INI CET Anatomy

Sample Paper – 10

Duration: 45 Minutes **Maximum Marks: 50**

Instructions

- This paper contains **50** Multiple Choice Questions (Single Best Response), modelled on the Anatomy content of **INI CET** (Institutes of National Importance Combined Entrance Test) conducted by AIIMS New Delhi.
- Each correct answer carries **+1 mark**. There is **negative marking of one-third (0.33) mark** for every incorrect answer; unattempted questions carry no penalty.
- Every question has **exactly one best answer**. Choose the single most appropriate option.
- INI CET is a computer-based test taken in fixed 50-question blocks of **45 minutes** each; attempt this practice paper in one timed sitting of about **45 minutes**.
- Use of textbooks, mobile phones, and other electronic gadgets is strictly prohibited during the attempt.

Neuroanatomy

Q1. Which brainstem network, through its ascending activating system, is chiefly responsible for maintaining wakefulness, arousal and consciousness?

(A) Reticular formation

(B) Dentate nucleus

(C) Nucleus gracilis

(D) Mammillary body

Q2. The rubrospinal tract, arising from the red nucleus of the midbrain, facilitates the tone of which muscle group?

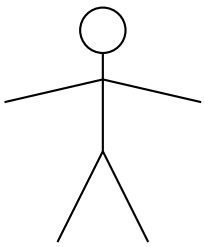
(A) Extensors of the lower limb

(B) Axial muscles of the trunk

(C) Extensors of the upper limb

(D) Flexors of the upper limb

Q3. A comatose patient shows sustained extension of both the upper and lower limbs, as sketched below. This decerebrate posture indicates a lesion located:



all four limbs held extended (decerebrate posture)

(A) Below the level of the red nucleus in the brainstem

(B) Above the red nucleus, within the cerebral hemispheres

(C) In the anterior horn of the lower spinal cord

(D) In the cerebellar vermis

Q4. A pineal region tumour compresses the tectal plate and causes paralysis of upward gaze (Parinaud syndrome). The pineal gland itself secretes which hormone?

(A) Thyroxine

(B) Melatonin

(C) Growth hormone

(D) Aldosterone

Q5. A stroke damaging the ventral posterolateral nucleus of the thalamus can produce Dejerine-Roussy (thalamic) syndrome, which is characterised by:

(A) Ipsilateral facial paralysis

(B) Bilateral sensorineural deafness

(C) Complete loss of the sense of smell

(D) Severe spontaneous pain over the contralateral half of the body

Q6. Which descending tract, arising from the pons and medulla, is chiefly concerned with posture and stereotyped automatic movements of the trunk and proximal limbs?

(A) Reticulospinal tract

(B) Lateral corticospinal tract

(C) Fasciculus cuneatus

(D) Anterior spinothalamic tract

Q7. The tectospinal tract, arising from the superior colliculus, mediates reflex turning of the head and neck in response to which type of stimulus?

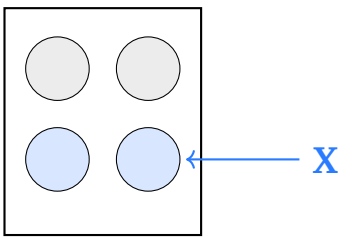
(A) Sudden visual stimuli

(B) Painful pinprick of the sole

(C) A fall in arterial blood pressure

(D) Vibration of a tuning fork on bone

Q8. In the dorsal view of the midbrain tectum below, the lower pair of swellings marked **X** (the inferior colliculi) serve as a relay station in which pathway?



dorsal midbrain (tectum)

(A) The visual reflex pathway

(B) The cardiac reflex pathway

(C) The auditory pathway

(D) The pain and temperature pathway

Q9. The afferent limb of the pupillary light reflex, after leaving the optic tract, relays in which midbrain nucleus before reaching the Edinger-Westphal nucleus?

(A) Red nucleus

(B) Pretectal nucleus

(C) Substantia nigra

(D) Trochlear nucleus

Head and Neck

Q10. The temporomandibular joint cavity is divided into upper and lower compartments by an articular disc. The gliding (translation) movement of the mandible occurs mainly in which compartment?

(A) The lower compartment, between the disc and the mandibular condyle

(B) The upper compartment, between the disc and the temporal bone

(C) Within the substance of the articular disc itself

(D) Entirely outside the fibrous joint capsule

Q11. The medial pterygoid, together with the masseter, forms a muscular sling around the angle of the mandible. Its principal action is to:

(A) Depress (open) the mandible

(B) Protrude the tongue

(C) Elevate (close) the mandible

(D) Tense the soft palate

Q12. Which fibres of the temporalis muscle are chiefly responsible for retraction (posterior pull) of the mandible?

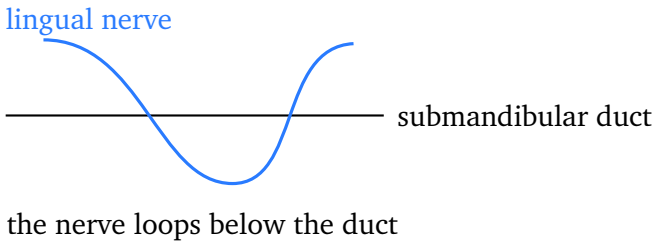
(A) The anterior, nearly vertical fibres

(B) The deep fibres of the masseter

(C) The superior head of the lateral pterygoid

(D) The posterior, nearly horizontal fibres

Q13. In the floor of the mouth the lingual nerve has a characteristic relation to the submandibular (Wharton's) duct, as sketched. The lingual nerve:



(A) Runs parallel to the duct and never crosses it

(B) Passes only above (superior to) the duct throughout its course

(C) Pierces the wall of the duct near its opening

(D) Loops below the duct, crossing it first laterally then medially

Q14. The sublingual gland, the smallest of the three paired major salivary glands, drains mainly by:

(A) A single long duct opening opposite the upper second molar

(B) The submandibular duct only

(C) Numerous small ducts opening directly on the floor of the mouth

(D) The parotid (Stensen's) duct

Q15. Besides general sensation from the anterior two-thirds of the tongue, the lingual nerve also conveys which additional fibres received from the chorda tympani?

(A) Motor fibres to the intrinsic muscles of the tongue

(B) Taste fibres and preganglionic parasympathetic secretomotor fibres

(C) Sympathetic vasomotor fibres only

(D) Proprioceptive fibres from the muscles of mastication

Q16. Most of the infrahyoid (strap) muscles are supplied by the ansa cervicalis, which is formed from the ventral rami of which spinal nerves?

