Institute of Anatomy, First Faculty of Medicine, Charles University

The questions for the final examination in anatomy as quadruplets for first-year students of general medicine

Each question covers both microscopic and macroscopic aspects of organ structure, its syntopy, vascular supply, innervation and lymphatics; also its development including the most frequent birth defects; concerning the muscles, it is necessary to know their beginning, attachment, innervation and function. In topographic anatomy questions it is necessary to first define the region (borders), including palpable structures, specify the nature of the skin that covers it, and any special features of the subcutaneous tissue. Only then you should proceed to the fascias, groups of muscles and course of the main neurovascular bundles.

1. Structure and types of bones, innervation and blood supply of the bone (draw a scheme)
   Salivary glands – structure, syntopy, innervation
   Mesencephalon (midbrain) - grey and white matter, draw cross a section
   Heart development and its common birth defects

2. Osteogenesis, ossification, remodeling and growth of bones
   Lesser sac (omental bursa), its recesses (draw a scheme)
   Auditory pathway
   Arteries of the upper limb - course, syntopy, branches

3. Connections of bones, structure and types of joints
   Stomach – structure of the wall, divisions, vascular supply, innervation, lymphatic drainage
   Neurotransmitters in the CNS, main brain chemical systems
   Vascular development, structure of the arteries, veins, lymphatic vessels, collateral circulation

4. The osseous nasal cavity, relations to neighboring structures
   Liver – structure, nutritional and portal vascular bed, intrahepatic bile ducts
   Neural tube development and its differentiation, defects of neural tube closure
   Coronary arteries, cardiac veins and nerves of the heart, coronarography

5. Bony orbit - walls, contents, relation to neighboring structures, passages
   Gallbladder and extrahepatic bile ducts (draw a scheme)
   Main functional areas of the cerebral cortex
   Heart – description, prenatal and postnatal circulation

6. Skull, skull of the neonate and its development
   Duodenum – divisions, positions, syntopy (draw a scheme), blood supply
   Floor of the rhomboid fossa and cranial nerves nuclei (draw a scheme)
   Cardiac wall arrangement, cardiac skeleton, chambers (draw a section through the ventricles)

7. Vertebrae, vertebral column and its development, connections, curvatures and motility
   Pharynx –structure, syntopy, its muscles, blood supply, innervation
   Cerebellum – structure, subdivision and functional organization, nuclei and afferent connections
   Portal vein – tributaries, portocaval (portosystemic) anastomoses

8. Craniovertebral connections
   Lungs – description, syntopy, bronchopulmonary segments
   Retina – structure, vascular supply (draw a scheme of the eye fundus)
   Hypophysis – development, structure of adeno- and neurohypophysis, function, syntopy

9. Skeleton of the thorax and its development, connections and mobility of the ribs
   Uterine (Fallopian) tube – structure, divisions, position, vascular supply, anatomical basis of infertility, extrauterine gravidity, IVF
   Spinal cord segments, positional changes of cord (vertebromedullar topography), cauda equina
   Suprarenal gland – structure and developmental origin of cortex and medulla, function, syntopy (draw a scheme), blood supply, function

10. Temporomandibular joint – structure and mobility
    Development and congenital malformations of the reproductive system
    Diencephalon – structure, subdivision and functional organization
    Mamma – description and structure, blood supply and innervation, lymphatics

11. Development and growth of the limbs, its molecular mechanisms, congenital limb defects
    Pancreas – structure, Langerhans islets, syntopy
    Corticospinal (pyramidal) and corticonuclear tract
    Lymph nodes and collectors of the head and neck

12. Shoulder joint – structure and movements
    Testis and epididymis – structure, division, blood supply, innervation, lymphatics
    Facial nerve, its central and peripheral palsy
    Lymph node – structure and functional zones, sentinel lymph node, lymphatic tissue in organs (MALT, BALT), main lymphatic ducts

13. Elbow joint – structure and movements
    Palate development, cleft defects
    Spinal cord – structure of the grey and white matter (draw a scheme of a cross section)
    External and internal iliac artery

