NEET MDS General Anatomy

Sample Paper – 9

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. The internal carotid artery leaves the neck and enters the skull through a canal that begins on the inferior surface of the petrous part of the temporal bone, runs forward and medially, and opens just above the foramen lacerum. This canal is the:

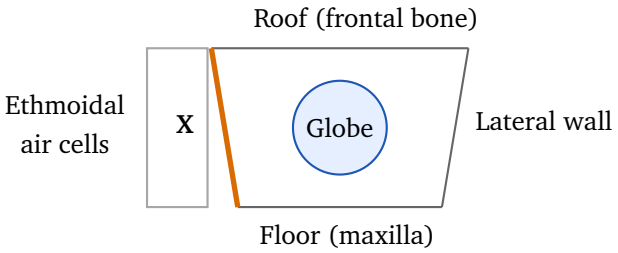
(A) Internal acoustic meatus

(B) Carotid canal

(C) Jugular foramen

(D) Foramen lacerum itself

Q2. The coronal section of the orbit below shows its four walls. The wall marked **X** is paper-thin, separates the orbit from the ethmoidal air cells, and blows out first when a fist or a ball strikes the eye. Wall **X** is the:



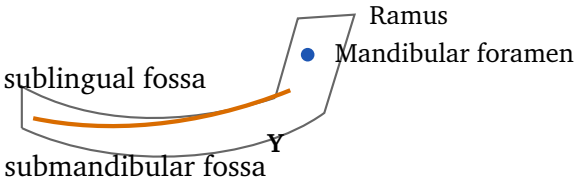
(A) Roof, formed mainly by the orbital plate of the frontal bone

(B) Lateral wall, formed by the zygomatic bone and the greater wing of the sphenoid

(C) Floor, formed mainly by the orbital surface of the maxilla

(D) Medial wall, formed largely by the lamina papyracea of the ethmoid

Q3. The medial surface of the mandible is shown below. The ridge marked **Y** runs downwards and forwards from behind the third molar to the region of the symphysis, gives origin to a muscle that forms the floor of the mouth, and divides the surface into a sublingual fossa above and a submandibular fossa below. Ridge **Y** is the:



(A) Mylohyoid line, the internal oblique ridge

(B) External oblique ridge

(C) Lingula

(D) Genial tubercle

Cranial Nerves

Q4. Secretomotor fibres to the parotid gland relay in a peripheral parasympathetic ganglion that receives its parasympathetic root from the lesser petrosal nerve, a branch of the glossopharyngeal nerve, and hands its postganglionic fibres to the auriculotemporal nerve for distribution. That ganglion is the:

(A) Otic ganglion

(B) Submandibular ganglion

(C) Pterygopalatine ganglion

(D) Ciliary ganglion

Q5. The small parasympathetic ganglion that hangs from the lingual nerve on the upper border of hyoglossus, takes its parasympathetic root from the chorda tympani, and sends its postganglionic secretomotor fibres to the submandibular and sublingual salivary glands, is the:

(A) Otic ganglion

(B) Pterygopalatine ganglion

(C) Ciliary ganglion

(D) Submandibular ganglion

Q6. The largest of the peripheral parasympathetic ganglia, lying in the upper part of its fossa just below the maxillary nerve, receives the greater petrosal nerve as its parasympathetic root and sends postganglionic secretomotor fibres to the lacrimal gland and to the mucous glands of the palate and nose. That ganglion is the:

(A) Pterygopalatine ganglion

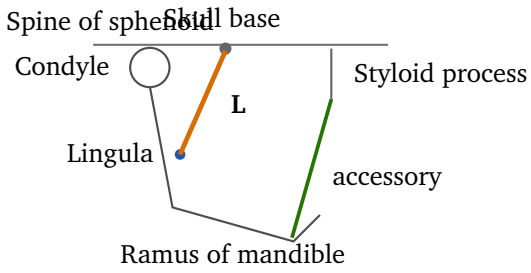
(B) Otic ganglion

(C) Submandibular ganglion

(D) Geniculate ganglion

Muscles, Temporomandibular Joint and Triangles of the Neck

Q7. The medial view of the temporomandibular joint below shows its two accessory ligaments. The ligament marked **L** runs from the spine of the sphenoid down to the lingula of the mandible, lies well away from the capsule, and is a persisting remnant of the first arch cartilage. Ligament **L** is the:



(A) Sphenomandibular ligament

(B) Stylomandibular ligament

(C) Lateral temporomandibular ligament

(D) Pterygomandibular raphe

Q8. The strap muscles of the neck, that is sternohyoid, sternothyroid, thyrohyoid and omohyoid taken as a group, act mainly to:

(A) Elevate the hyoid bone and the floor of the mouth at the start of swallowing

(B) Elevate the mandible during clenching

(C) Depress the hyoid bone and larynx after swallowing, and steady the hyoid so that other muscles can act on the jaw and tongue

(D) Retract and elevate the tongue against the palate

General Embryology and Pharyngeal Arches

Q9. Gastrulation converts the bilaminar disc into three germ layers, and each layer then commits to a fixed set of tissues. Skeletal muscle, bone and the general connective tissues of the body are derived chiefly from the:

(A) Ectoderm

(B) Mesoderm

(C) Endoderm

(D) Trophoblast

Q10. A child is brought to your clinic with hypoplastic zygomatic bones, a small retruded mandible, downward-slanting palpebral fissures, colobo-

mas of the lower eyelids and malformed external ears. Hearing is impaired but intelligence is normal. This picture of mandibulofacial dysostosis (Treacher Collins syndrome) results from defective development of the:

(A) Second pharyngeal arch

(B) Third pharyngeal arch

(C) First pharyngeal arch

(D) Fourth pharyngeal arch

Q11. In the developing tooth germ, the enamel organ and the dental papilla have different origins. The enamel organ, whose inner cells later become ameloblasts, arises from:

(A) Ectomesenchyme condensing under the tooth bud

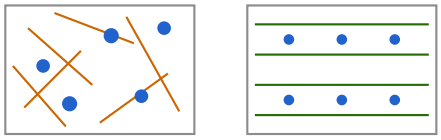
(B) Paraxial mesoderm of the first arch

(C) Oral ectoderm, through the down-growing dental lamina

(D) Endoderm of the primitive stomodeum

General Histology

Q12. The two bone specimens below are drawn at the same magnification. Panel **W** shows coarse collagen bundles running in random directions with many large osteocytes scattered irregularly, while panel **L** shows collagen laid down in orderly parallel sheets with fewer, evenly spaced osteocytes. The bone in panel **W** is normally found in:



Panel **W** Panel **L**

(A) The outer cortex of the adult mandible

(B) Fetal bone and the early callus of a healing fracture

(C) The circumferential lamellae of a normal adult long bone

(D) Articular cartilage of the mandibular condyle

Q13. The periosteum covering the outer surface of the mandible is made of two distinct layers. The deeper of the two layers is:

(A) A dense fibrous layer anchored to bone by Sharpey's fibres

(B) A layer of hyaline cartilage that allows the bone to grow in length

(C) A layer of fat that cushions the bone from muscle pull

(D) An osteogenic or cambium layer containing osteoprogenitor cells that form new bone

Vascular and Lymphatic Supply of the Head and Neck

Q14. Within the substance of the parotid gland, deep to the facial nerve and superficial to the external carotid artery, two veins join to form the retromandibular vein. Those two veins are the:

(A) Facial and lingual veins

(B) Superficial temporal and maxillary veins

(C) Anterior and posterior divisions of the facial vein

(D) Internal jugular and subclavian veins

Detailed Solutions

Q1.

Solution

Concept – the route of the internal carotid artery into the skull: The artery has a named bony canal of its own in the petrous temporal bone.

Step 1 – start at the neck: The internal carotid artery ascends in the carotid sheath without giving any branch in the neck.

Step 2 – find where it leaves the neck: It enters the **carotid canal**, whose lower opening lies on the inferior surface of the petrous part of the temporal bone, in front of the jugular fossa.

Step 3 – follow its course inside the canal: The canal first runs upwards, then turns forwards and medially through the petrous bone.

Step 4 – find where it emerges: The canal opens at the petrous apex, so the artery crosses **above** the foramen lacerum and then enters the cavernous sinus.

Step 5 – match to the question: Every clue in the stem, that is the petrous temporal bone, the forward and medial course and the opening above the foramen lacerum, describes the carotid canal.