(A) C1, C2 and C3

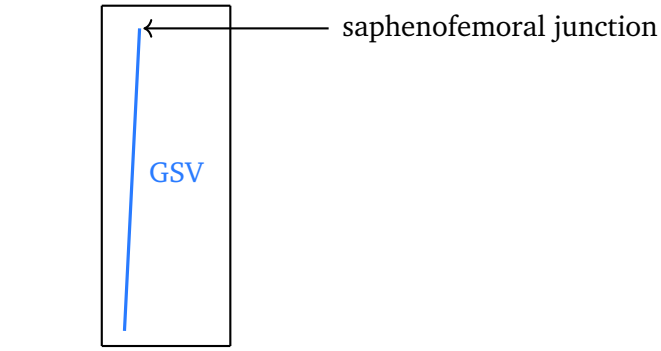
(B) C5 and C6

(C) The facial nerve alone

(D) C7, C8 and T1

Upper and Lower Limb

Q17. The great saphenous vein ascends on the medial side of the limb, as marked in the diagram, and ends by draining into the femoral vein. This saphenofemoral junction lies:



medial aspect of the limb

(A) In the femoral triangle, just below and lateral to the pubic tubercle

(B) Immediately behind the medial malleolus

(C) In the middle of the popliteal fossa

(D) At the level of the umbilicus

Q18. The small (short) saphenous vein passes behind the lateral malleolus and ascends the back of the leg to drain into which vein?

(A) The great saphenous vein at the ankle

(B) The popliteal vein in the popliteal fossa

(C) The femoral vein in the thigh

(D) The inferior vena cava directly

Q19. The great and small saphenous veins both take origin from which superficial venous network of the foot?

(A) The deep plantar venous plexus of the sole

(B) The dorsal venous arch on the dorsum of the foot

(C) The profunda femoris (deep femoral) vein

(D) The posterior tibial vein

Q20. Deep vein thrombosis most commonly begins in the deep veins of which region, from where a thrombus may embolise to the lungs?

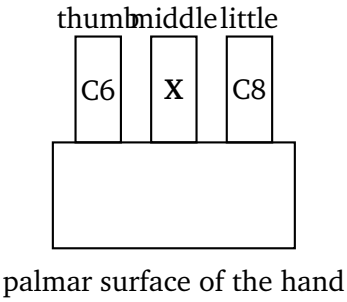
(A) The dorsal venous arch of the foot

(B) The superficial great saphenous vein

(C) The deep veins of the calf (soleal and posterior tibial veins)

(D) The cephalic vein of the arm

Q21. In the diagram of the hand, sensation over the tip of the middle finger (marked **X**) chiefly tests which dermatome?



palmar surface of the hand

(A) C6

(B) C8

(C) T1

(D) C7

Q22. Lymph from the skin of most of the lower limb, including the great saphenous territory, drains first to which group of lymph nodes?

(A) The popliteal nodes only

(B) The superficial inguinal nodes

(C) The deep inguinal (Cloquet) node only

(D) The para-aortic nodes

Q23. The valves of the perforator (communicating) veins of the lower limb normally direct the flow of blood:

(A) From the deep veins to the superficial veins

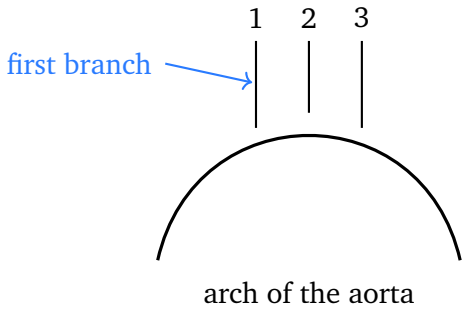
(B) From the superficial veins to the deep veins

(C) From the artery into the accompanying vein

(D) Distally, away from the heart

Thorax, Abdomen and Pelvis

Q24. The three branches of the arch of the aorta are numbered in order in the diagram. The first and largest branch (number 1) is the:



(A) Brachiocephalic trunk

(B) Left common carotid artery

(C) Left subclavian artery

(D) Right subclavian artery

Q25. The thoracic duct begins at the cisterna chyli, crosses to the left side at about the level of T5, and finally empties into the venous system at the:

(A) Right jugulo-subclavian junction

(B) Superior vena cava directly

(C) Junction of the left internal jugular and left subclavian veins

(D) Termination of the azygos vein

Q26. The azygos vein arches forward over the root of the right lung to drain into which vessel?

(A) Superior vena cava

(B) Inferior vena cava

(C) Left brachiocephalic vein

(D) Pulmonary trunk

Q27. The superior vena cava is formed behind the lower border of the right first costal cartilage by the union of:

(A) The azygos and hemiazygos veins

(B) The right internal jugular and right subclavian veins

(C) The right and left brachiocephalic (innominate) veins

(D) The two common iliac veins

Q28. The phrenic nerve, the sole motor supply to the diaphragm, arises chiefly from which spinal segments?

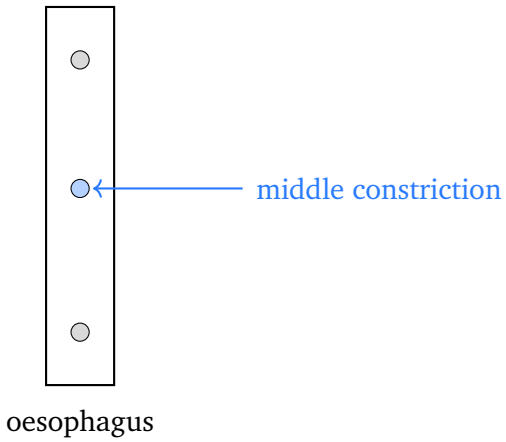
(A) C1 and C2

(B) T1 to T4

(C) L1 to L3

(D) C3, C4 and C5

Q29. The oesophagus shows three normal constrictions. The middle constriction, about 25 cm from the incisor teeth (arrowed in the diagram), is produced by the crossing of the:



(A) Cricopharyngeus muscle at its very beginning

(B) Diaphragmatic hiatus

(C) Arch of the aorta and the left main bronchus

(D) Left atrium of the heart

Q30. On the stomach, the anterior vagal trunk supplying the anterior surface is derived chiefly from the:

(A) Right vagus nerve

(B) Greater splanchnic nerve

(C) Left vagus nerve

(D) Phrenic nerve

Embryology

Q31. The limb buds first appear in the fourth week as outgrowths whose mesenchymal core is derived from:

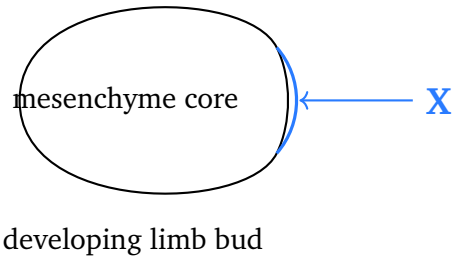
(A) Lateral plate (somatic) mesoderm

(B) Neural crest cells

(C) Endoderm of the yolk sac

(D) The notochord

Q32. In the developing limb bud shown, the thickened ectoderm capping its distal tip (marked **X**) is the apical ectodermal ridge. Its main role is to:



(A) Establish the dorsoventral axis of the limb

(B) Form the future melanocytes of the skin

(C) Set the anteroposterior (thumb-to-little-finger) axis

(D) Drive proximodistal outgrowth of the limb

Q33. The zone of polarizing activity, at the posterior margin of the limb bud, controls the anteroposterior (thumb-to-little-finger) axis by secreting:

(A) Sonic hedgehog (Shh)

(B) Insulin

(C) Thyroxine

(D) Pulmonary surfactant

Q34. The histological stages of lung development follow a fixed sequence. Which is the correct order?