14. Axilla – boundaries, content
    Foregut – its development, derivatives, defects
    Cervical and thoracic sympathetic system
    Endocardium, cardiac valves – structure and function, auscultation points, cardiac skeleton (draw a scheme)

15. Brachial region (draw a transverse section)
    Structure of the kidney – envelopes, cortex, medulla; nephron
    Thalamus – nuclei, afferent and efferent connections of the main nuclei, their function
    Thymus – structure, position and syntopy, function

16. Cubital region
    Paranasal sinuses and their syntopy and development
    Visual pathway and visual cortical areas
    Projections of abdominal organs onto abdominal wall

17. Antebrachial region (draw a transverse section)
    Midgut – its development, derivatives, defects
    Lens – structure and attachment, accommodation; development of the eye
    Internal jugular vein – course and tributaries

18. Topographic anatomy of the hand (draw a transverse section through the palm) and fingers
    Hindgut – its development, derivatives, defects
    Lemniscal system (dorsal column tract), proprioceptive and tactile sensation, sensory loss in spinal cord lesions
    External carotid artery – course, syntopy, branches

19. Gluteal region
    Larynx - cartilages, ligaments, joints, muscles (draw a frontal section)
    Bony and membranous labyrinth (draw cross section of the bony cochlea and the cochlear duct)
    Vestibulocochlear nerve, nystagmus
    Topography of the peritoneal cavity – supra- and inframesocolic part (draw a transverse section through the lesser sac)

20. Femoral triangle, iliopectineal fossa (draw a scheme)
    Microscopic structure of teeth and their development
    Ventricular system of the brain (draw a scheme), circulation of liquor, hydrocephaly
    Lymph nodes and collectors of stomach, liver and pancreas

21. Popliteal fossa, adductor canal
    Small intestine – divisions, positions, syntopy, blood supply
    Neural crest cells and their differentiation
    Common carotid artery, internal carotid artery

22. Leg region (draw a transverse section)
    Development and congenital malformations of the urinary system
    Hypothalamus – subdivisions, connections and function
    Subclavian artery – course, syntopy, branches

23. Medial and lateral retromalleolar region
    Tongue, structure, intra- and extraglossal muscles, vascular supply, innervation, lymphatics
    Basal ganglia, their connections and function, parkinsonism
    Eyelids, conjunctiva, lacrimal apparatus

24. Topography of the foot (draw a transverse section)
    Peritoneum - parietal and visceral, greater and lesser omentum, attachment of the viscera
    Medulla oblongata and pons – grey and white matter, draw cross sections
    Spleen – structure, position, syntopy, vascular supply

25. Bones and joints of the hand including reading of X-ray images
    Internal structure of the lungs – alveoli and their microscopic structure, surfactant, development and maturation of the lungs
    White matter of the hemispheres - association and commissural fibers, internal capsule (draw a scheme of tracts in the internal capsule)
    Abdominal aorta, position, topographic relations, parietal and visceral branches

26. Bony pelvis as a complex, connections, passages, diameters, planes, sexual dimorphism
    Bronchi, bronchial tree – structure, lobar and segmental bronchi, syntopy
    Anatomical background of hypothalamohypophyseal regulation
    Azygos and hemiazygos vein, vertebral venous plexuses

27. Hip joint – structure, movements, developmental dysplasia of the hip (DDH)
    Trachea – description, structure, syntopy (draw a scheme), tracheotomy
    Reticular formation – connections, function
    Topography of the duodenum and pancreas (draw a scheme)

28. Knee joint - structure, biomechanics and movements
    Pharyngeal, palatine and lingual tonsils (Waldeyer's circuit)
    Intrinsic and efferent connections of the cerebellum and their function
    Development of the eye

29. Talocrural and subtalar joint – structure, movements
    Conducting system of the heart – structure and function
    Cornea, sclera and vitreous body, corneal reflex
    Inferior vena cava – course and tributaries, cavocaval anastomoses

