NEET MDS General Anatomy

Sample Paper – 8

Duration: 11 Minutes **Maximum Marks: 56**

Instructions

- This paper contains **14** Multiple Choice Questions (Single Best Response), modelled on the General Anatomy including Embryology and Histology content of **NEET MDS** conducted by NBEMS.
- The **14-question** length matches the number of General Anatomy items you actually meet in the real 240-question paper.
- Each correct answer carries **+4 marks**. There is **negative marking of 1 mark** for every incorrect answer; unattempted questions carry no penalty.
- Every question has **exactly one best answer**. Choose the single most appropriate option.
- Attempt this practice paper in one timed sitting of about **11 minutes**, the pace the real computer-based test demands.

Head and Neck Osteology

Q1. On a dried skull you place a probe in the small opening that lies between the base of the styloid process and the mastoid process, on the inferior surface of the temporal bone. The nerve that leaves the skull through this opening is the:

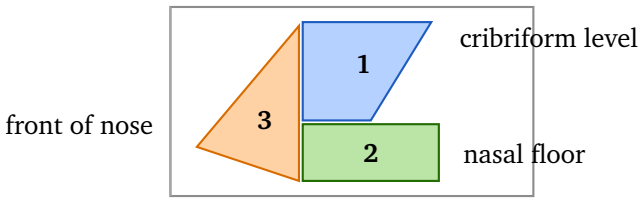
(A) Facial nerve, emerging from the stylomastoid foramen

(B) Glossopharyngeal nerve, emerging from the stylomastoid foramen

(C) Facial nerve, emerging from the petrotympanic fissure

(D) Hypoglossal nerve, emerging from the stylomastoid foramen

Q2. The sagittal schematic below shows the bony and cartilaginous framework of the nasal septum. The three structures marked **1**, **2** and **3** that together build the bulk of the septum are, respectively:



(A) Perpendicular plate of the ethmoid, vomer and septal cartilage

(B) Vomer, perpendicular plate of the ethmoid and septal cartilage

(C) Septal cartilage, vomer and perpendicular plate of the ethmoid

(D) Perpendicular plate of the palatine bone, vomer and septal cartilage

Q3. The genial tubercles, also called the mental spines, are four small bony projections in the midline of the lingual surface of the mandible just above its lower border. The muscles that arise from them are the:

(A) Mylohyoid and the anterior belly of digastric

(B) Genioglossus and the anterior belly of digastric

(C) Geniohyoid and mylohyoid

(D) Genioglossus from the upper pair and geniohyoid from the lower pair

Cranial Nerves

Q4. Three weeks after a lymph node biopsy low in the posterior triangle of the neck, a patient cannot shrug the shoulder on that side, the shoulder droops, and there is difficulty raising the arm above the head. The nerve injured during the biopsy and the muscles it supplies are the:

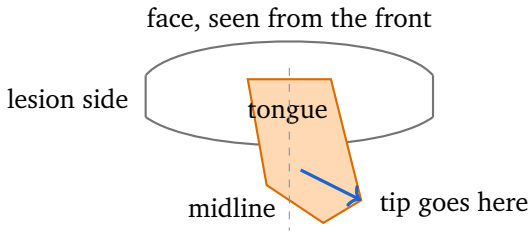
(A) Long thoracic nerve, supplying serratus anterior

(B) Suprascapular nerve, supplying supraspinatus and infraspinatus

(C) Dorsal scapular nerve, supplying the rhomboids and levator scapulae

(D) Accessory nerve, supplying sternocleidomastoid and trapezius

Q5. The figure below shows a patient asked to protrude the tongue after a unilateral hypoglossal nerve lesion. The tip deviates as shown by the arrow. The correct statement about the deviation is:



(A) The tongue deviates away from the lesion, because the genioglossus on the lesion side is unopposed

(B) The tongue deviates away from the lesion, because the styloglossus on the lesion side is unopposed

(C) The tongue deviates towards the lesion, because the normal genioglossus of the opposite side acts unopposed and pushes the tongue across

(D) The tongue deviates towards the lesion, because the hyoglossus on the lesion side pulls the tip down and across

