Contents

Preface to the Fourth Edition

v

GENERAL ANATOMY	Page No.	Signature
Language of Anatomy	2	
Skeleton	12	
Joints	18	
Muscles	22	
Blood Vessels	26	
Lymphatic System	29	
Nervous System	31	
Skin and Fasciae	35	
UPPER LIMB	,	
Bones	40	
Pectoral Region	43	
Axilla	46	
Back	48	
Scapular Region	51	
Arm	56	
Forearm and Hand	60	
Joints	74	
THORAX	'	
Bones	82	
Wall of Thorax	86	
Pleura	89	
Lung	90	
Mediastinum	93	
Pericardium and Heart	94	
Oesophagus and Thoracic Duct	99	
LOWER LIMB	1	
Bones	104	
Front of Thigh	107	

	Page No.	Signature
Anterior Triangle of Neck	215	
Parotid Region	217	
Temporal and Infratemporal Regions	219	
Submandibular Region	223	
Structures in the Neck	226	
Prevertebral and Paravertebral Regions	230	
Back of Neck	233	
Contents of Vertebral Canal	234	
Cranial Cavity	235	
Contents of the Orbit	237	
Mouth and Pharynx	239	
Nose and Paranasal Sinuses	242	
Larynx	245	
Tongue	246	
Ear	248	
Eyeball	250	
Muscles	252	
BRAIN		
Meninges of the Brain and Cerebrospinal Fluid	258	
Spinal Cord	260	
Cranial Nerves	263	
Brainstem	273	
Cerebellum	277	
Fourth Ventricle	279	
Cerebrum	281	
Third and Lateral Ventricles of Brain	286	
Blood Supply of Spinal Cord and Brain	289	

Index of Competencies

Competency Number	CORE (Y/N)	Practical Competencies Covered	Page No.
AN 1.1		Anatomical Terminology Demonstrate normal anatomical position, various planes, relation, comparison, laterality and movement in our body	2
AN 1.2		Describe composition of bone and bone marrow	12
AN 2.1 AN 2.4 AN 2.5		General Features of Bones and Joints Describe parts, blood and nerve supply of a long bone Describe various types of cartilage with its structure and distribution in body Describe various joints with subtypes and examples	14 16 18
AN 3.1 AN 3.2		General Features of Muscle Classify muscle tissue according to structure and action Enumerate parts of skeletal muscle and differentiate between tendons and aponeuroses with examples	24 22
AN 4.2 AN 4.4		General Features of Skin and Fascia Describe structure and function of skin with its appendages Describe modifications of deep fascia with its functions	35 35
AN 5.2 AN 5.3 AN 5.4 AN 5.6		General Features of the Cardiovascular System Differentiate between pulmonary and systemic circulation List general differences between arteries and veins Explain functional difference between elastic, muscular arteries and arterioles Describe the concept of anastomoses and collateral circulation with significance of	26 27 26
AN 5.8		end-arteries Define thrombosis, infarction and aneurysm	28 28
AN 6.1 AN 6.2		General Features of Lymphatic System List the components and functions of the lymphatic system Describe structure of lymph capillaries and mechanism of lymph circulation	29 29
AN 7.2 AN 7.3		Introduction to the Nervous System List components of nervous tissue and their functions Describe parts of a neurone and classify them based on number of neurites, size and function	31 31
AN 8.1 AN 8.2 AN 8.3		Features of Individual Bones (Upper Limb) Identify the given bone, its side, important features and keep it in anatomical position Identify and describe joints formed by the given bone Demonstrate important muscle attachment on the given bone	40 40, 74 40
AN 9.2		Pectoral Region Breast: Describe the location, extent, deep relations, structure, age changes, blood supply, lymphatic drainage, microanatomy and applied anatomy of breast	43
AN 10.1 AN 10.3		Axilla, Shoulder and Scapular Region Identify and describe boundaries and contents of axilla Describe, identify and demonstrate formation, branches, relations, area of supply of branches, course and relations of terminal branches of brachial plexus	46 47