Why the other options are wrong:

- A, the internal acoustic meatus: transmits the facial and vestibulocochlear nerves and the labyrinthine artery, not the internal carotid.
- C, the jugular foramen: transmits the sigmoid sinus becoming the internal jugular vein, along with the ninth, tenth and eleventh cranial nerves.
- D, the foramen lacerum: is filled with cartilage in life and transmits nothing vertically. The artery only crosses over its upper surface.

Final Answer: Carotid canal $\Rightarrow$ B

Answer: (B) Go Back to Q1

Q2.

Solution

Concept – the four walls of the orbit and their relative thickness: Each wall has a different bony composition, so each has a different strength.

Step 1 – list the walls: Roof from the frontal bone and lesser wing of sphenoid, lateral wall from the zygomatic bone and greater wing of sphenoid, floor from the

maxilla, zygomatic and palatine bones, and medial wall from the frontal process of maxilla, lacrimal bone, ethmoid and body of sphenoid.

Step 2 – read the relation given in the diagram: Wall **X** separates the orbit from the ethmoidal air cells, and only the medial wall does that.

Step 3 – name the plate: The largest part of the medial wall is the orbital plate of the ethmoid, called the **lamina papyracea** because it is as thin as paper.

Step 4 – state the thickness ranking: The lateral wall is the thickest, since it must take blows from the side. The medial wall is the thinnest.

Step 5 – link to the clinical point: A fist or a ball larger than the orbital rim raises intraorbital pressure suddenly, and the medial wall and the floor give way first. Orbital fat and medial rectus may herniate into the ethmoidal cells, and surgical emphysema appears when the patient blows the nose.

Why the other options are wrong:

- A, the roof: separates the orbit from the anterior cranial fossa, and is not the wall marked in the diagram.
- B, the lateral wall: is the strongest wall of the orbit, so it is not the one that blows out first.
- C, the floor: is also thin and does fracture, but it lies over the maxillary sinus, not the ethmoidal cells, and the diagram marks the wall next to the ethmoid.

Final Answer: Medial wall, the lamina papyracea of the ethmoid $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q2

Q3.

Solution

Concept – the ridges on the mandible: The mandible carries one oblique ridge on its outer surface and one on its inner surface, and they are easy to confuse.

Step 1 – read the surface asked about: The diagram is the **medial** surface of the mandible, so the ridge must be an internal one.

Step 2 – trace the ridge described: It begins behind the third molar and runs downwards and forwards to the symphysis. That is the **mylohyoid line**, also called the internal oblique ridge.

Step 3 – use the muscle clue: The mylohyoid line gives origin to the mylohyoid muscle, and the two mylohyoids together form the muscular floor of the mouth.

Step 4 – use the fossa clue: Above the line lies the sublingual fossa for the sub-

lingual gland; below and behind it lies the submandibular fossa for the superficial part of the submandibular gland. Only the mylohyoid line separates these two fossae.

Step 5 – add the clinical value: The line matters in practice because a lower denture flange must clear it, and because a periapical infection of a lower molar drains into the submandibular space if the apex lies below the line, but into the sublingual space if it lies above.

Why the other options are wrong:

- B, the external oblique ridge: runs on the **lateral** surface of the mandible from the anterior border of the ramus forwards, and gives attachment to buccinator, not mylohyoid.
- C, the lingula: is a small tongue-shaped bony projection guarding the mandibular foramen. It is a single spike, not a long ridge, and the diagram marks the foramen separately.
- D, the genial tubercle: is a set of small spines in the midline of the medial surface for genioglossus and geniohyoid, not an oblique ridge.

Final Answer: Mylohyoid line, the internal oblique ridge $\Rightarrow$ A

Answer: (A) Go Back to Q3

Q4.

Solution

Concept – the four parasympathetic ganglia of the head: Each ganglion has one parasympathetic root, one cranial nerve of origin, one target gland and one nerve that carries its fibres onward.

Step 1 – read the parasympathetic root given: The stem says the root is the **lesser petrosal nerve**. Only one ganglion takes that root, the otic ganglion.

Step 2 – trace the pathway backwards from that root: Preganglionic fibres begin in the inferior salivatory nucleus in the medulla, leave in the glossopharyngeal nerve, pass into its tympanic branch, form the tympanic plexus on the promontory, and leave it as the lesser petrosal nerve.