(A) Canalicular $\rightarrow$ pseudoglandular $\rightarrow$ alveolar $\rightarrow$ saccular

(B) Alveolar $\rightarrow$ saccular $\rightarrow$ canalicular $\rightarrow$ pseudoglandular

(C) Pseudoglandular $\rightarrow$ canalicular $\rightarrow$ saccular $\rightarrow$ alveolar

(D) Saccular $\rightarrow$ alveolar $\rightarrow$ pseudoglandular $\rightarrow$ canalicular

Q35. A congenital diaphragmatic hernia most often occurs through a postero-lateral defect (foramen of Bochdalek) and is usually found on which side?

(A) The right side

(B) The left side

(C) Always exactly in the midline

(D) The anterior (retrosternal) region

Q36. The sclerotome portion of each somite differentiates chiefly to form which adult structures?

(A) The dermis of the skin of the back

(B) The skeletal muscle of the limbs

(C) The smooth muscle of the gut wall

(D) The vertebrae and ribs

Q37. The flat bones of the skull vault, such as the frontal and parietal bones, are formed by which type of ossification?

(A) Endochondral ossification within a hyaline cartilage model

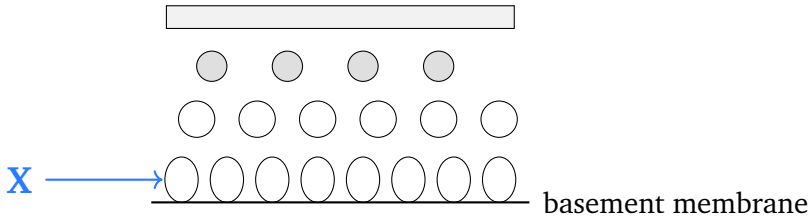
(B) Fibrous ossification within a tendon

(C) Intramembranous ossification within a mesenchymal membrane

(D) Ossification of the notochordal rod

Histology

Q38. In this diagram of the epidermis, the single deepest layer of keratinocytes (marked **X**) rests on the basement membrane and is the site of continuous cell division. It is the:



(A) Stratum corneum

(B) Stratum granulosum

(C) Stratum spinosum

(D) Stratum basale

Q39. Which connective-tissue cell is packed with large metachromatic granules rich in histamine and heparin and is central to immediate (type I) hypersensitivity reactions?

(A) Plasma cell

(B) Mast cell

(C) Fibroblast

(D) Adipocyte

Q40. Which neuroglial cell of the central nervous system is a resident phagocyte and, unlike the other glia, is of mesodermal (monocyte) origin?

(A) Astrocyte

(B) Oligodendrocyte

(C) Microglia

(D) Ependymal cell

Q41. Which non-ciliated secretory cell of the bronchiolar epithelium produces a surfactant-like material and helps detoxify inhaled substances?

(A) Goblet cell

(B) Type I pneumocyte

(C) Ciliated columnar cell

(D) Clara (club) cell

Q42. The germinal centre within a lymph node follicle is chiefly a site of:

(A) Storage and destruction of aged erythrocytes

(B) Maturation of T-lymphocytes into cytotoxic cells

(C) Synthesis of bile pigments

(D) B-lymphocyte proliferation supported by follicular dendritic cells

Q43. The melanocytes of the epidermis, which lie in the stratum basale and produce melanin, are derived embryologically from the:

(A) Surface ectoderm keratinocytes

(B) Neural crest

(C) Lateral plate mesoderm

(D) Definitive endoderm

Genetics and Cytogenetics

Q44. Familial hypercholesterolaemia, marked by very high LDL cholesterol and tendon xanthomas, is caused by a defect in the LDL receptor and is inherited as:

(A) An autosomal dominant trait

(B) An autosomal recessive trait

(C) An X-linked recessive trait

(D) A mitochondrial (maternal) trait

Q45. A patient whose urine turns black on standing and who later develops ochronosis has alkaptonuria, due to deficiency of homogentisate oxidase. Its inheritance pattern is:

(A) Autosomal dominant

(B) X-linked dominant

(C) Autosomal recessive

(D) Y-linked

Q46. The risk of having a child with Down syndrome caused by meiotic non-disjunction rises sharply with:

(A) Advancing maternal age

(B) Advancing paternal age only

(C) Low maternal body weight

(D) A high-fibre maternal diet

Q47. A child with elfin facies, an unusually friendly personality and supravalvular aortic stenosis is found to have a microdeletion on chromosome 7q11. This is:

(A) DiGeorge syndrome

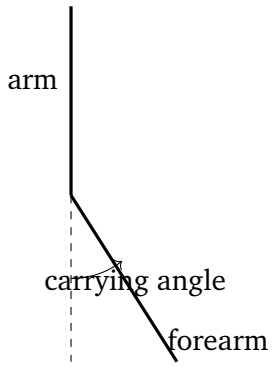
(B) Williams syndrome

(C) Cri-du-chat syndrome

(D) Prader-Willi syndrome

Osteology and Radiological Anatomy

Q48. The diagram shows an increased carrying angle at the elbow (cubitus valgus). Over many years this deformity can stretch which nerve, producing a delayed ("tardy") palsy?



(A) Median nerve

(B) Radial nerve

(C) Musculocutaneous nerve

(D) Ulnar nerve

Q49. On a normal chest radiograph of an infant, a triangular "sail sign" projecting from the superior mediastinum is the normal appearance of the:

(A) Enlarged heart

(B) Normal thymus

(C) Collapsed right upper lobe

(D) Mediastinal tumour

Q50. An extra rib articulating with the seventh cervical vertebra (a cervical rib) may compress the lower trunk of the brachial plexus and the subclavian artery, producing:

(A) Thoracic outlet syndrome

(B) Carpal tunnel syndrome

(C) Cubital tunnel syndrome

(D) Tarsal tunnel syndrome

Detailed Solutions

Q1.

Solution

Concept – ascending reticular activating system: Wakefulness depends on a diffuse core of neurons in the brainstem.