Competency Number	CORE (Y/N)	Practical Competencies Covered	Page No.
AN 10.4		Describe the anatomical groups of axillary lymph nodes and specify their areas of	
A D. I. d. O. C.		drainage	43
AN 10.6		Explain the anatomical basis of clinical features of Erb's palsy and Klumpke's paralysis	48
AN 10.7		Explain anatomical basis of enlarged axillary lymph nodes	44
AN 10.8		Describe, identify and demonstrate the position, attachment, nerve supply and	
A NT 40 40		actions of trapezius and latissimus dorsi	48
AN 10.12		Describe and demonstrate shoulder joint for type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements, muscles involved, blood	
		supply, nerve supply and applied anatomy	75
AN 10.13		Explain anatomical basis of injury to axillary nerve during intramuscular injections	52
		Arm and Cubital Fossa	
AN 11.1		Describe and demonstrate muscle groups of upper arm with emphasis on biceps	
437446		and triceps brachii	56
AN 11.2		Identify and describe origin, course, relations, branches (or tributaries), termination of important nerves and vessels in arm	56
AN 11.5		Identify and describe boundaries and contents of cubital fossa	58
AN 11.6		Describe the anastomosis around the elbow joint	57
		Forearm and Hand	
AN 12.1		Describe and demonstrate important muscle groups of ventral forearm with	
		attachments, nerve supply and actions	60
AN 12.2		Identify and describe origin, course, relations, branches (or tributaries), termination	60
AN 12.3		of important nerves and vessels of forearm Identify and describe flexor retinaculum with its attachments	60 66
AN 12.4		Explain anatomical basis of carpal tunnel syndrome	72
AN 12.5		Identify and describe small muscles of hand. Also describe movements of thumb and	
A 3-1 4 2 0		muscles involved	67
AN 12.8 AN 12.11		Describe anatomical basis of claw hand Identify, describe and demonstrate important muscle groups of dorsal forearm with	72
7111 12.11		attachments, nerve supply and actions	71
AN 12.14		Identify and describe compartments deep to extensor retinaculum	70
		Features of Joints	
AN 13.2		Describe dermatomes of upper limb	55
AN 13.3		Identify and describe the type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements, blood and nerve supply of elbow joint,	
		proximal and distal radioulnar joints, wrist joint and first carpometacarpal joint	76
AN 13.4		Describe sternoclavicular joint, acromioclavicular joint, carpometacarpal joints and	
		metacarpophalangeal joint	77
		General Features of Bones	
AN 14.1		Identify the given bone, its side, important features and keep it in anatomical position	104
AN 14.3		Describe the importance of ossification of lower end of femur and upper end of tibia	115
AN 14.4		Identify and name various bones in the articulated foot with individual muscle attachment	124
			124
AN 15.1		Front and Medial Side of Thigh Describe and demonstrate origin, course relations, branches (or tributaries)	
A11 13.1		Describe and demonstrate origin, course, relations, branches (or tributaries), termination of important nerves and vessels of anterior thigh	108
AN 15.2		Describe and demonstrate major muscles with their attachment, nerve supply and	
		actions	108
		Describe and demonstrate major muscles with their attachment, nerve supply and actions	
AN 15.2			
			107
AN 15.2 AN 15.3 AN 15.4		Describe and demonstrate boundaries, floor, roof and contents of femoral triangle Explain anatomical basis of psoas abscess and femoral hernia	107 109