Step 3 – place the ganglion: The lesser petrosal nerve descends through the foramen ovale and relays in the **otic ganglion**, which lies in the infratemporal fossa just below the foramen ovale, medial to the mandibular nerve.

Step 4 – trace the fibres onward: Postganglionic fibres hitch a ride on the **auriculotemporal nerve**, a branch of V3, and reach the parotid gland as its secretomotor

supply.

Step 5 – match to the question: Lesser petrosal root plus auriculotemporal delivery plus parotid target is the otic ganglion on all three counts.

Why the other options are wrong:

- B, the submandibular ganglion: takes the chorda tympani as its root and supplies the submandibular and sublingual glands, not the parotid.
- C, the pterygopalatine ganglion: takes the greater petrosal nerve and supplies the lacrimal gland and the mucous glands of the nose and palate.
- D, the ciliary ganglion: sits in the orbit, takes its root from the oculomotor nerve, and supplies sphincter pupillae and ciliaris.

Final Answer: Otic ganglion $\Rightarrow$ A

Answer: (A) Go Back to Q4

Q5.

Solution

Concept – the ganglion that serves the two lower salivary glands: Read the root fibre and the target gland together, and only one ganglion fits.

Step 1 – read the position given: The ganglion hangs from the lingual nerve by two roots, on the upper border of hyoglossus. That position belongs to the **submandibular ganglion**.

Step 2 – trace the parasympathetic root: Preganglionic fibres begin in the superior salivatory nucleus, run in the facial nerve, leave it as the **chorda tympani**, and join the lingual nerve in the infratemporal fossa. The lingual nerve simply carries them down to the ganglion.

Step 3 – relay in the ganglion: These preganglionic fibres synapse in the submandibular ganglion.

Step 4 – trace the postganglionic fibres: Some go straight to the submandibular gland below the ganglion; others rejoin the lingual nerve and are carried forward to the sublingual gland and the anterior lingual glands.

Step 5 – note the second root: The ganglion also has a sympathetic root from the plexus on the facial artery, whose fibres pass through without relay and are vasomotor.

Why the other options are wrong:

- A, the otic ganglion: takes the lesser petrosal nerve from IX and supplies the

parotid gland, not the submandibular and sublingual glands.

- B, the pterygopalatine ganglion: takes the greater petrosal nerve and hangs from the maxillary nerve in the pterygopalatine fossa, not from the lingual nerve.
- C, the ciliary ganglion: is an orbital ganglion on the oculomotor pathway and has nothing to do with salivation.

Final Answer: Submandibular ganglion $\Rightarrow$ D

Answer: (D) Go Back to Q5

Q6.

Solution

Concept – the ganglion of hay fever and tears: Match the root nerve to the ganglion, then check the target glands.

Step 1 – read the root given: The parasympathetic root is the **greater petrosal nerve**, a branch of the facial nerve arising at the geniculate ganglion.

Step 2 – follow that nerve: The greater petrosal nerve runs forward over the petrous bone, crosses the foramen lacerum, and there joins the deep petrosal nerve, which carries sympathetic fibres from the plexus on the internal carotid artery.

Step 3 – name the combined nerve and its destination: The two together form the nerve of the pterygoid canal, which reaches the **pterygopalatine ganglion** in the pterygopalatine fossa.

Step 4 – confirm with the size and position: The pterygopalatine ganglion is the largest of the four peripheral parasympathetic ganglia and hangs from the maxillary nerve in the upper part of the fossa, exactly as the stem says.

Step 5 – trace the output: Postganglionic fibres reach the lacrimal gland through the zygomatic and then the lacrimal nerve, and reach the palatal and nasal mucous glands through the palatine and nasal branches.

Why the other options are wrong:

- B, the otic ganglion: takes the lesser petrosal nerve and supplies the parotid gland only.
- C, the submandibular ganglion: takes the chorda tympani and supplies the submandibular and sublingual glands.
- D, the geniculate ganglion: is a **sensory** ganglion of the facial nerve holding the cell bodies of taste fibres. It is not a parasympathetic relay station and

no fibres synapse there.