Step 1 – name the network: The **reticular formation**, through its ascending reticular activating system, projects widely to the thalamus and cortex to maintain arousal and consciousness.

Step 2 – link to function: Damage to it causes drowsiness or coma.

Why the other options are wrong:

- B, Dentate nucleus: a cerebellar nucleus for coordination.
- C, Nucleus gracilis: a dorsal column relay for touch.
- D, Mammillary body: part of the limbic memory circuit.

Final Answer: Reticular formation $\Rightarrow$ A

Answer: (A) Go Back to Q1

Q2.

Solution

Concept – rubrospinal tract: This midbrain tract balances the tone of flexors against extensors.

Step 1 – recall its action: The **rubrospinal tract** facilitates the **flexor** muscles of the upper limb and inhibits extensors.

Step 2 – clinical correlation: When a lesion lies above the red nucleus, its flexor bias is preserved and produces the flexed arms of decorticate posturing.

Why the other options are wrong:

- A and C, Extensors: extensor tone is driven mainly by the vestibulospinal tract.
- B, Axial trunk muscles: controlled largely by the reticulospinal and vestibulospinal tracts.

Final Answer: Flexors of the upper limb $\Rightarrow$ D

Answer: (D) Go Back to Q2

Q3.

Solution

Concept – decerebrate versus decorticate posture: The red nucleus is the dividing line between the two posturing patterns.

Step 1 – read the sign: All four limbs are **extended**, which is decerebrate rigidity.

Step 2 – locate the lesion: Decerebrate posturing follows a lesion **below the red nucleus**, which removes rubrospinal flexor drive and leaves unopposed extensor (vestibulospinal) tone.

Why the other options are wrong:

- B, Above the red nucleus: gives flexed arms (decorticate), not extension.
- C, Anterior horn: causes flaccid lower motor neuron paralysis.
- D, Cerebellar vermis: causes truncal ataxia, not fixed posturing.

Final Answer: Below the red nucleus $\Rightarrow$ $\boxed{A}$

Answer: (A) Go Back to Q3

Q4.

Solution

Concept – the pineal gland: This small midline gland is both an endocrine organ and a landmark near the tectum.

Step 1 – name its hormone: The pineal gland secretes **melatonin**, which regulates the sleep-wake (circadian) rhythm.

Step 2 – explain the eye sign: A pineal tumour presses on the tectal plate to cause Parinaud syndrome (loss of upward gaze).

Why the other options are wrong:

- A, Thyroxine: from the thyroid gland.
- C, Growth hormone: from the anterior pituitary.
- D, Aldosterone: from the adrenal cortex.

Final Answer: Melatonin $\Rightarrow$ $\boxed{B}$

Answer: (B) Go Back to Q4

Q5.

Solution

Concept – thalamic pain syndrome: The VPL nucleus relays body sensation to the cortex.

Step 1 – recognise the syndrome: A VPL stroke gives Dejerine-Roussy syndrome, with **severe spontaneous pain over the contralateral half of the body**.

Step 2 – note the side: Because the sensory pathway has already crossed, the pain is felt on the side opposite the lesion.

Why the other options are wrong:

- A, Facial paralysis: a lower motor neuron or facial nerve sign, not thalamic.
- B, Deafness: needs bilateral auditory pathway damage.
- C, Loss of smell: an olfactory (frontal) lesion.

Final Answer: Contralateral hemibody pain $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q5

Q6.

Solution

Concept – reticulospinal tract: This tract carries the output of the brainstem reticular formation to the cord.

Step 1 – name the tract: The **reticulospinal tract** governs posture and stereotyped automatic movements of the trunk and proximal limbs.

Step 2 – contrast it: It works alongside the vestibulospinal tract for balance and antigravity tone.

Why the other options are wrong:

- B, Lateral corticospinal tract: fine voluntary movement of the distal limbs.
- C, Fasciculus cuneatus: an ascending sensory column.
- D, Anterior spinothalamic tract: carries crude touch.

Final Answer: Reticulospinal tract $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q6

Q7.

Solution

Concept – tectospinal tract: This tract links the visual midbrain to the neck muscles.

Step 1 – trace its origin: It arises from the **superior colliculus**, which processes visual input.

Step 2 – state its reflex: It turns the head and eyes reflexly toward a **sudden visual stimulus**.

Why the other options are wrong:

- B, Painful foot stimulus: mediated by spinal withdrawal reflexes.
- C, Blood pressure change: handled by the baroreceptor reflex.
- D, Vibration: a dorsal column sensation, not a motor reflex.

Final Answer: Sudden visual stimuli $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q7

Q8.

Solution

Concept – the corpora quadrigemina: The tectum carries two pairs of colliculi with different jobs.

Step 1 – identify X: The lower pair marked **X** are the **inferior colliculi**.

Step 2 – state their role: They are the main midbrain relay of the **auditory pathway**, projecting to the medial geniculate body.

Why the other options are wrong:

- A, Visual reflex: this is the job of the superior colliculi (the upper pair).
- B, Cardiac reflex: a medullary function.
- D, Pain pathway: relayed in the thalamus, not the colliculi.

Final Answer: Auditory pathway $\Rightarrow$ $\boxed{\text{C}}$

Answer: (C) Go Back to Q8

Q9.

Solution

Concept – pupillary light reflex: The afferent limb passes through a special midbrain relay before reaching the parasympathetic nucleus.

Step 1 – trace the pathway: Fibres leave the optic tract and synapse in the **pretectal nucleus**.

Step 2 – complete the circuit: The pretectal nucleus then projects bilaterally to the Edinger-Westphal nuclei, giving a consensual response.

Why the other options are wrong:

- A, Red nucleus: a motor relay of the rubrospinal tract.
- C, Substantia nigra: a basal ganglia nucleus.
- D, Trochlear nucleus: supplies the superior oblique muscle.

Final Answer: Pretectal nucleus $\Rightarrow$ B

Answer: (B) Go Back to Q9

Q10.

Solution

Concept – the two compartments of the TMJ: The articular disc splits the joint, and each compartment has its own movement.

Step 1 – match movement to compartment: Gliding (protraction and retraction) occurs in the **upper compartment**, between the disc and the temporal bone.

Step 2 – recall the other: Simple hinge (rotation) for the first part of opening occurs in the lower compartment, between the disc and the condyle.

Why the other options are wrong:

- A, Lower compartment: that is where hinge movement, not gliding, occurs.
- C, Within the disc: the disc is a passive fibrocartilage, not a moving compartment.
- D, Outside the capsule: movement is intracapsular.

Final Answer: Upper compartment $\Rightarrow$ B

Answer: (B) Go Back to Q10

Q11.

Solution

Concept – the pterygomasseteric sling: Medial pterygoid and masseter cradle the mandibular angle.