Q6. A loop of nerve lies on the front of the carotid sheath in the neck, formed by a superior root from the first cervical nerve travelling with the hypoglossal nerve and an inferior root from the second and third cervical nerves. The muscles it supplies are the:

(A) Suprahyoid muscles, that is mylohyoid, geniohyoid, stylohyoid and digastric

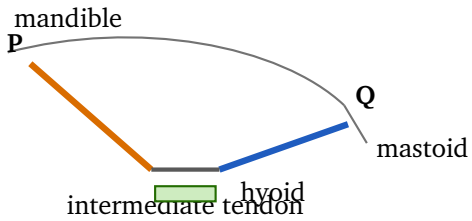
(B) Infrahyoid strap muscles, that is sternohyoid, sternothyroid and both bellies of omohyoid

(C) Scalene muscles of the neck

(D) Muscles of the soft palate other than tensor veli palatini

Muscles, Temporomandibular Joint and Triangles of the Neck

Q7. The figure below shows a single muscle with two fleshy bellies joined by an intermediate tendon that is slung to the hyoid bone. Uniquely among the muscles of the neck, its two bellies are supplied by two different cranial nerves because they come from two different pharyngeal arches. The nerve supply of belly **P** and belly **Q** respectively is:



(A) Mandibular nerve through the nerve to mylohyoid for **P**, and the facial nerve for **Q**

(B) Facial nerve for **P**, and the mandibular nerve through the nerve to mylohyoid for **Q**

(C) Facial nerve for both **P** and **Q**

(D) Mandibular nerve for **P**, and the glossopharyngeal nerve for **Q**

Q8. The supraclavicular (subclavian) triangle is the small lower part of the posterior triangle of the neck. Its boundaries and its most important content are:

(A) Bounded by the posterior belly of digastric, omohyoid and the clavicle, containing the common carotid artery

(B) Bounded in front by the posterior border of sternocleidomastoid, above by the inferior belly of omohyoid and below by the middle third of the clavicle, containing the third part of the subclavian artery

(C) Bounded in front by the anterior border of sternocleidomastoid, above by the inferior belly of omohyoid and below by the clavicle, containing the vertebral artery

(D) Bounded by the two bellies of digastric and the base of the mandible, containing the submandibular gland

General Embryology and Pharyngeal Arches

Q9. The pharyngeal clefts, or grooves, are the ectodermal indentations on the outer surface of the embryonic neck. Only one of them gives a definitive adult structure. That structure is the:

(A) Auditory tube and the middle ear cavity, from the first cleft

(B) Tympanic membrane, formed entirely by the first cleft

(C) External acoustic meatus, from the first cleft

(D) Palatine tonsil, from the second cleft

Q10. A neonate presents with hypocalcaemic tetany on the second day of life, recurrent infections with a very low T-cell count, an interrupted aortic arch and abnormal facies. The developmental failure that best explains this syndrome is failure of development of the:

(A) First and second pharyngeal arches

(B) First and second pharyngeal pouches

(C) Second pharyngeal pouch alone

(D) Third and fourth pharyngeal pouches, with an associated fourth-arch aortic defect

Q11. Regarding the way the body of the mandible is laid down, the correct statement is:

(A) It ossifies in membrane, directly from mesenchyme lateral to Meckel's cartilage, without the cartilage itself being converted into bone

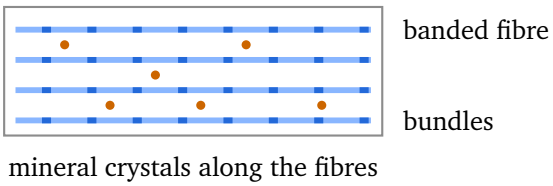
(B) It ossifies in cartilage, Meckel's cartilage being progressively replaced by bone from a primary centre

(C) It ossifies in membrane, but only after Meckel's cartilage has calcified and been resorbed

(D) It ossifies in cartilage from the condylar cartilage downwards over the whole body

General Histology

Q12. The schematic below shows the organic matrix of bone under high magnification, with thick banded fibres running in parallel bundles and mineral laid down along them. About 90 per cent of the organic matrix of bone, and the bulk of the matrix of dentine, is made of a single collagen type. That type is:



(A) Type II collagen

(B) Type IV collagen

(C) Type I collagen

(D) Type III collagen

Q13. Thin, delicate, highly branched fibres that form a fine supporting meshwork for the cells of the lymph node, spleen and bone marrow are demonstrated by silver staining rather than by routine haematoxylin and eosin. These fibres are:

(A) Elastic fibres, made of elastin and fibrillin

(B) Reticular fibres, made of type III collagen

(C) Coarse type I collagen fibres of dense connective tissue

(D) Oxytalan fibres of the periodontal ligament

Vascular and Lymphatic Supply of the Head and Neck

Q14. While exposing the carotid bifurcation you identify the external carotid artery and follow it upwards. The very first branch it gives, arising from its front just below the tip of the greater cornu of the hyoid bone, is the:

(A) Ascending pharyngeal artery

(B) Superior thyroid artery

(C) Lingual artery

(D) Occipital artery

Detailed Solutions

Q1.

Solution

Concept – reading a foramen from its bony landmarks: On the base of the skull, each opening is named from the bones or processes that flank it.

Step 1 – read the position described: The opening lies between the base of the **styloid** process and the **mastoid** process.

Step 2 – name the foramen from those two landmarks: Those two names combined give the **stylomastoid foramen**, on the inferior surface of the petrous temporal bone.

Step 3 – recall what passes through it: The stylomastoid foramen transmits the **facial nerve (VII)** as it finally leaves the skull, along with the stylomastoid branch of the posterior auricular artery.

Step 4 – trace the nerve onwards: Having emerged, the facial nerve turns forwards into the parotid gland and there divides into its terminal branches to the muscles of facial expression.

Why the other options are wrong:

- B, the glossopharyngeal nerve at the stylomastoid foramen: the foramen is correct in name but the nerve is wrong. The glossopharyngeal nerve leaves through the **jugular foramen**.
- C, the facial nerve at the petrotympanic fissure: the nerve is right but the opening is wrong. The petrotympanic fissure transmits the **chorda tympani**, which is only a branch of the facial nerve and leaves higher up.
- D, the hypoglossal nerve at the stylomastoid foramen: the hypoglossal nerve leaves through the **hypoglossal canal** in the occipital bone.

Final Answer: Facial nerve, emerging from the stylomastoid foramen $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q1

Q2.

Solution

Concept – the three-part construction of the nasal septum: The septum is not one piece. It is two bones behind and one cartilage in front.

Step 1 – take the upper bony part, marked 1: The **perpendicular plate of the ethmoid** descends from the cribriform plate, so it occupies the upper and posterior

part of the septum. The figure marks the cribriform level at that height.

Step 2 – take the lower bony part, marked 2: The **vomer** sits on the nasal floor, running from the sphenoid behind to the hard palate below, which is exactly where the figure marks the nasal floor.

Step 3 – take the front part, marked 3: The wedge-shaped **septal cartilage** fills the anterior gap between the two bones and reaches forward towards the tip of the nose, which is the front of the nose in the figure.

Step 4 – read the order the question demands: The question asks for 1, 2 and 3 in that order, giving perpendicular plate of ethmoid, then vomer, then septal cartilage.

Why the other options are wrong:

- B, vomer then perpendicular plate then cartilage: the right three structures but the first two are swapped. The vomer is the **lower** bone, not the upper.
- C, septal cartilage first: the cartilage is anterior, not superior, so it cannot be structure 1.
- D, perpendicular plate of the palatine bone: the palatine bone's perpendicular plate forms part of the **lateral** wall of the nose, not the septum.

Final Answer: Perpendicular plate of the ethmoid, vomer and septal cartilage $\Rightarrow$ A

Answer: (A) Go Back to Q2

Q3.

Solution

Concept – the genial tubercles: These four midline spines on the lingual surface of the mandible are arranged as an upper pair and a lower pair, and each pair has its own muscle.

Step 1 – take the upper pair: The **genioglossus** arises from the upper genial tubercles and fans backwards into the tongue.

Step 2 – take the lower pair: The **geniohyoid** arises from the lower genial tubercles and runs back to the body of the hyoid bone.

Step 3 – use the naming clue: The prefix *genio-* means chin, so both muscle names already tell you they start at the chin, at these tubercles.