Final Answer: Pterygopalatine ganglion ⇒ A

Answer: (A) Go Back to Q6

Q7.

Solution

Concept – the ligaments of the temporomandibular joint: The joint has one true ligament thickening its capsule and two accessory ligaments placed at a distance from it.

Step 1 – separate true from accessory: The lateral temporomandibular ligament is the true ligament, a thickening of the lateral part of the capsule itself. The sphenomandibular and stylomandibular ligaments lie away from the capsule and are accessory.

Step 2 – read the attachments given: Ligament **L** runs from the **spine of the sphenoid** above to the **lingula** of the mandible below. Those are the attachments of the sphenomandibular ligament.

Step 3 – use the developmental clue: The stem says the ligament persists from the first arch cartilage. The middle part of Meckel's cartilage regresses and leaves behind the sphenomandibular ligament, which is exactly the clue given.

Step 4 – note the practical relevance: The inferior alveolar nerve and vessels pass between the sphenomandibular ligament and the ramus before entering the mandibular foramen, so the ligament is one landmark you work against during an inferior alveolar nerve block.

Why the other options are wrong:

- B, the stylomandibular ligament: is the other accessory ligament, shown in green in the diagram. It runs from the styloid process to the angle and posterior border of the ramus, not from the sphenoid spine to the lingula.
- C, the lateral temporomandibular ligament: is the true ligament and is fused with the lateral capsule, so it is neither placed away from the capsule nor a remnant of any cartilage.
- D, the pterygomandibular raphe: is a tendinous band between buccinator and superior constrictor, running from the pterygoid hamulus to the mylohyoid line. It is not a ligament of the joint.

Final Answer: Sphenomandibular ligament ⇒ A

Answer: (A) Go Back to Q7

Q8.

Solution

Concept – what the strap muscles do: The four muscles named in the stem form the infrahyoid group, and their name tells you their position and therefore their pull.

Step 1 – place the group: All four lie **below** the hyoid bone, in front of the larynx and trachea, arranged in a superficial plane (sternohyoid and omohyoid) and a deep plane (sternothyroid and thyrohyoid).

Step 2 – read their fixed attachments: Their lower ends are anchored to the sternum, the clavicle and the scapula, all of which lie below the hyoid.

Step 3 – work out the direction of pull: A muscle running from a low fixed point to the hyoid can only pull the hyoid **downwards**. So the group depresses the hyoid, and thyrohyoid and sternothyroid depress the larynx with it.

Step 4 – put it in the swallowing sequence: The suprahyoid muscles first lift the hyoid and larynx during swallowing. The infrahyoid muscles then bring both back down, which is why they are described as depressors.

Step 5 – add their second, quieter role: By fixing the hyoid, they give the suprahyoid muscles a firm base, so that digastric and mylohyoid can depress the mandible instead of simply pulling the hyoid up.

Why the other options are wrong:

- A, elevating the hyoid and the floor of the mouth: is the action of the **suprahyoid** group, that is digastric, stylohyoid, mylohyoid and geniohyoid, which lie above the hyoid.
- B, elevating the mandible: is done by the muscles of mastication, masseter, temporalis and medial pterygoid, none of which are strap muscles.
- D, retracting and elevating the tongue: is done by styloglossus and palatoglossus. The infrahyoid muscles have no attachment to the tongue.

Final Answer: Depress the hyoid and larynx and steady the hyoid $\Rightarrow$ C

Answer: (C) Go Back to Q8

Q9.

Solution

Concept – what each germ layer becomes: After gastrulation in the third week the embryo has three layers, and each is committed to a fixed list of tissues.

Step 1 – take the ectoderm: It gives the epidermis and its appendages, the whole nervous system, the enamel organ, and, through neural crest, much of the facial skeleton.

Step 2 – take the endoderm: It gives the epithelial lining of the gut and respiratory tract, and the parenchyma of the liver, pancreas, thyroid, parathyroids and thymus.

Step 3 – take the mesoderm: It gives **muscle of all three types, bone, cartilage, all connective tissue, blood and blood vessels, the kidneys and the gonads**. Muscle, bone and connective tissue in the stem all sit on this one list.

Step 4 – confirm by elimination: No other single layer supplies all three tissues named in the stem, so mesoderm is the only possible answer.