Step 1 – state the action: Contracting together, they **elevate (close)** the mandible.

Step 2 – confirm with the sling: The sling lifts the angle of the mandible upward, closing the jaw.

Why the other options are wrong:

- A, Depress: opening is done by the lateral pterygoid and digastric.
- B, Protrude the tongue: an action of genioglossus.
- D, Tense the soft palate: by tensor veli palatini.

Final Answer: Elevate the mandible $\Rightarrow$ C

Answer: (C) Go Back to Q11

Q12.

Solution

Concept – fibre direction of temporalis: Different parts of the fan-shaped temporalis do different jobs.

Step 1 – identify the retractors: The **posterior, nearly horizontal fibres** pull the mandible backward (retraction).

Step 2 – separate the elevators: The anterior vertical fibres elevate the jaw.

Why the other options are wrong:

- A, Anterior vertical fibres: these elevate rather than retract.
- B, Deep masseter fibres: elevate the mandible.
- C, Superior head of lateral pterygoid: stabilises the disc and protracts.

Final Answer: Posterior horizontal fibres $\Rightarrow$ D

Answer: (D) Go Back to Q12

Q13.

Solution

Concept – lingual nerve and Wharton's duct: In the floor of the mouth the nerve and duct have a spiralling relation.

Step 1 – describe the loop: The **lingual nerve loops below the submandibular duct**, passing first lateral, then under, then medial to it.

Step 2 – clinical note: This "double cross" places the nerve at risk during duct or gland surgery.

Why the other options are wrong:

- A, Parallel, never crossing: incorrect; it does cross.
- B, Only above the duct: it actually dips below the duct.
- C, Pierces the duct: the nerve remains separate from the lumen.

Final Answer: Loops below the duct $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q13

Q14.

Solution

Concept – drainage of the sublingual gland: Unlike the parotid and submandibular glands, it has no single main duct.

Step 1 – describe its ducts: It drains by **numerous small ducts (of Rivinus)** opening along the sublingual fold on the floor of the mouth.

Step 2 – add the exception: A few anterior ducts may join to form the duct of Bartholin, which opens with the submandibular duct.

Why the other options are wrong:

- A, Single duct beside the upper molar: that is the parotid duct.
- B, Submandibular duct only: is the main duct of the submandibular gland.
- D, Parotid duct: drains the parotid gland.

Final Answer: Numerous small ducts on the floor of the mouth $\Rightarrow$ $\boxed{\text{C}}$

Answer: (C) Go Back to Q14

Q15.

Solution

Concept – lingual nerve as a carrier: The lingual nerve is a branch of V_3 that also carries hitch-hiking chorda tympani fibres.

Step 1 – name the extra fibres: It carries **taste fibres and preganglionic parasympathetic secretomotor fibres** from the chorda tympani (a branch of the facial nerve).

Step 2 – state their destinations: Taste serves the anterior two-thirds of the tongue; the secretomotor fibres relay in the submandibular ganglion for the submandibular and sublingual glands.

Why the other options are wrong:

- A, Motor fibres to the tongue: these run in the hypoglossal nerve.
- C, Sympathetic fibres only: the key added fibres are parasympathetic and taste.
- D, Proprioception from mastication muscles: carried by other V_3 branches.

Final Answer: Taste and parasympathetic secretomotor fibres $\Rightarrow$ B

Answer: (B) Go Back to Q15

Q16.

Solution

Concept – the ansa cervicalis: This nerve loop supplies the strap muscles that steady the hyoid and larynx.

Step 1 – state its roots: The ansa cervicalis is formed from the ventral rami of **C1, C2 and C3**.

Step 2 – name what it supplies: It supplies the infrahyoid muscles (sternohyoid, sternothyroid, omohyoid); the thyrohyoid and geniohyoid take a separate C1 supply.

Why the other options are wrong:

- B, C5–C6: these form the upper trunk of the brachial plexus.
- C, Facial nerve: supplies muscles of facial expression.
- D, C7–T1: contribute to the lower brachial plexus.

Final Answer: C1, C2 and C3 $\Rightarrow$ A

Answer: (A) Go Back to Q16

Q17.

Solution

Concept – termination of the great saphenous vein: This long superficial vein ends by diving through the saphenous opening.

Step 1 – locate the junction: The saphenofemoral junction lies **in the femoral triangle, about 4 cm below and lateral to the pubic tubercle**.

Step 2 – confirm the drainage: Here the great saphenous vein pierces the cribriform fascia to join the femoral vein.

Why the other options are wrong:

- B, Behind the medial malleolus: that is where the vein begins, not ends.
- C, Popliteal fossa: is where the small saphenous vein ends.
- D, Umbilicus: far above the venous junction.

Final Answer: In the femoral triangle below the pubic tubercle $\Rightarrow$ A

Answer: (A) Go Back to Q17

Q18.

Solution

Concept – the small saphenous vein: It is the short superficial vein of the back of the leg.

Step 1 – trace its end: After passing behind the lateral malleolus and up the calf, it drains into the **popliteal vein** in the popliteal fossa.

Step 2 – contrast the great saphenous: The great saphenous vein instead ends in the femoral vein.

Why the other options are wrong:

- A, Great saphenous at the ankle: they connect only through small communications.
- C, Femoral vein: is the termination of the great saphenous vein.
- D, Inferior vena cava: no superficial vein drains directly into it.

Final Answer: Popliteal vein $\Rightarrow$ B

Answer: (B) Go Back to Q18

Q19.

Solution

Concept – origin of the saphenous veins: Both superficial saphenous veins share a common starting network.

Step 1 – name the network: They arise from the **dorsal venous arch on the dorsum of the foot**.

Step 2 – trace them: The medial end continues as the great saphenous vein, the lateral end as the small saphenous vein.

Why the other options are wrong:

- A, Plantar plexus: drains the sole into the deep veins.
- C, Profunda femoris: a deep vein of the thigh.
- D, Posterior tibial vein: a deep vein of the leg.

Final Answer: Dorsal venous arch of the foot $\Rightarrow$ B

Answer: (B) Go Back to Q19

Q20.

Solution

Concept – site of deep vein thrombosis: Thrombi tend to form where venous flow is most sluggish.

Step 1 – name the usual site: DVT most often begins in the **deep veins of the calf** (soleal and posterior tibial veins).

Step 2 – state the danger: A calf clot may propagate proximally and embolise to the lungs.

Why the other options are wrong:

- A, Dorsal venous arch: a superficial network, not a DVT site.
- B, Great saphenous vein: superficial thrombophlebitis, lower embolic risk.
- D, Cephalic vein: an arm vein, a rare site.

Final Answer: Deep veins of the calf $\Rightarrow$ C

Answer: (C) Go Back to Q20

Q21.