Competency Number	CORE (Y/N)	Practical Competencies Covered	Page No.
		Gluteal Region and Back of Thigh	
AN 16.1		Describe and demonstrate origin, course, relations, branches (or tributaries),	
2114 10.1		termination of important nerves and vessels of gluteal region	112, 115
A NI 16 O		•	
AN 16.2		Describe anatomical basis of sciatic nerve injury during gluteal intramuscular injections	115
AN 16.3		Explain the anatomical basis of Trendelenburg sign	115
AN 16.4		Describe and demonstrate the hamstrings group of muscles with their attachment,	110
ANIACE		nerve supply and actions	119
AN 16.5		Describe and demonstrate the origin, course, relations, branches (or tributaries),	110
ANIACC		termination of important nerves and vessels on the back of thigh	119
AN 16.6		Describe and demonstrate the boundaries, roof, floor, contents and relations of	11/
		popliteal fossa	116
		Hip Joint	
AN 17.1		Describe and demonstrate the type, articular surfaces, capsule, synovial membrane,	
		ligaments, relations, movements and muscles involved, blood and nerve supply,	
		bursae around the hip joint	135
AN 17.2		Describe anatomical basis of complications of fracture neck of femur	140
		-	
		Knee Joint, Anterior Compartment of Leg and Dorsum of Foot	
AN 18.1		Describe and demonstrate major muscles of anterior compartment of leg with their	
		attachment, nerve supply and actions	122, 125
AN 18.2		Describe and demonstrate origin, course, relations, branches (or tributaries),	
		termination of important nerves and vessels of anterior compartment of leg	122, 126
AN 18.3		Explain the anatomical basis of footdrop	126
AN 18.4		Describe and demonstrate the type, articular surfaces, capsule, synovial membrane,	
		ligaments, relations, movements and muscles involved, blood and nerve supply,	
		bursae around the knee joint	136
AN 18.5		Explain the anatomical basis of locking and unlocking of the knee joint	141
AN 18.6		Describe knee joint injuries with its applied anatomy	141
		Back of Leg and Sole	
AN 19.1			
AIN 19.1		Describe and demonstrate the major muscles of back of leg with their attachment, nerve supply and actions	130
AN 19.2		Describe and demonstrate the origin, course, relations, branches (or tributaries),	150
AIN 19.2			132
A NI 10 2		termination of important nerves and vessels of back of leg Explain the concept of "Peripheral heart"	
AN 19.3			134
AN 19.5		Describe factors maintaining importance arches of the foot with its importance	139
AN 19.6		Explain the anatomical basis of flat foot and club foot	142
		General Features, Joints, Radiographs and Surface Marking	
AN 20.1		Describe and demonstrate the type, articular surfaces, capsule, synovial membrane,	
		ligaments, relations, movements and muscles involved, blood and nerve supply of	
		tibiofibular and ankle joint	137
AN 20.2		Describe the subtalar and transverse tarsal joints	138
AN 20.3		Describe and demonstrate fascia lata, venous drainage, lymphatic drainage,	
		retinacula and dermatomes of lower limb	134
AN 20.5		Explain anatomical basis of varicose veins and deep vein thrombosis	142
		The arms in Course	
		Thoracic Cage	
AN 21.1		Identify and describe the salient features of sternum, typical rib, 1st rib and typical	
		thoracic vertebra	82
AN 21.2		Identify and describe the features of 2nd, 11th and 12th ribs, 1st, 11th and 12th	
		thoracic vertebrae	82
AN 21.4		Describe and demonstrate extent, attachments, direction of fibres, nerve supply and	
		actions of intercostal muscles	86
AN 21.5		Describe and demonstrate origin, course, relations and branches of a typical	-
		intercostal nerve	87
	1	THE TEORET HET VE	07