Why the other options are wrong:

- A, ectoderm: gives epidermis and nervous tissue. Its neural crest does contribute to some head skeleton, but ectoderm is not the general source of muscle, bone and connective tissue of the body.
- C, endoderm: gives only epithelial linings and glandular parenchyma, never muscle or bone.
- D, trophoblast: is not a germ layer at all. It is the outer cell layer of the blastocyst and forms the placenta.

Final Answer: Mesoderm $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q9

Q10.

Solution

Concept – reading a facial syndrome back to its arch: A syndrome that damages one arch will damage every structure that arch forms, so list the affected structures and see which arch owns them.

Step 1 – list what is abnormal in the child: The zygomatic bones, the mandible, the lower eyelids, the external ears and hearing.

Step 2 – recall the skeletal derivatives of the first arch: The maxillary process

gives the maxilla, the zygomatic bone and the squamous temporal. The mandibular process gives the mandible, and Meckel's cartilage gives the malleus and incus.

Step 3 – match the list: A small zygoma and a small mandible are first arch skeletal defects. Malformed ears with conductive deafness fit failure of the first arch ossicles and of the external ear region.

Step 4 – name the condition: This combination is **Treacher Collins syndrome**, also called mandibulofacial dysostosis. It follows a failure of neural crest cells to migrate into and populate the first arch.

Step 5 – note the dental relevance: Because the mandible is hypoplastic and the airway is narrow, these patients often have severe crowding, an anterior open bite and difficulty with airway management during dental treatment under sedation.

Why the other options are wrong:

- A, the second arch: would affect the stapes, styloid process, lesser cornu of the hyoid and the muscles of facial expression. The child has no facial palsy, and the zygoma and mandible are not second arch bones.
- B, the third arch: forms the greater cornu and lower body of the hyoid and stylopharyngeus. A third arch defect would not touch the zygoma, mandible or eyelids.
- D, the fourth arch: forms the laryngeal cartilages and the pharyngeal and laryngeal muscles, so a defect would present with swallowing and voice problems, not facial hypoplasia.

Final Answer: First pharyngeal arch $\Rightarrow$ C

Answer: (C) Go Back to Q10

Q11.

Solution

Concept – the two halves of the tooth germ have two different origins: The tooth is built where an epithelium meets a mesenchyme, and each part keeps the origin of its own tissue.

Step 1 – start at the oral epithelium: In the sixth week the **oral ectoderm** lining the stomodeum thickens into a horseshoe band, the dental lamina, in each jaw.

Step 2 – follow the lamina down: The dental lamina grows down into the underlying ectomesenchyme and buds off ten swellings in each jaw. Each bud enlarges into the cap and then the bell stage and becomes the **enamel organ**.

Step 3 – name the cells it makes: The inner enamel epithelium of that organ

differentiates into ameloblasts, which secrete enamel. Enamel is therefore the only dental hard tissue of ectodermal origin.

Step 4 – contrast with the papilla: The dental papilla, which is trapped inside the concavity of the enamel organ, comes from neural crest derived **ectomesenchyme**. It gives odontoblasts and dentine, and its central part becomes the pulp.

Step 5 – add the follicle: The ectomesenchyme condensing around the whole germ becomes the dental follicle, which gives cementum, periodontal ligament and alveolar bone. So of the four dental tissues only enamel is ectodermal.

Why the other options are wrong:

- A, ectomesenchyme condensing under the tooth bud: forms the dental **papilla** and follicle, not the enamel organ.
- B, paraxial mesoderm of the first arch: forms the muscles of mastication of that arch, not the tooth germ epithelium.
- D, endoderm of the stomodeum: is wrong on two counts. The stomodeum is lined by **ectoderm**, and endoderm begins only beyond the buccopharyngeal membrane.

Final Answer: Oral ectoderm, through the dental lamina $\Rightarrow$ C

Answer: (C) Go Back to Q11

Q12.

Solution

Concept – woven bone versus lamellar bone: All bone starts as woven bone and is later replaced by lamellar bone, so the type you see tells you how old and how mature the bone is.

Step 1 – read panel W: Coarse collagen bundles running in random directions, with many large osteocytes scattered irregularly. That is the definition of **woven or immature bone**.

