorax 433
Veins of the Heart 433
The Pulmonary Veins 435
The Superior Vena Cava 435

22. The Oesophagus, The Thymus, Lymphatics and Nerves of the Thorax 438
The Oesophagus 438
The Thymus 442
Lymphatics of the Thorax 444
Lymph Nodes of the Thorax 446
Nerves of the Thorax 450
The Phrenic Nerves 451
Preliminary Remarks on the Autonomic Nervous System 452
The Vagus Nerve 455
The Sympathetic Trunk 458

23. Surface Marking and Radiological Anatomy of the Thorax 463
Surface Marking 463
Radiological Anatomy of the thorax 467

PART 4: ABDOMEN AND PELVIS

24. Bones and Joints of the Abdomen 473
Bones of the Abdomen 473
Lumbar Vertebrae 473
The Sacrum and Coccyx 476
Joints of the Abdomen 480

25. Introduction to the Abdomen and the Anterior Abdominal Wall 485
Introduction to the Abdomen 485
Regions of the Abdomen 488
Some Introductory Remarks about the Peritoneum 490
The Anterior Abdominal Wall 491
Anterolateral Muscles of Abdominal Wall 491

26. The Perineum and Related Genital Organs 512
Introduction to the Perineum 512
The Testis and Epididymis 513
The Ductus Deferens 515
The Spermatic Cord 516
The Penis 520
The Perineum 522
Anal Triangle and Ischiorectal Fossa 528
Vessels of the Perineum 531
Nerves of the Perineum 532

27. Oesophagus, Stomach and Intestines 535
Abdominal Part of Oesophagus 535
The Stomach 535
The Small Intestine 541
The Jejunum and Ileum 544
The Large Intestine 545
The Vermiform Appendix 553
The Sigmoid Colon 558
Innervation of the Gut 559

28. The Liver, Pancreas and Spleen 561
The Liver 561
Extrahepatic Biliary Apparatus 573
The Pancreas 576
The Spleen 580

29. Blood Vessels of Stomach, Intestines, Liver, Pancreas and Spleen 583
The Coeliac Trunk and its Branches 583
Superior Mesenteric Artery 587
Inferior Mesenteric Artery 589
The Hepatic Portal System 590

30. Kidney, Ureter and Suprarenal Gland 595
Introduction to the Urinary System 595
The Kidneys 595
The Ureters 600
The Suprarenal Glands 604

31. Posterior Abdominal Wall and Some Related Structures 608
Muscles of Posterior Abdominal Wall 610
The Abdominal Aorta 612
Branches of Abdominal Aorta 614
The Inferior Vena Cava and its Main Tributaries 619
Nerves of Posterior Abdominal Wall 625

32. Walls of the Pelvis 629
Muscles and Fascia of Pelvic Wall 629
Blood Vessels of True Pelvis 632
Nerves of the Pelvis 637

33. Pelvic Viscera and Peritoneum 639
Pelvic Viscera 639
The Rectum 639
The Anal Canal 642
The Ureters 649
The Urinary Bladder 651
The Urethra 657
The Prostate 661
The Ovaries 664
The Uterine Tubes 666
The Uterus 668
The Vagina 671
The Peritoneum 673

34. Lymphatics and Autonomic Nerves of Abdomen and Pelvis 684
Lymphatics of Abdomen and Pelvis 684
Chief Lymph Nodes of Abdomen and Pelvis 684
Lymphatic Drainage of Abdominal and Pelvic Viscera 685
Autonomic Nerves of Abdomen and Pelvis 692
Parasympathetic Nerves in Abdomen and Pelvis 693
Sympathetic Nerves in Abdomen and Pelvis 694

35. Surface and Radiological Anatomy of the Abdomen 697
Regions of the Abdomen 697
Relationship of Inguinal Canal to the Surface of the Abdominal Wall 697
Surface Marking of Parts of the Gastrointestinal Tract 697
Surface Marking of Biliary Apparatus, Pancreas and Spleen 701
Surface Marking of Urinary Organs 702
Surface Marking of Some Arteries 704
Surface Marking of Some Large Veins 705
Radiological Anatomy of the Abdomen and Pelvis 706

PART 5: HEAD AND NECK

36. Bones and Joints of the Head and Neck 715
Vertebral Column 715
Atypical Cervical Vertebrae 716
The Skull 719
The Mandible 738
The Hyoid Bone 741

Joints of Head and Neck 743
The Atlanto-axial Joints 744
The Atlanto-occipital Joints 745

37. Scalp, Face, Parotid Region and Lacrimal Apparatus 748
The Scalp 748
The Face 751
Muscles of the Face 757
Parotid Gland 760
Vessels of the Face and Parotid Region 765
Lymph Nodes of Head and Neck 766
Nerves of the Face 766

38. Temporal and Infratemporal Regions 768
Temporal Region 768
Infratemporal Fossa 769
Muscles of Mastication 772
The Temporomandibular Joint 776

39. Submandibular Region and Tongue 779
The Submandibular Gland 779
The Sublingual Gland 781
Suprahyoid Muscles 783
The Tongue 784
Muscles of the Tongue 787
Blood Vessels, Lymphatics, and Nerves of the Tongue 787

40. Cranial Cavity and Vertebral Canal 795
The Cranial Cavity 795
The Meninges 796
Nerves and Arteries in the Cranial Cavity 803
The Spinal Cord 807