Step 4 – note the clinical point: Because genioglossus holds the tongue forward, these tubercles matter when a lower complete denture is planned, and they are a

landmark in genioglossus advancement for obstructive sleep apnoea.

Why the other options are wrong:

- A, mylohyoid and anterior belly of digastric: the mylohyoid arises from the **mylohyoid line**, and the anterior belly of digastric from the **digastric fossa**, both of which are separate from the genial tubercles.
- B, genioglossus and anterior belly of digastric: genioglossus is right, but the anterior belly of digastric comes from the digastric fossa, on either side of the midline below the tubercles.
- C, geniohyoid and mylohyoid: geniohyoid is right, but mylohyoid arises from the mylohyoid line running obliquely along the body of the mandible.

Final Answer: Genioglossus from the upper pair and geniohyoid from the lower pair $\Rightarrow$ D

Answer: (D) Go Back to Q3

Q4.

Solution

Concept – the accessory nerve in the posterior triangle: The spinal accessory nerve is the one nerve that crosses the posterior triangle superficially, which is why neck surgery threatens it.

Step 1 – use the site of the operation: A biopsy low in the posterior triangle is the classic cause of iatrogenic accessory nerve injury, because there the nerve lies just under the investing layer of deep cervical fascia with almost nothing to protect it.

Step 2 – recall what the nerve supplies: The spinal accessory nerve (XI) supplies two muscles, **sternocleidomastoid** and **trapezius**. It enters the deep surface of sternocleidomastoid, then emerges at the posterior border of that muscle at the junction of its upper and middle thirds.

Step 3 – explain the shoulder droop: Trapezius holds the scapula up against the weight of the arm. When it is denervated the scapula drops, so the shoulder droops on that side.

Step 4 – explain the failure to shrug: Shrugging is elevation of the shoulder by the upper fibres of trapezius, so it is lost.

Step 5 – explain the failure to abduct above the head: The upper and lower fibres of trapezius rotate the scapula so that the glenoid faces upwards. Without that rotation the arm cannot be carried past about 90 degrees, so raising the arm

overhead fails.

Why the other options are wrong:

- A, the long thoracic nerve: it does not run in the posterior triangle floor at biopsy level, and its injury paralyses serratus anterior, giving **winging** of the scapula, not a drooping shoulder with lost shrug.
- B, the suprascapular nerve: it supplies supraspinatus and infraspinatus, so injury weakens the first 15 degrees of abduction and external rotation. It does not affect shoulder shrug.
- C, the dorsal scapular nerve: it supplies the rhomboids and levator scapulae, which retract and elevate the scapula, and lies deep, under levator scapulae, not in the superficial triangle.

Final Answer: Accessory nerve, supplying sternocleidomastoid and trapezius $\Rightarrow$ D

Answer: (D) Go Back to Q4

Q5.

Solution

Concept – why a paralysed tongue points at its own lesion: Protrusion of the tongue is not a pull, it is a push from behind, and that push is what decides the direction of deviation.

Step 1 – name the protruding muscle: Protrusion is the work of **genioglossus**. It arises from the genial tubercle at the chin and fans backwards, so when it contracts it pushes the body of the tongue forwards and to the opposite side.

Step 2 – note that the two sides normally cancel out: When both genioglossi contract together, the two opposite-directed side components cancel and the tongue comes straight out in the midline.

Step 3 – remove one side: In a hypoglossal lesion the genioglossus on the **lesion** side is paralysed, so it contributes no push.

Step 4 – follow the surviving side: The **normal genioglossus of the opposite side** now acts unopposed. It pushes its own half of the tongue forwards and across the midline.

Step 5 – state the direction: Because the healthy side is pushed forward further than the dead side, the tip swings **towards the paralysed, lesion side**, exactly as the arrow in the figure shows.

Step 6 – add the supporting signs: The affected half also shows wasting and

fasciculation in a lower motor neurone lesion, which confirms the side.