Competency Number	CORE (Y/N)	Practical Competencies Covered	Page No.
AN 21.6		Mention origin, course and branches/tributaries of: (1) Anterior and posterior intercostal vessels, (2) internal thoracic vessels	87
AN 21.9		Describe and demonstrate mechanics and types of respiration	84
AN 21.11		Mention boundaries and contents of the superior, anterior, middle and	
		posterior mediastinum	93
		Heart and Pericardium	
AN 22.1		Describe and demonstrate subdivisions, sinuses in pericardium, blood supply and	0.4
ANI 22 2		nerve supply of pericardium	94 95
AN 22.2 AN 22.3		Describe and demonstrate external and internal features of each chamber of heart Describe and demonstrate origin, course and branches of coronary arteries	93 97
AN 22.4		Describe and denoishate origin, course and branches of coronary arteries Describe anatomical basis of ischaemic heart disease	101
AN 22.5		Describe and demonstrate the formation, course, tributaries and termination of	101
		coronary sinus	97
		Mediastinum	
AN 23.2		Describe and demonstrate the extent, relations, tributaries of thoracic duct and	
		enumerate its applied anatomy	99
AN 23.3		Describe and demonstrate origin, course, relations, tributaries and termination	
		of superior vena cava, azygos, hemiazygos and accessory hemiazygos veins	87
AN 23.4		Mention the extent, branches and relations of arch of aorta and descending thoracic aorta	87
		Lungs and Trachea	
AN 24.1		Mention the blood supply, lymphatic drainage and nerve supply of pleura, extent	00
ANI 04 0		of pleura and describe the pleural recesses and their applied anatomy	89
AN 24.2		Identify side, external features and relations of structures which form root of lung and bronchial tree and their clinical correlate	91
AN 24.3		Describe a bronchopulmonary segment	91
AN 24.6		Describe the extent, length, relations, blood supply, lymphatic drainage and nerve	71
1111 2110		supply of trachea	90
		Skull Osteology	
AN 26.1		Demonstrate anatomical position of skull, identify and locate individual skull	
		bones in skull	196
AN 26.2		Describe the features of norma frontalis, verticalis, occipitalis, lateralis and basalis	196
AN 26.3		Describe cranial cavity, its subdivisions, foramina and structures passing through them	199
AN 26.4 AN 26.5		Describe morphological features of mandible	199 203
AN 26.7		Describe features of typical and atypical cervical vertebrae (atlas and axis) Describe the features of the 7th cervical vertebra	205
AIN 20.7			203
A NI 07 1		Scalp Describe the layers of scalp, its blood supply, news supply and supply and supply importance.	104
AN 27.1 AN 27.2		Describe the layers of scalp, its blood supply, nerve supply and surgical importance Describe emissary veins with its role in spread of infection from extracranial route	106
AIN 27.2		to intracranial venous sinuses	207
		Face and Parotid Region	
AN 28.1		Describe and demonstrate muscles of facial expression and their nerve supply	208
AN 28.2		Describe sensory innervation of face	207
AN 28.3		Describe and demonstrate origin/formation, course, branches/tributaries of facial vessels	209
AN 28.4		Describe and demonstrate branches of facial nerve with distribution	210
AN 28.6		Identify superficial muscles of face, their nerve supply and actions	208
AN 28.7		Explain the anatomical basis of facial nerve palsy	211
AN 28.8		Explain surgical importance of deep facial vein	211
AN 28.9		Describe and demonstrate the parts, borders, surfaces, contents, relations and	217
AN 28.10		nerve supply of parotid gland with course of its duct and surgical importance Explain the anatomical basis of Frey's syndrome	217
		Side of Neck	
		Explain anatomical basis of wry neck	214