41. Muscles of the Neck, Triangles of the Neck, Deep Cervical Fascia and Lymph Nodes 813
Muscles of the Neck 813
The Platysma 813
The Sternomastoid and Trapezius 813
Infrahyoid Muscles 813
The Lateral Vertebral Muscles 814
Anterior Vertebral Muscles (Prevertebral Muscles) 815
Deep Muscles of the Back 815
Triangles of the Neck 821
The Posterior Triangle 823
Subdivisions of the Anterior Triangle 824
Suboccipital Triangle 826
Deep Cervical Fascia 827
Investing Layer 827
Pretracheal Fascia 828
Prevertebral Fascia 828
Carotid Sheath 828
Lymph Nodes of Head and Neck 829

42. Blood Vessels of Head and Neck **833**
Arteries 833
The Common Carotid Arteries 833
Internal Carotid Artery 834
The External Carotid Arteries 838
The Subclavian Arteries 847
Veins 854
The Internal Jugular Veins 854
The Subclavian Veins 855
The Intracranial Venous Sinuses 855
Tributaries of Internal Jugular Veins in the Neck 860
Other Veins of the Head and Neck 861

43. Nerves of the Head and Neck **868**
Cervical Nerves 868
The Cervical Plexus and its Branches 870
The Cranial Nerves 874
Types of Fibres in Peripheral Nerves 875
Cranial Nerve Nuclei 879
The Olfactory Nerves 883
The Optic Nerve 884
The Oculomotor Nerve 887
The Trochlear Nerve 891
The Abducent Nerve 891
The Trigeminal Nerve 893
The Ophthalmic Nerve 895
The Maxillary Nerve 898
The Facial Nerve 908
The Vestibulocochlear Nerve 916
The Glossopharyngeal Nerve 918
The Vagus Nerve 923
The Accessory Nerve 927
The Hypoglossal Nerve 929
Cervical Part of Sympathetic Trunk 931

44. Orbit, Eye and Ear **935**
The Orbit 935
Contents of the Orbit 935
Muscles of the Orbit 935
The Lacrimal Gland 939
Nerves and Vessels of Orbit 940
The Eyeball 943
The Ear and Some Related Structures 953
The Auricle 955
External Acoustic Meatus 956
The Middle Ear 957
The Internal Ear 969

45. Oral Cavity, Nasal Cavity, Pharynx, Larynx, Trachea and Oesophagus **976**
The Oral Cavity and Some Related Structures 976
The Oral Cavity 976
The Palate 978

Muscles of the Soft Palate 978
The Teeth 981
The Nasal Cavities and Paranasal Sinuses 984
The Paranasal Sinuses 988
The Pharynx 991
Muscles of the Pharynx 994
The Palatine Tonsils 996
The Larynx 998
Interior of the Larynx 1000
Muscles of the Larynx 1002
The Trachea 1005
The Oesophagus 1006

46. Endocrine Glands of the Head and Neck, Carotid Sinus and Carotid Body 1007
The Hypophysis Cerebri 1007
The Pineal Body 1013
The Thyroid Gland 1014
The Parathyroid Glands 1019
The Carotid Sinus 1020
The Carotid Bodies and Paraganglia 1021

47. Surface Marking and Radiological Anatomy of Head and Neck 1022
Surface Marking 1022
Surface Marking of Some Viscera 1022
Paranasal Sinuses 1023
Arteries 1023
Veins 1025
Intracranial Venous Sinuses 1025
Nerves 1026
Radiological Anatomy 1028

PART 6: CENTRAL NERVOUS SYSTEM

48. Introduction to Central Nervous System and Internal Structure of Spinal Cord 1033
Introduction to the Central Nervous System 1033
Internal Structure of Spinal Cord 1037

49. Gross Anatomy of Brain 1040
Gross Anatomy of the Brainstem 1040
Preliminary Review of the Internal Structure of the Brainstem 1043
Gross Anatomy of the Cerebellum 1048
Gross Anatomy of the Cerebral Hemispheres 1051
An Introduction to Some Structures within the Cerebral Hemispheres 1059
Important Functional Areas of the Cerebral Cortex 1061
White Matter of Cerebral Hemispheres 1063

50. Tracts of Spinal Cord and Brainstem; and Cerebellar Connections 1066
Tracts of Spinal Cord and Brainstem 1066
Descending Tracts Ending in the Spinal Cord 1066
Descending Tracts Ending in the Brainstem 1071
Ascending Tracts 1072

Connections of the Cerebellum 1078
Cerebellar Peduncles 1078

51. Internal Structure of Brainstem 1084
The Medulla 1084
The Pons 1089
The Midbrain 1091

52. Diencephalon, Basal Ganglia, Olfactory Region and Limbic System 1096
The Diencephalon 1096
The Thalamus 1096
The Hypothalamus 1100
The Metathalamus 1105
The Epithalamus 1105
The Subthalamic Region 1106
The Basal Ganglia 1106
The Olfactory Region and Limbic System 1109
The Olfactory Region 1109
The Olfactory Pathway 1110
The Limbic System 1111

53. Internal Capsule Commissures 1116
The Internal Capsule 1116
Commissures of the Brain 1119

54. Pathways for Special Senses 1120
Visual Pathway 1120
Pathway for Hearing 1124
Pathways for Taste 1126
Pathways for Smell 1126

55. Ventricles of the Brain and Cerebrospinal Fluid 1127
The Lateral Ventricles 1127
The Third Ventricle 1129
The Fourth Ventricle 1131
The Cerebrospinal Fluid 1134

56. Blood Supply of the Brain and Some Investigative Procedures for Neurological Diagnosis 1137
Arteries that Supply the Brain 1137
Arterial Supply of the Cerebral Cortex 1141
Arteries Supplying the Interior of the Cerebral Hemisphere 1143
Venous Drainage of the Brain 1146

Index 1153