Why the other options are wrong:

- A, deviation away from the lesion because the lesion-side genioglossus is unopposed: self-contradictory. The muscle on the lesion side is the paralysed one, so it cannot be the unopposed one.
- B, deviation away because of an unopposed styloglossus on the lesion side: styloglossus is also supplied by the hypoglossal nerve, so it is paralysed too, and in any case it **retracts** the tongue rather than protruding it.
- D, deviation towards the lesion because of hyoglossus on that side: the direction is right but the reason is wrong. Hyoglossus is hypoglossal-supplied and therefore paralysed, and it depresses the tongue rather than steering the tip.

Final Answer: Towards the lesion, driven by the unopposed opposite genioglossus $\Rightarrow$ C

Answer: (C) Go Back to Q5

Q6.

Solution

Concept – the ansa cervicalis: This is a nerve loop of the cervical plexus lying on the carotid sheath, and its whole job is the strap muscles.

Step 1 – read the description of the roots: The question describes a superior root carrying C1 fibres that hitch a ride on the hypoglossal nerve and then leave it, and an inferior root from C2 and C3. Those two roots joining into a loop define the **ansa cervicalis**.

Step 2 – confirm the position: The loop lies on the anterior surface of the carotid sheath, embedded in the sheath, which is exactly the site given.

Step 3 – list what it supplies: Branches run to **sternohyoid**, **sternothyroid**, and the **superior and inferior bellies of omohyoid**, the infrahyoid strap muscles.

Step 4 – note the important exception: Thyrohyoid is also an infrahyoid muscle, but it is supplied directly by C1 fibres running with the hypoglossal nerve, not through the loop. The question restricts itself to the three muscles the loop actually supplies, so the option stands.

Step 5 – note the function: The strap muscles depress the hyoid and larynx after swallowing and steady the hyoid during speech.

Why the other options are wrong:

- A, the suprahyoid muscles: these have four different nerves. Mylohyoid and the anterior belly of digastric come from V3, geniohyoid from C1 via the hypoglossal, and stylohyoid and the posterior belly of digastric from VII. None comes from the ansa.
- C, the scalene muscles: they are supplied by direct muscular branches from the ventral rami of the cervical nerves, not through the ansa.
- D, the muscles of the soft palate: they are supplied by the pharyngeal plexus, that is by the vagus, with tensor veli palatini taking V3.

Final Answer: Infrahyoid strap muscles $\Rightarrow$ B

Answer: (B) Go Back to Q6

Q7.

Solution

Concept – one muscle, two arches, two nerves: A muscle keeps the nerve of the arch it developed from. If a muscle develops from two arches, it ends up with two nerves.

Step 1 – identify the muscle: Two bellies joined by an intermediate tendon slung to the hyoid bone, running from the mandible to the mastoid, is the **digastric**.

Step 2 – read the figure to name the bellies: Belly **P** runs from the mandible down to the tendon, so it is the **anterior belly**. Belly **Q** runs from the mastoid down to the tendon, so it is the **posterior belly**.

Step 3 – assign the arch of the anterior belly: The anterior belly is a **first arch** derivative, developing with the muscles of mastication and mylohyoid.

Step 4 – assign its nerve: The nerve of the first arch is the mandibular nerve, and the anterior belly is reached by the **nerve to mylohyoid**, a branch of the inferior alveolar nerve from V3.

Step 5 – assign the arch of the posterior belly: The posterior belly is a **second arch** derivative, developing with the muscles of facial expression, stapedius and stylohyoid.

Step 6 – assign its nerve: The nerve of the second arch is the **facial nerve**, which supplies the posterior belly by its digastric branch just after leaving the stylomastoid foramen.

Step 7 – put the pair in the order asked: P then Q gives nerve to mylohyoid from V3, then facial nerve.

Why the other options are wrong:

- B, facial for P and V3 for Q: the two nerves are correct but the bellies are swapped. The facial nerve reaches the muscle from the mastoid end, that is the posterior belly.
- C, facial for both: this would be true if the whole muscle came from the second arch, but the anterior belly is a first arch muscle and takes V3.
- D, glossopharyngeal for Q: the glossopharyngeal nerve is the nerve of the **third** arch and supplies only stylopharyngeus. Digastric has no third arch component.

Final Answer: Nerve to mylohyoid from V3 for P, facial nerve for Q $\Rightarrow$ A

Answer: (A) Go Back to Q7

Q8.