Solution

Concept – dermatomes of the hand: The digits carry a neat map of the lower cervical dermatomes.

Step 1 – read the figure: The thumb is C6 and the little finger is C8, so the middle finger marked **X** is **C7**.

Step 2 – fix the rule: Middle finger equals C7 is a standard clinical landmark.

Why the other options are wrong:

- A, C6: supplies the thumb and lateral forearm.
- B, C8: supplies the little finger.
- C, T1: supplies the medial forearm and arm.

Final Answer: C7 $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q21

Q22.

Solution

Concept – lymphatic drainage of the lower limb: Superficial lymph follows the great saphenous vein.

Step 1 – name the first nodes: Most of the lower limb drains to the **superficial inguinal nodes**.

Step 2 – note the exception: Only the lateral heel and small saphenous territory drain first to the popliteal nodes.

Why the other options are wrong:

- A, Popliteal nodes only: drain just the small saphenous territory.
- C, Deep inguinal (Cloquet) node only: receives from the deep tissues and glans.
- D, Para-aortic nodes: are a later, more central station.

Final Answer: Superficial inguinal nodes $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q22

Q23.

Solution

Concept – valves of the perforator veins: Perforators link the superficial and deep systems across the deep fascia.

Step 1 – state the normal direction: Their valves direct blood **from the superficial veins into the deep veins**.

Step 2 – clinical relevance: When these valves fail, high deep-vein pressure is transmitted outward, producing varicose veins.

Why the other options are wrong:

- A, Deep to superficial: is the incompetent (reversed) direction.
- C, Artery to vein: perforators connect veins to veins, not arteries.
- D, Distally away from the heart: venous flow is toward the heart.

Final Answer: Superficial to deep $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q23

Q24.

Solution

Concept – branches of the aortic arch: Three great vessels leave the top of the arch in a fixed order.

Step 1 – name the first branch: The first and largest is the **brachiocephalic trunk**, which soon divides into the right common carotid and right subclavian arteries.

Step 2 – list the order: Then come the left common carotid and the left subclavian arteries.

Why the other options are wrong:

- B, Left common carotid: is the second branch.
- C, Left subclavian: is the third branch.
- D, Right subclavian: is a branch of the brachiocephalic trunk, not of the arch itself.

Final Answer: Brachiocephalic trunk $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q24

Q25.

Solution

Concept – termination of the thoracic duct: The body's main lymph channel ends on the left side of the neck root.

Step 1 – name the site: It drains at the **junction of the left internal jugular and left subclavian veins**.

Step 2 – recall its course: It starts at the cisterna chyli, ascends on the right, then crosses to the left at about T5.

Why the other options are wrong:

- A, Right jugulo-subclavian junction: is where the right lymphatic duct ends.
- B, Superior vena cava: not a direct lymphatic drainage site.
- D, Azygos vein: is a systemic vein, not the duct's ending.

Final Answer: Left jugulo-subclavian junction $\Rightarrow$ $\boxed{C}$

Answer: (C) Go Back to Q25

Q26.

Solution

Concept – the azygos arch: The azygos vein hooks over a lung root to reach a great vein.

Step 1 – name the vessel: It arches over the root of the right lung and drains into the **superior vena cava**.

Step 2 – state its role: It provides a collateral channel between the superior and inferior caval systems.

Why the other options are wrong:

- B, Inferior vena cava: the azygos begins near it but ends in the SVC.
- C, Left brachiocephalic vein: drained by the accessory hemiazygos.
- D, Pulmonary trunk: carries blood to the lungs, unrelated.

Final Answer: Superior vena cava $\Rightarrow$ $\boxed{A}$

Answer: (A) Go Back to Q26

Q27.

Solution

Concept – formation of the superior vena cava: The SVC is built from the two great veins of the upper body.

Step 1 – name its roots: It is formed by the union of the **right and left brachiocephalic veins** behind the right first costal cartilage.

Step 2 – add a tributary: The azygos vein joins it just before it enters the right atrium.

Why the other options are wrong:

- A, Azygos and hemiazygos: these drain the posterior thoracic wall.
- B, Right IJV and subclavian: their union forms the right brachiocephalic vein, one step earlier.
- D, Common iliac veins: unite to form the inferior vena cava.

Final Answer: Right and left brachiocephalic veins $\Rightarrow$ C

Answer: (C) Go Back to Q27

Q28.

Solution

Concept – the phrenic nerve: A single nerve pair carries the entire motor supply of the diaphragm.

Step 1 – state its roots: The phrenic nerve arises from **C3, C4 and C5** ("C3, 4, 5 keep the diaphragm alive").

Step 2 – note the sensory role: It is also sensory to the pericardium and the central diaphragmatic pleura and peritoneum.

Why the other options are wrong:

- A, C1–C2: too high; supply upper neck structures.
- B, T1–T4: thoracic segments, not the phrenic origin.
- C, L1–L3: lumbar segments, far too low.

Final Answer: C3, C4 and C5 $\Rightarrow$ D

Answer: (D) Go Back to Q28

Q29.

Solution

Concept – oesophageal constrictions: Three normal narrowings occur where nearby structures indent the oesophagus.

Step 1 – identify the middle one: At about 25 cm from the incisors the oesophagus is crossed by the **arch of the aorta and the left main bronchus**, causing the middle constriction.

Step 2 – name the other two: The upper constriction is at the cricopharyngeus (15 cm) and the lower at the diaphragmatic hiatus (40 cm).

Why the other options are wrong:

- A, Cricopharyngeus: causes the upper (pharyngo-oesophageal) constriction.
- B, Diaphragmatic hiatus: causes the lower constriction.
- D, Left atrium: does not normally constrict the oesophagus unless enlarged.

Final Answer: Aortic arch and left main bronchus $\Rightarrow$ C

Answer: (C) Go Back to Q29

Q30.

Solution

Concept – rotation of the vagal trunks: As the stomach rotates in development, the vagus nerves are carried around it.

Step 1 – trace the anterior trunk: The anterior vagal trunk, lying on the front of the stomach, is derived chiefly from the **left vagus nerve**.

Step 2 – recall the mnemonic: "LARP": Left is Anterior, Right is Posterior.

Why the other options are wrong:

- A, Right vagus: forms the posterior trunk.
- B, Greater splanchnic nerve: is sympathetic, not vagal.
- D, Phrenic nerve: supplies the diaphragm, not the stomach.

Final Answer: Left vagus nerve $\Rightarrow$ C

Answer: (C) Go Back to Q30

Q31.

Solution

Concept – origin of the limb bud: The bulk of the early limb is mesodermal.

Step 1 – name the mesoderm: The mesenchymal core comes from **lateral plate (somatic) mesoderm**, which forms the bones and connective tissue.