Competency Number	CORE (Y/N)	Practical Competencies Covered	Page No.
		Orbit	
AN 31.1		Describe and identify extraocular muscles of eyeball	237
AN 31.3		Describe anatomical basis of Horner's syndrome	229
AN 31.4		Enumerate components of lacrimal apparatus	210
		Anterior Triangle	
AN 32.1		Describe boundaries and subdivisions of anterior triangle	215
AN 32.2		Describe and demonstrate boundaries and contents of muscular, carotid,	
		digastric and submental triangles	215
		Temporal and Infratemporal Regions	
AN 33.1		Describe and demonstrate extent, boundaries and contents of temporal and	
		infratemporal fossae	219
AN 33.2		Describe and demonstrate attachments, direction of fibres, nerve supply and	
4 NT 00 0		actions of muscles of mastication	220
AN 33.3		Describe and demonstrate articulating surfaces, type and movements of temporomandibular joint	220
AN 33.4		Explain the clinical significance of pterygoid venous plexus	222
AN 33.5		Describe the features of dislocation of temporomandibular joint	222
		Submandibular Region	
AN 34.1		Describe and demonstrate the morphology, relations and nerve supply of	
AIN 34.1		submandibular salivary gland and submandibular ganglion	224
AN 34.3		Describe the basis of formation of submandibular stones	225
		Deep Structures in the Neck	
AN 35.2		Describe and demonstrate location, parts, borders, surfaces, relations and blood	
111 00.2		supply of thyroid gland	226
AN 35.5		Describe and demonstrate extent, drainage and applied anatomy of cervical lymph	
		nodes	228
AN 35.6		Describe and demonstrate the extent, formation, relation and branches of cervical	
		sympathetic chain	227
AN 35.8		Describe the anatomically relevant clinical features of thyroid swellings	229
AN 35.9		Describe the clinical features of compression of subclavian artery and lower trunk	220
		of brachial plexus by cervical rib	229
		Mouth, Pharynx and Palate	
AN 36.2		Describe the (1) morphology, relations, blood supply and applied anatomy of	239
		palatine tonsil, (2) composition of soft palate	
AN 36.4		Describe the components and functions of Waldeyer's lymphatic ring	239
AN 36.7		Describe the clinical significance of Killian's dehiscence	241
		Cavity of Nose	
AN 37.1		Describe and demonstrate features of nasal septum, lateral wall of nose, their	
A 3.1 6 = 6		blood supply and nerve supply	242
AN 37.2		Describe location and functional anatomy of paranasal sinuses	242
AN 37.3		Describe anatomical basis of sinusitis and maxillary sinus tumours	242
		Larynx	
AN 38.1		Describe the morphology, identify structure of the wall, nerve supply, blood	0.45
ANICOC		supply and actions of intrinsic and extrinsic muscles of the larynx	245
AN 38.3		Describe anatomical basis of recurrent laryngeal nerve injury	245
		Tongue	
AN 39.1		Describe and demonstrate the morphology, nerve supply, embryological basis of	
		nerve supply, blood supply, lymphatic drainage and actions of extrinsic and	0.47
A NI 20 2		intrinsic muscles of tongue	246
AN 39.2		Explain the anatomical basis of hypoglossal nerve palsy	247

Competency Number	CORE (Y/N)	Practical Competencies Covered	Page No.
AN 40.1 AN 40.2		Organs of Hearing and Equilibrium Describe and identify the parts, blood supply and nerve supply of external ear Describe and demonstrate the boundaries, contents, relations and functional	248
AN 40.3		anatomy of middle ear and auditory tube Describe the features of internal ear	248 249
		Eyeball	
AN 41.1 AN 41.2		Describe and demonstrate parts and layers of eyeball Describe the anatomical aspects of cataract, glaucoma and central retinal artery occlusion	250 251
			231
AN 42.1 AN 42.2 AN 42.3		Back Region Describe the contents of the vertebral canal Describe and demonstrate the boundaries and contents of suboccipital triangle Describe the position, direction of fibres, relations, nerve supply, actions of	234 233
		semispinalis capitis and splenius capitis	233
		Head and Neck Joints	
AN 43.1		Describe and demonstrate the movements with muscles producing the movements of atlanto-occipital joint and atlantoaxial joint	231
		Anterior Abdominal Wall	
AN 44.1		Describe and demonstrate the planes (transpyloric, transtubercular, subcostal, lateral vertical, linea alba, linea semilunaris), regions and quadrants of abdomen	159
AN 44.3 AN 44.4		Describe the formation of rectus sheath and its contents Describe and demonstrate extent, boundaries, contents of inguinal canal including	151
A D T 44 F		Hesselbach's triangle	154
AN 44.5 AN 44.6		Explain the anatomical basis of inguinal hernia Describe and demonstrate attachments of muscles of anterior abdominal wall	156 150
		Male External Genitalia	
AN 46.1		Describe and demonstrate coverings, internal structure, side determination, blood	
		supply, nerve supply, lymphatic drainage and descent of testis with its applied	
AN 46.3		anatomy Describe penis under following headings (parts, components, blood supply and	155
ANI 46 4		lymphatic drainage)	157 158
AN 46.4 AN 46.5		Explain the anatomical basis of varicocele Explain the anatomical basis of phimosis and circumcision	158
		Abdominal Cavity	
AN 47.1		Describe and identify boundaries and recesses of lesser and greater sac	159
AN 47.2 AN 47.5		Name and identify various peritoneal folds and pouches with its explanation Describe and demonstrate major viscera of abdomen under following headings	159
		(anatomical position, external and internal features, important peritoneal and other relations, blood supply, nerve supply, lymphatic drainage and applied	162
AN 47.6		aspects) Explain the anatomical basis of splenic notch, accessory spleens, Kehr's sign, different types of vagotomy, liver biopsy (site of needle puncture), referred pain in cholecystitis, obstructive jaundice, referred pain around umbilicus, radiating pain	102
		of kidney to groin and lymphatic spread in carcinoma stomach	169
AN 47.7 AN 47.9		Mention the clinical importance of Calot's triangle Describe and identify the origin, course, important relations and branches of	168
		abdominal aorta, coeliac trunk, superior mesenteric, inferior mesenteric and	166 175
AN 47.10		common iliac artery Enumerate the sites of portosystemic anastomosis	166, 175 167
AN 47.10 AN 47.13		Describe and demonstrate the attachments, openings, nerve supply and action of	107
AN 47.14		the thoracoabdominal diaphragm	174
AIN 4/.14		Describe the abnormal openings of thoracoabdominal diaphragm and diaphragmatic hernia	174