Solution

Concept – how omohyoid splits the posterior triangle: The inferior belly of omohyoid crosses the posterior triangle and divides it into a large upper part and a small lower part.

Step 1 – name the two parts: Above the omohyoid is the occipital triangle. Below it is the **supraclavicular** or **subclavian** triangle, sometimes called the omoclavicular triangle.

Step 2 – fix the front boundary: Both subdivisions belong to the posterior triangle, so the front boundary is the **posterior** border of sternocleidomastoid.

Step 3 – fix the upper boundary: The upper boundary is the **inferior belly of omohyoid**, the muscle that made the division.

Step 4 – fix the lower boundary: The lower boundary is the **middle third of the clavicle**.

Step 5 – name the key content: The **third part of the subclavian artery** arches across the first rib here, lying at its most superficial. This is why the subclavian pulse is felt in this hollow and why the artery can be compressed against the first rib.

Step 6 – add the neighbouring contents: The trunks of the brachial plexus, the subclavian vein and the suprascapular vessels are also here, which is why this triangle is the target for a supraclavicular brachial plexus block.

Why the other options are wrong:

- A, digastric, omohyoid and clavicle with the common carotid: mixes boundaries from different triangles. The posterior belly of digastric bounds the carotid triangle, which is in the **anterior** triangle.
- C, anterior border of sternocleidomastoid with the vertebral artery: the anterior border bounds the anterior triangle, and the vertebral artery is deep, running up through the foramina transversaria, not a content of this triangle.
- D, the two bellies of digastric and the mandible with the submandibular gland: that is the **submandibular (digastric) triangle**, in the anterior triangle.

Final Answer: Posterior border of sternocleidomastoid, inferior belly of omohyoid and the clavicle, containing the third part of the subclavian artery $\Rightarrow$ B

Answer: (B) Go Back to Q8

Q9.

Solution

Concept – clefts are outside, pouches are inside: The pharyngeal grooves or clefts are the ectodermal depressions on the **outer** surface between the arches. The pouches are the endodermal outpocketings on the **inner** surface.

Step 1 – count the clefts: There are four clefts, but only the first survives as an adult structure.

Step 2 – state the fate of the first cleft: The dorsal part of the first cleft deepens and its ectoderm forms the **external acoustic meatus**.

Step 3 – state the fate of clefts 2, 3 and 4: The second arch overgrows them, and they are buried as the transient cervical sinus, which normally disappears completely.

Step 4 – note what happens if it does not: Persistence of the cervical sinus gives a branchial cyst or a branchial fistula on the side of the neck.

Why the other options are wrong:

- A, auditory tube and middle ear cavity: correct in level but wrong in germ layer. These come from the first **pouch**, which is endodermal and lies inside the pharynx, not from the cleft.
- B, tympanic membrane formed entirely by the first cleft: the eardrum is a three-layered structure. The cleft ectoderm supplies only its outer layer; the first pouch endoderm supplies the inner layer and mesoderm supplies the middle. The word “entirely” makes this false.

- D, palatine tonsil from the second cleft: the palatine tonsil comes from the second **pouch**. The second cleft leaves no derivative at all.

Final Answer: External acoustic meatus, from the first cleft ⇒ C

Answer: (C) Go Back to Q9

Q10.

Solution

Concept – reading a syndrome backwards to its embryology: When several unrelated-looking defects appear together, look for one embryonic region that would produce all of them.

Step 1 – take the tetany: Hypocalcaemic tetany in a neonate means **absent parathyroid glands**. The inferior parathyroids come from the third pouch and the superior parathyroids from the fourth.

Step 2 – take the infections: A very low T-cell count with recurrent infection means an **absent or hypoplastic thymus**, and the thymus is a third pouch derivative.

Step 3 – combine the first two: Both parathyroids and thymus point together at failure of the **third and fourth pharyngeal pouches**.

Step 4 – take the cardiac defect: An interrupted aortic arch, along with truncus arteriosus and tetralogy, arises from failure of neural crest cells to populate the outflow tract and the **fourth arch** artery, which is the arch corresponding to the fourth pouch.

Step 5 – take the facies: The abnormal facies also reflects defective neural crest migration into the pharyngeal region.