Step 2 – add the muscle source: The limb muscles migrate in separately from the somites (myotomes).

Why the other options are wrong:

- B, Neural crest: forms peripheral nerves and melanocytes, not the core.
- C, Yolk sac endoderm: forms the gut lining.
- D, Notochord: forms the nucleus pulposus.

Final Answer: Lateral plate mesoderm $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q31

Q32.

Solution

Concept – the apical ectodermal ridge: This ectodermal thickening is the master switch for limb lengthening.

Step 1 – identify X: The ridge marked **X** at the distal tip **drives proximodistal outgrowth** of the limb.

Step 2 – link to failure: Loss of the ridge stops outgrowth and causes limb truncation.

Why the other options are wrong:

- A, Dorsoventral axis: set by Wnt7a in the dorsal ectoderm.
- B, Melanocytes: derive from neural crest.
- C, Anteroposterior axis: set by the zone of polarizing activity (Shh).

Final Answer: Drives proximodistal outgrowth $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q32

Q33.

Solution

Concept – the zone of polarizing activity: A posterior signalling centre patterns the digits from thumb to little finger.

Step 1 – name the signal: The ZPA secretes **Sonic hedgehog (Shh)** to set the anteroposterior axis.

Step 2 – link to a defect: An extra ZPA-like signal anteriorly produces mirror-image polydactyly.

Why the other options are wrong:

- B, Insulin: a metabolic hormone, not a patterning morphogen.
- C, Thyroxine: regulates metabolism.
- D, Surfactant: a lung secretion, unrelated to limb patterning.

Final Answer: Sonic hedgehog $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q33

Q34.

Solution

Concept – stages of lung maturation: Lung tissue matures through four named histological stages.

Step 1 – put them in order: The sequence is **pseudoglandular** $\rightarrow$ **canalicular** $\rightarrow$ **saccular** $\rightarrow$ **alveolar**.

Step 2 – link to viability: Enough surfactant and terminal sacs to survive appear at the late canalicular to saccular stage.

Why the other options are wrong:

- A, Canalicular first: pseudoglandular precedes it.
- B, Reversed order: alveolar is the last, not the first, stage.
- D, Saccular first: saccular follows the canalicular stage.

Final Answer: Pseudoglandular $\rightarrow$ canalicular $\rightarrow$ saccular $\rightarrow$ alveolar $\Rightarrow$ $\boxed{\text{C}}$

Answer: (C) Go Back to Q34

Q35.

Solution

Concept – congenital diaphragmatic hernia: Failure of a pleuroperitoneal membrane to close leaves a posterolateral gap.

Step 1 – state the usual side: The Bochdalek hernia is usually on the **left side**, because the right side is shielded by the liver and closes earlier.

Step 2 – note the effect: Abdominal contents enter the chest and compress the developing lung (pulmonary hypoplasia).

Why the other options are wrong:

- A, Right side: less common, protected by the liver.
- C, Midline: describes the anterior Morgagni type differently, not Bochdalek.
- D, Retrosternal: is the site of the anterior Morgagni hernia.

Final Answer: Left side $\Rightarrow$ $\boxed{B}$

Answer: (B) Go Back to Q35

Q36.

Solution

Concept – fate of the somite: Each somite splits into sclerotome, myotome and dermatome.

Step 1 – follow the sclerotome: The **sclerotome** forms the **vertebrae and ribs**.

Step 2 – name the others: The myotome forms skeletal muscle and the dermatome forms the dermis of the back.

Why the other options are wrong:

- A, Dermis of the back: is from the dermatome.
- B, Limb muscle: is from migrating myotome cells.
- C, Gut smooth muscle: is from splanchnic mesoderm.

Final Answer: Vertebrae and ribs $\Rightarrow$ $\boxed{D}$

Answer: (D) Go Back to Q36

Q37.

Solution

Concept – two modes of ossification: Bone forms either from a cartilage model or directly within a membrane.

Step 1 – classify the skull vault: The flat bones of the vault form by **intramembranous ossification** within a mesenchymal membrane.

Step 2 – contrast the long bones: Long bones and the skull base form by endochondral ossification.

Why the other options are wrong:

- A, Endochondral: is the method for long bones, not the vault.
- B, Fibrous ossification of tendons: describes pathological, not normal, bone.
- D, Notochordal ossification: the notochord does not ossify into vault bones.

Final Answer: Intramembranous ossification $\Rightarrow$ $\boxed{C}$

Answer: (C) Go Back to Q37

Q38.

Solution

Concept – layers of the epidermis: Keratinocytes are born deep and mature as they move to the surface.

Step 1 – identify X: The deepest single layer on the basement membrane, marked **X**, is the **stratum basale**.

Step 2 – state its role: Its dividing (germinative) cells replace the epidermis, moving upward through spinosum, granulosum and corneum.

Why the other options are wrong:

- A, Stratum corneum: the flat, dead, outermost layer.
- B, Stratum granulosum: a middle layer of granule-filled cells.
- C, Stratum spinosum: lies above the basale, not on the membrane.

Final Answer: Stratum basale $\Rightarrow$ $\boxed{D}$

Answer: (D) Go Back to Q38

Q39.

Solution

Concept – the mast cell: It is the tissue effector of immediate allergic reactions.

Step 1 – name the cell: The **mast cell** holds metachromatic granules rich in **histamine and heparin**.

Step 2 – state its action: Cross-linking of IgE triggers degranulation, releasing histamine in type I hypersensitivity.

Why the other options are wrong:

- A, Plasma cell: secretes antibodies, no such granules.
- C, Fibroblast: makes collagen and ground substance.
- D, Adipocyte: stores fat.

Final Answer: Mast cell $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q39

Q40.

Solution

Concept – microglia: Not all glia share the neuroectodermal lineage.

Step 1 – name the phagocyte: **Microglia** are the resident macrophages of the central nervous system.

Step 2 – note the origin: Unlike other glia, they arise from mesoderm (bone-marrow monocyte precursors).

Why the other options are wrong:

- A, Astrocyte: supports and forms the blood-brain barrier; neuroectodermal.
- B, Oligodendrocyte: myelinates CNS axons; neuroectodermal.
- D, Ependymal cell: lines the ventricles; neuroectodermal.

Final Answer: Microglia $\Rightarrow$ $\boxed{\text{C}}$

Answer: (C) Go Back to Q40

Q41.

Solution

Concept – the club (Clara) cell: The small airways have their own protective secretory cell.

Step 1 – name the cell: The **Clara (club) cell** is a non-ciliated bronchiolar cell that secretes a surfactant-like material.

Step 2 – add its roles: It also detoxifies inhaled toxins and can act as a stem cell for the bronchiolar lining.