30. Bones and joints of the foot including reading of X-ray images, plantar arches and their support
    Rectum and the anal canal – structure, syntopy (draw frontal and sagittal section), vascular supply, lymphatics, sphincters and their innervation
    Third division of the trigeminal nerve
    Thyroid and parathyroid glands – structure, function, topography, blood supply, function

31. Inguinal region, inguinal canal, hernias
    General anatomy (macro and micro) of the gut tube
    Anterolateral system of sensory spinal tracts – (spinothalamic, spinoreticular and spinotectal tracts), pain pathways
    Iris, ciliary body, choroidea, pupillary light reflex

32. Pelvic floor muscles, ischioanal fossa (draw a frontal section of pelvis), perineal region
    Scrotum and envelopes of testis, descent of testis and its defects
    Meninges, vascular supply of the spinal cord, lumbar puncture (spinal tap)
    Heart position and projection, X-ray (draw scheme of radiogram), auscultation points

33. Topography of the vertebral canal, anatomical backgrounds of the spinal tap (lumbar puncture) and epidural anesthesia
    Prostate – structure, topographic relations, prostatic urethra, ejaculatory ducts
    Olfactory and gustatory pathway, olfactory nerve
    Lymph nodes and collectors of the upper and lower limb

34. Topography of the abdominal wall, rectus abdominis sheath (draw transverse sections above and below the umbilicus), blood supply, innervation, surgical approaches into abdominal cavity
    Renal calices, pelvis, ureter – syntopy
    Extraocular muscles
    Epicardium and pericardium – structure, syntopy, pericardial reflections around the roots of the great vessels, pericardial puncture (pericardiocentesis)

35. Topography of the chest wall (draw scheme of an intercostal space)
    Large intestine, structure, divisions (draw a scheme), syntopy, vascular supply, innervation, lymphatics, positions of the vermiform appendix and its projections on the abdominal wall
    Glossopharyngeal and vagus nerve
    Cranial veins, dural venous sinuses, cerebral veins

36. Submandibular triangle, carotid triangle (draw a scheme)
    Kidney – description, position, syntopy (draw a scheme), birth defects
    Sacral plexus and its branches
    Tympanic cavity, auditory ossicles, auditory tube

37. Lateral cervical region, scalene fissure
    Uterus – position, fixation, syntopy, birth defects
    Brain vessels and blood-brain barrier, brain dysfunction and damage due to specific vascular occlusion
    Skin – epidermis and dermis, skin types, skin receptors, skin appendages (hairs, nails, glands)

38. Superficial regions of the face
    External female genital organs, perineum
    Ventral and dorsal spinal nerve root, dorsal root ganglion, draw a general scheme of a spinal nerve and its branches, autonomic fibers in the spinal nerve
    Arteries of the lower limb - course, syntopy, branches

39. Infratemporal and pterygoplatine fossa
    Liver – segments, syntopy (draw a scheme of the visceral surface)
    Limbic system – connections and function (cortical areas, hippocampal formation, amygdalar complex)
    Lymph nodes and collectors of the vagina, uterus and ovaries

40. Layers of the scalp, frontal and temporal regions
    Uterus – shape and divisions, structure of the wall, endometrial cycle, vascular supply, lymphatics
    Cranial and sacral parasympathetic system
    Superficial and deep veins of the upper and lower limb, the perforators

41. Origin and development of muscles, molecular mechanisms
    Oesophagus – structure, syntopy
    Femoral nerve
    Eyeball (draw a horizontal section) - vascular supply, innervation, chambers, aqueous humor and its circulation

42. General features of the striated muscle, its auxiliary structures (motor end plate, motor unit, muscle spindle, Golgi tendon organ), motor and proprioceptive innervation
    Nasal cavity, choanae, vascular and nerve supply
    Oculomotor, trochlear, and abducens nerve
    Ascending aorta, aortic arch, thoracic aorta (course, syntopy, branches)