Step 6 – name the syndrome: This complete picture is **DiGeorge syndrome**, due to a microdeletion at 22q11.2, and the common thread is failure of neural crest migration into the third and fourth pharyngeal apparatus.

Why the other options are wrong:

- A, first and second arches: this gives Treacher Collins syndrome or hemifacial microsomia, with mandibular hypoplasia and ear defects. It does not cause tetany, immunodeficiency or an aortic arch defect.
- B, first and second pouches: the first pouch gives the auditory tube and middle ear, the second the palatine tonsil. Their failure gives conductive deafness and a missing tonsil, not this systemic picture.
- C, second pouch alone: this would cost only the palatine tonsil, which is

clinically almost silent and cannot account for any of the findings.

Final Answer: Failure of the third and fourth pharyngeal pouches $\Rightarrow$ D

Answer: (D) Go Back to Q10

Q11.

Solution

Concept – two ways bone can form: In intramembranous ossification, mesenchyme turns straight into bone. In endochondral ossification, a cartilage model is first laid down and then replaced by bone.

Step 1 – fix the timing: A single ossification centre appears in the sixth week of intrauterine life, in the mesenchyme near the future mental foramen, at the bifurcation of the inferior alveolar nerve into the incisive and mental branches.

Step 2 – fix the position relative to Meckel's cartilage: That centre lies in the mesenchyme **lateral** to Meckel's cartilage. The bone spreads forwards and backwards from it in a membrane.

Step 3 – state the fate of the cartilage itself: Meckel's cartilage is not converted into the body of the mandible. It acts only as a template or guide, and then most of it simply regresses, its perichondrium persisting as the sphenomandibular ligament.

Step 4 – conclude the mode: The mandible is therefore an **intramembranous** bone, and along with the clavicle it is one of the first bones in the body to ossify.

Step 5 – note the one qualification: Secondary cartilages do appear later at the condyle, the coronoid process and the symphysis, and the condylar cartilage does ossify endochondrally. But that is a growth cartilage added afterwards, not the way the body of the mandible is first laid down.

Why the other options are wrong:

- B, Meckel's cartilage replaced by bone: this is the common trap. The cartilage is a guide only; the bone forms beside it, and only the dorsal end of Meckel's cartilage ossifies, into the malleus and incus.
- C, membrane ossification only after the cartilage calcifies and is resorbed: the sequence is invented. Ossification in the membrane starts while Meckel's cartilage is still present, not after it goes.
- D, endochondral from the condylar cartilage over the whole body: the condylar cartilage is a secondary cartilage that appears about the tenth week, long after the body has begun ossifying, and it drives condylar growth only.

Final Answer: Intramembranous, from mesenchyme lateral to Meckel's cartilage $\Rightarrow$ A

Answer: (A) Go Back to Q11

Q12.

Solution

Concept – matching a collagen type to its tissue: There are many collagen types, but for the dental PG exam four of them carry almost all the marks, and each has a signature tissue.

Step 1 – read the figure: The schematic shows thick, cross-banded fibres in parallel bundles with mineral crystals deposited along them. Thick banded fibres in bundles are the hallmark of **type I** collagen.

Step 2 – take the bone clue: About 90 per cent of the organic matrix of bone is type I collagen. The remaining organic fraction is the non-collagenous proteins such as osteocalcin and osteopontin.

Step 3 – take the dentine clue: Dentine matrix is also about 90 per cent type I collagen by weight of its organic component, which is why the same answer covers both tissues in the stem.

Step 4 – extend the list for revision: Type I is also the collagen of cementum, the periodontal ligament, dermis and tendon, that is of every tough load-bearing tissue.

Step 5 – link to a disease for recall: A defect in type I collagen gives osteogenesis imperfecta, with brittle bones, blue sclerae and dentinogenesis imperfecta of the teeth. The fact that both bone and dentine are hit in one disorder confirms they share type I collagen.