Why the other options are wrong:

- A, Goblet cell: secretes mucus and disappears in bronchioles.
- B, Type I pneumocyte: a thin alveolar gas-exchange cell.
- C, Ciliated columnar cell: moves mucus but does not secrete surfactant.

Final Answer: Clara (club) cell $\Rightarrow$ $\boxed{D}$

Answer: (D) Go Back to Q41

Q42.

Solution

Concept – the germinal centre: Lymph node follicles are B-cell territory.

Step 1 – state its function: The germinal centre is a site of **B-lymphocyte proliferation** and affinity maturation, supported by follicular dendritic cells.

Step 2 – add the output: Selected B cells become plasma cells and memory cells.

Why the other options are wrong:

- A, Erythrocyte destruction: a function of the spleen and liver.
- B, Cytotoxic T-cell maturation: T cells mature in the thymus and occupy the paracortex.
- C, Bile pigment synthesis: a liver function.

Final Answer: B-lymphocyte proliferation $\Rightarrow$ $\boxed{D}$

Answer: (D) Go Back to Q42

Q43.

Solution

Concept – origin of melanocytes: Pigment cells of the skin are migrants, not local ectoderm.

Step 1 – name the source: Epidermal melanocytes come from the **neural crest**.

Step 2 – state their site and product: They settle in the stratum basale and produce melanin, which they pass to keratinocytes.

Why the other options are wrong:

- A, Surface ectoderm keratinocytes: give rise to keratinocytes, not melanocytes.
- C, Lateral plate mesoderm: forms dermis and connective tissue.
- D, Endoderm: forms gut and gland linings.

Final Answer: Neural crest $\Rightarrow$ B

Answer: (B) Go Back to Q43

Q44.

Solution

Concept – familial hypercholesterolaemia: A receptor defect raises LDL from birth.

Step 1 – state the inheritance: It is **autosomal dominant**, so heterozygotes are already affected.

Step 2 – link the mechanism: A defective LDL receptor cannot clear LDL, producing tendon xanthomas and early atherosclerosis.

Why the other options are wrong:

- B, Autosomal recessive: would spare carriers; this disorder affects heterozygotes.
- C, X-linked recessive: it is not sex-linked.
- D, Mitochondrial: not maternally transmitted through mitochondria.

Final Answer: Autosomal dominant $\Rightarrow$ A

Answer: (A) Go Back to Q44

Q45.

Solution

Concept – alkaptonuria: A blocked step of tyrosine breakdown lets homogentisic acid build up.

Step 1 – state the inheritance: Alkaptonuria is **autosomal recessive**, from deficiency of homogentisate oxidase.

Step 2 – explain the signs: Homogentisic acid darkens the urine on standing and deposits in cartilage as ochronosis.

Why the other options are wrong:

- A, Autosomal dominant: most inborn errors of metabolism, including this one, are recessive.
- B, X-linked dominant: it is not sex-linked.
- D, Y-linked: would affect only males from father to son.

Final Answer: Autosomal recessive $\Rightarrow$ C

Answer: (C) Go Back to Q45

Q46.

Solution

Concept – non-disjunction and maternal age: Older oocytes are more prone to faulty chromosome separation.

Step 1 – state the risk factor: The chance of trisomy 21 from non-disjunction rises sharply with **advancing maternal age**.

Step 2 – give the reason: Oocytes arrested in meiosis for decades separate their chromosomes less reliably.

Why the other options are wrong:

- B, Paternal age only: paternal age has little effect on trisomy 21.
- C, Low maternal weight: not a recognised risk factor.
- D, High-fibre diet: unrelated to non-disjunction.

Final Answer: Advancing maternal age $\Rightarrow$ A

Answer: (A) Go Back to Q46

Q47.

Solution

Concept – Williams syndrome: A contiguous gene deletion produces a recognisable pattern.

Step 1 – name the syndrome: Elfin facies, a friendly manner and supravalvular aortic stenosis with a **7q11 microdeletion** point to **Williams syndrome**.

Step 2 – note the deleted gene: Loss of the elastin gene explains the vascular stenosis.

Why the other options are wrong:

- A, DiGeorge syndrome: a 22q11 deletion with cardiac and thymic defects.
- C, Cri-du-chat syndrome: a 5p deletion with a cat-like cry.
- D, Prader-Willi syndrome: a 15q deletion with obesity and hypotonia.

Final Answer: Williams syndrome ⇒ B

Answer: (B) Go Back to Q47

Q48.

Solution

Concept – cubitus valgus and the ulnar nerve: An increased carrying angle stretches the nerve behind the medial epicondyle.

Step 1 – name the nerve: Cubitus valgus stretches the **ulnar nerve**, causing a delayed ("tardy") ulnar palsy.

Step 2 – recall the cause: It often follows a malunited lateral condyle fracture in childhood.

Why the other options are wrong:

- A, Median nerve: passes in front of the elbow, not behind the medial epicondyle.
- B, Radial nerve: lies laterally in the spiral groove.
- C, Musculocutaneous nerve: lies in the front of the arm.

Final Answer: Ulnar nerve ⇒ D

Answer: (D) Go Back to Q48

Q49.

Solution

Concept – the thymic sail sign: The infant thymus is large and casts a characteristic shadow.

Step 1 – read the sign: The triangular "sail sign" from the superior mediastinum is the normal **thymus**.

Step 2 – reassure: It is a normal finding in infants and should not be mistaken for a mass.

Why the other options are wrong:

- A, Enlarged heart: widens the lower, not the upper, mediastinum.
- C, Collapsed upper lobe: would show volume loss and shift.
- D, Mediastinal tumour: the sail sign is a normal thymic shape, not a tumour.

Final Answer: Normal thymus $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q49

Q50.

Solution

Concept – cervical rib: An extra C7 rib narrows the thoracic outlet.

Step 1 – name the syndrome: Compression of the lower trunk of the brachial plexus and the subclavian artery produces **thoracic outlet syndrome**.

Step 2 – recall the features: It gives pain and tingling along the medial forearm and hand, with possible vascular signs.

Why the other options are wrong:

- B, Carpal tunnel syndrome: median nerve compression at the wrist.
- C, Cubital tunnel syndrome: ulnar nerve compression at the elbow.
- D, Tarsal tunnel syndrome: tibial nerve compression at the ankle.

Final Answer: Thoracic outlet syndrome $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q50

Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	A	2	D	3	A	4	B	5	D
6	A	7	A	8	C	9	B	10	B
11	C	12	D	13	D	14	C	15	B
16	A	17	A	18	B	19	B	20	C
21	D	22	B	23	B	24	A	25	C
26	A	27	C	28	D	29	C	30	C
31	A	32	D	33	A	34	C	35	B
36	D	37	C	38	D	39	B	40	C
41	D	42	D	43	B	44	A	45	C
46	A	47	B	48	D	49	B	50	A