43. Muscles and fascias of the head
    Ovary – structure and position, ovarian cycle, vascular supply
    Segmental innervation, radicular areas, dermatomes, Head´s zones (zones of referred visceral pain), sensory receptors, peripheral nerve regeneration
    Superior vena cava, brachiocephalic veins, jugular veins

44. Muscles and fascias of the neck (draw a transverse section of the neck)
    Stomach – shape, position, syntopy, projections
    Abdominal and pelvic autonomic plexuses and ganglia, enteric nervous system
    External and internal base of the skull – openings for the vessels and nerves

45. Muscles and fascias of the chest, diaphragm – structure, passages, function, innervation, diaphragmatic hernias
    Primary and permanent dentition formula, eruption, types of occlusion
    Radial and axillary nerve and their palsy
    External acoustic meatus and tympanic membrane (draw an otoscopic view), paracentesis (myringotomy)

46. Muscles of the abdominal wall, fascias, function
    Macroscopic structure of the teeth, fixation, gingivodental junction, innervation and vascular supply
    Accessory and hypoglossal nerve
    Lymph nodes and collectors of the intestines, lymph nodes and collectors of testis

47. Inguinal region, inguinal canal (draw a scheme), inguinal hernias
    Male and female urethra – description, its parts, hypospadia
    First and second division of the trigeminal nerve, sensory trigeminal nuclei
    Lymph nodes and collectors of the thorax and the chest wall, lymphatic drainage of the lungs

48. Pelvic floor muscles, perineal muscles, ischioanal fossa, pelvic fascias (draw a frontal section of the pelvis)
    Larynx – position and syntopy, vascular and nerve supply (draw laryngoscopic view of the inlet)
    Lumbar plexus and its branches
    Projections of the heart, lungs and pleura onto thoracic wall, puncture of the thorax

49. Muscles and fascias of the back
    Soft and hard palate, muscles of the soft plate (draw a scheme), isthmus of the fauces
    Infraclavicular portion of the brachial plexus (draw a scheme), upper limb innervation
    Mediastinum – division, borders (draw a transverse section)

50. Muscles of the shoulder girdle, fascias, axillary fossa
    Vascular supply of the kidney, segments
    Overview of muscular and skin innervation of the lower limb
    Anatomical background for vessel puncture, pressure points, palpation

51. Muscles and fascias of the arm and forearm (draw transverse sections)
    Lungs – description, syntopy, borders and projection onto thoracic wall, vascular and nerve supply, lymphatics
    Sciatic nerve, paralysis of the common peroneal nerve
    Retroperitoneal space, topography of its organs including large vessels

52. Muscles and fascias of the hand (draw transverse section), tendon sheaths, carpal canal
    Urinary bladder – structure and position, fixation and syntopy in male and female (draw schemes)
    Skin and motor innervation of the head and neck
    Mechanics of respiration, pneumothorax

53. Muscles and fascias of the hip
    Pleura – visceral and parietal, structure, borders of pleura, pleural dome and recesses (draw a scheme), innervation
    Median and ulnar nerve and their palsy
    Topographic anatomy of the male pelvis (draw a sagittal section)

54. Muscles and fascias of the thigh, femoral triangle, popliteal fossa
    Vas (ductus) deferens, spermatic cord, seminal vesicles
    Cervical plexus, supraclavicular portion of the brachial plexus
    Topographic anatomy of the female pelvis (draw sagittal section), mechanism of continence

55. Muscles, fascias and compartments of the leg and foot (draw transverse sections)
    Penis – structure (draw a cross-section), vascular and nerve supply, lymphatics, mechanism of erection
    Corticospinal (pyramidal) and corticonuclear tract
    Heart development and its common birth defects

56. External and internal cranial base – openings for vessels and nerves
    Vagina – structure and syntopy (draw uterus and vagina in a sagittal section)
    Topography of the duodenum and pancreas (draw a scheme)
    Lemniscal system (dorsal column tract), proprioceptive and tactile sensation, sensory loss in spinal cord lesions