Why the other options are wrong:

- A, type II collagen: it is the collagen of **hyaline and elastic cartilage**, including the nucleus pulposus. Its fibrils are thin and unbanded on light microscopy, and they are masked by ground substance.
- B, type IV collagen: it does not form fibrils at all. It forms the sheet-like meshwork of the **basement membrane**, so it can never be a banded bundle.
- D, type III collagen: this makes **reticular fibres**, which are thin, branched and argyrophilic, forming stroma in lymphoid organs. It appears in bone only transiently in woven bone and in early granulation tissue, not as the principal matrix.

Final Answer: Type I collagen $\Rightarrow$ C

Answer: (C) Go Back to Q12

Q13.

Solution

Concept – reading a fibre from its staining behaviour: Connective tissue fibres are told apart by thickness, branching pattern and the stain that shows them.

Step 1 – use the branching clue: The fibres are described as thin, delicate and highly **branched**, forming a network rather than parallel bundles. That branching network is the definition of **reticular** fibres.

Step 2 – use the staining clue: Reticular fibres are **argyrophilic**, that is they bind silver and appear black on a silver impregnation stain. They are also PAS positive because of their high sugar content, and they do not stain with routine haematoxylin and eosin, exactly as the stem says.

Step 3 – name the chemistry: Reticular fibres are made of **type III collagen**. It is the heavy glycosylation of type III collagen, and its coat of proteoglycan, that both binds the silver and keeps the fibrils thin.

Step 4 – confirm with the sites given: The stem names lymph node, spleen and bone marrow. Reticular fibres, secreted by reticular cells, form the supporting stroma of exactly these lymphoid and haemopoietic organs, and also surround liver sinusoids, adipocytes, muscle fibres and small blood vessels.

Step 5 – state why a delicate mesh is right here: These organs need a soft three-dimensional scaffold that lets blood cells and lymphocytes move freely through it, which a fine branching mesh gives and a stiff parallel bundle would not.

Why the other options are wrong:

- A, elastic fibres: they are made of elastin on a fibrillin scaffold, and they are shown by orcein or Verhoeff, not silver. They give recoil in the aorta, elastic cartilage and the ligamenta flava, and do not form the stroma of lymphoid organs.
- C, coarse type I collagen fibres: these are the thick, unbranched, parallel bundles of dense connective tissue such as tendon. They stain pink perfectly well with eosin, so the stem's staining clue rules them out.
- D, oxytalan fibres: these are immature elastic-system fibres found in the **periodontal ligament**, running around blood vessels there. They are a dental curiosity and have nothing to do with the stroma of the spleen or marrow.

Final Answer: Reticular fibres, made of type III collagen $\Rightarrow$ B

Answer: (B) Go Back to Q13

Q14.

Solution

Concept – the order of the external carotid branches: The external carotid gives eight branches, and the exam almost always tests which one comes first.

Step 1 – fix the level of the bifurcation: The common carotid divides at the upper border of the thyroid cartilage, at the level of the fourth cervical vertebra.

Step 2 – read the direction and the landmark: The stem says the branch arises from the **front** of the artery, just below the tip of the greater cornu of the hyoid.

Step 3 – name the artery: That is the **superior thyroid artery**, the first branch of the external carotid, arising almost at the bifurcation itself.

Step 4 – follow its course: It arches downwards and forwards, deep to the infrahyoid muscles, to reach the upper pole of the thyroid gland. Its important companion is the **external laryngeal nerve**, which runs with it and is at risk during thyroidectomy, so the artery is tied close to the gland to spare the nerve.

Step 5 – list the branches in order for revision: Front: superior thyroid, lingual, facial. Back: occipital, posterior auricular. Medial: ascending pharyngeal. Terminal: maxillary and superficial temporal.

Why the other options are wrong:

- A, the ascending pharyngeal artery: it does arise very near the origin, but from the **medial** side, and it is the smallest branch, running upwards on the pharynx. It is not the first branch.
- C, the lingual artery: it is also an anterior branch, but the **second** one, arising at the level of the tip of the greater cornu of the hyoid, above the superior thyroid.
- D, the occipital artery: it arises from the **back** of the external carotid, opposite the facial artery, and runs to the back of the scalp.

Final Answer: Superior thyroid artery $\Rightarrow$ B

Answer: (B) Go Back to Q14

Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	A	2	A	3	D	4	D	5	C
6	B	7	A	8	B	9	C	10	D
11	A	12	C	13	B	14	B		