Competency Number	CORE (Y/N)	Practical Competencies Covered	Page No.
AN 48.1 AN 48.4 AN 48.6		Pelvic Wall and Viscera Describe and demonstrate the (position, features, important peritoneal and other relations, blood supply, nerve supply, lymphatic drainage and clinical aspects) important male and female pelvic viscera Describe the branches of sacral plexus Describe the neurological basis of automatic bladder	183 189 182
AN 49.2 AN 49.3 AN 49.4		Perineum Describe and identify perineal body Describe and demonstrate perineal membrane in male and female Describe and demonstrate boundaries, content and applied anatomy of ischiorectal fossa	177 177 177
AN 50.2		Vertebral Column Describe and demonstrate the type, articular end, ligaments and movements of intervertebral joints, sacroiliac joints and pubic symphysis	190
AN 53.3		Osteology Define true pelvis and false pelvis and demonstrate sex determination in male and female bony pelvis	149
AN 56.1 AN 56.2		Meninges and CSF Describe and identify various layers of meninges with its extent and modifications Describe circulation of CSF with its applied anatomy	258 259
AN 57.3 AN 57.4 AN 57.5		Spinal Cord Draw and label transverse section of spinal cord at midcervical and midthoracic level Enumerate ascending and descending tracts at midthoracic level of spinal cord Describe anatomical basis of syringomyelia	260 260 262
AN 58.1 AN 58.2 AN 58.4		Medulla Oblongata Identify external features of medulla oblongata Describe transverse section of medulla oblongata at the level of (1) pyramidal decussation, (2) sensory decussation (3) ION Describe anatomical basis and effects of medial and lateral medullary syndrome	273 273, 274 292
AN 59.1 AN 59.2		Pons Identify external features of pons Draw and label transverse section of pons at the upper and lower level	275 275
AN 60.1 AN 60.2		Cerebellum Describe and demonstrate external and internal features of cerebellum Describe connections of cerebellar cortex and intracerebellar nuclei	277 277
AN 61.1 AN 61.2 AN 61.3		Midbrain Identify external and internal features of midbrain Describe internal features of midbrain at the level of superior and inferior colliculus Describe anatomical basis and effects of Benedikt's and Weber's syndrome	276 276 292
AN 62.1 AN 62.2		Cranial Nerve Nuclei and Cerebral Hemispheres Enumerate cranial nerve nuclei with its functional component Describe and demonstrate surfaces, sulci, gyri, poles, and functional areas of cerebral hemisphere	263 281, 283
AN 62.5 AN 62.6		Describe boundaries, parts, gross relations, major nuclei and connections of dorsal thalamus, hypothalamus, epithalamus, metathalamus and subthalamus Describe and identify formation, branches and major areas of distribution of circle of Willis	284 285, 290
AN 63.1		Ventricular System Describe and demonstrate parts, boundaries and features of III, IV and lateral ventricles	279, 286