Step 2 – read panel L: Collagen in orderly parallel sheets with fewer, evenly spaced osteocytes. That is **lamellar or mature bone**.

Step 3 – list the extra differences: Woven bone is laid down fast, is less mineralised, has more cells per unit volume and is mechanically weaker. Lamellar bone is laid down slowly, is more mineralised, has fewer cells and is much stronger.

Step 4 – ask where woven bone occurs normally: It is the normal bone of the **fetus** and of the newborn, and it reappears normally in the early **callus** of a

healing fracture and in the sockets after extraction.

Step 5 – note what happens next: Woven bone is remodelled into lamellar bone within months. If woven bone persists in an adult skeleton outside a healing site, it is abnormal and points to conditions such as Paget's disease, fibrous dysplasia or osteosarcoma.

Why the other options are wrong:

- A, the outer cortex of the adult mandible: is fully remodelled lamellar bone, arranged as osteons and circumferential lamellae, so it matches panel L instead.
- C, the circumferential lamellae of an adult long bone: are lamellar by definition, since the name itself states that the collagen is in lamellae.
- D, articular cartilage of the condyle: is not bone at all. In the temporomandibular joint it is fibrocartilage, and it contains chondrocytes in lacunae, not osteocytes.

Final Answer: Fetal bone and the early fracture callus $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q12

Q13.

Solution

Concept – the two layers of the periosteum: The periosteum is not a single membrane. It has an outer mechanical layer and an inner cellular layer, and only the inner one makes bone.

Step 1 – describe the outer layer: It is a **fibrous** layer of dense collagen with blood vessels and nerves. Its collagen bundles continue into the bone as Sharpey's fibres, which anchor the membrane and give tendons a firm hold.

Step 2 – describe the inner layer: It is the **osteogenic or cambium** layer, and it lies directly against the bone surface. It is cellular rather than fibrous.

Step 3 – name the cells in it: It contains osteoprogenitor cells, which are undifferentiated mesenchymal cells that divide and mature into osteoblasts.

Step 4 – state what the layer does: Those osteoblasts lay down new bone on the surface, so this layer drives appositional growth in width and is the main source of new bone in fracture healing.

Step 5 – read the question again: The question asks for the **deeper** of the two layers, and the deeper one is the osteogenic cambium layer.

Why the other options are wrong:

- A, a dense fibrous layer with Sharpey's fibres: is a correct description of periosteum, but it is the **outer** layer, and the question asks for the deeper one.
- B, hyaline cartilage for growth in length: describes the epiphyseal growth plate, which lies inside the bone at the epiphysis and is no part of the periosteum.
- C, a layer of fat: does not exist in the periosteum. Fatty marrow lies inside the medullary cavity.

Final Answer: Osteogenic or cambium layer with osteoprogenitor cells $\Rightarrow$ D

Answer: (D) Go Back to Q13

Q14.

Solution

Concept – the three structures inside the parotid gland: From superficial to deep the gland contains the facial nerve, then the retromandibular vein, then the external carotid artery. The vein forms where it lies.

Step 1 – follow the first tributary: The **superficial temporal vein** drains the scalp, descends in front of the tragus and enters the upper part of the parotid gland.

Step 2 – follow the second tributary: The **maxillary vein** drains the pterygoid venous plexus in the infratemporal fossa and passes backwards into the same part of the gland.

Step 3 – join them: The two unite within the substance of the parotid gland, behind the neck of the mandible, to form the **retromandibular vein**.

Step 4 – follow the vein downwards: Lower in the gland it divides into an anterior and a posterior division. The anterior division joins the facial vein to form the common facial vein, which drains to the internal jugular vein.

Step 5 – finish the posterior division: The posterior division joins the posterior auricular vein to form the external jugular vein.

Why the other options are wrong:

- A, the facial and lingual veins: drain to the internal jugular vein, and the facial vein **receives** the anterior division of the retromandibular vein rather than forming it.

- C, the anterior and posterior divisions of the facial vein: is a reversal of the facts. It is the retromandibular vein that splits into anterior and posterior divisions, and it does so after being formed, not before.
- D, the internal jugular and subclavian veins: unite behind the sternoclavicular joint to form the brachiocephalic vein, which is nowhere near the parotid gland.

Final Answer: Superficial temporal and maxillary veins $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q14

Answer Key

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