NEET MDS General Anatomy

Sample Paper – 5

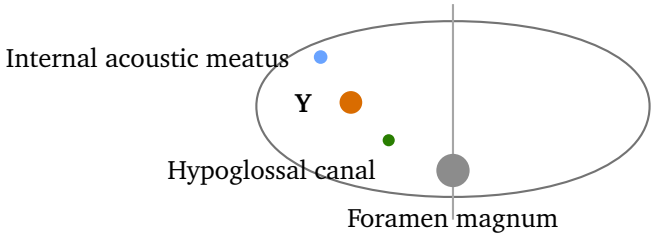
Duration: 11 Minutes **Maximum Marks: 56**

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. In the schematic of the posterior cranial fossa below, the opening marked **Y** lies between the petrous temporal bone and the occipital bone, lateral to the hypoglossal canal. The set of cranial nerves leaving the skull through **Y** is:



(A) Facial and vestibulocochlear nerves

(B) Glossopharyngeal, vagus and accessory nerves

(C) Hypoglossal nerve only

(D) Vagus and hypoglossal nerves

Q2. The sphenoid air sinus lies within the body of the sphenoid bone. The structure that lies immediately **above** its roof, and is therefore approached surgically through this sinus, is the:

(A) Cavernous sinus

(B) Nasopharynx

(C) Pterygoid canal

(D) Pituitary gland in the hypophyseal fossa

Q3. The angle of the mandible gives attachment to two powerful elevators of the jaw, one on its lateral surface and one on its medial surface. These two muscles are the:

(A) Masseter laterally and medial pterygoid medially

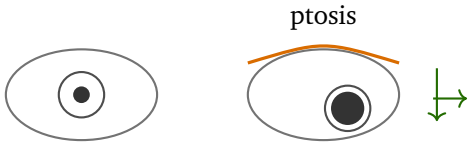
(B) Temporalis laterally and lateral pterygoid medially

(C) Masseter laterally and mylohyoid medially

(D) Buccinator laterally and medial pterygoid medially

Cranial Nerves

Q4. A 58-year-old man attends with a drooping right upper eyelid. On lifting the lid you find the right eye resting in the position shown below, with a widely dilated pupil that does not react to light. The nerve involved is the:



Normal left eye Right eye: down and out

(A) Trochlear nerve

(B) Abducens nerve

(C) Oculomotor nerve

(D) Ophthalmic division of the trigeminal nerve

Q5. A patient cannot abduct the left eye beyond the midline and has horizontal diplopia that worsens on looking to the left. The paralysed muscle and its nerve are the:

(A) Medial rectus, supplied by the oculomotor nerve

(B) Lateral rectus, supplied by the abducens nerve

(C) Superior oblique, supplied by the trochlear nerve

(D) Inferior oblique, supplied by the oculomotor nerve

Q6. The only cranial nerve that emerges from the **dorsal** surface of the brainstem and then crosses to the opposite side supplies a single extraocular muscle. That muscle is the:

(A) Inferior rectus

(B) Levator palpebrae superioris

(C) Superior oblique

(D) Superior rectus

Muscles, Temporomandibular Joint and Triangles of the Neck

Q7. The temporomandibular joint is unusual among the synovial joints of the body. Which of the following statements describes it **correctly**?

(A) It is a synovial hinge joint whose articular surfaces are covered with hyaline cartilage and which has no intra-articular disc

(B) It is a cartilaginous joint with a fibrocartilaginous disc between the two bones

(C) It is a synovial condylar joint whose articular surfaces are covered with hyaline cartilage, the disc dividing it into two compartments

(D) It is a synovial condylar joint whose articular surfaces are covered with fibrocartilage, and an intra-articular disc divides it into upper and lower compartments

Q8. The submental triangle is bounded on each side by the anterior belly of digastric, below by the body of the hyoid bone, and its floor is formed by the mylohyoid. The structures it contains are the:

(A) Submental lymph nodes and the beginning of the anterior jugular veins

(B) Submandibular gland and the lingual nerve

(C) Carotid bifurcation and the internal jugular vein

(D) Accessory nerve and the deep cervical lymph nodes

General Embryology and Pharyngeal Arches

Q9. A population of cells delaminates from the crests of the neural folds, migrates into the pharyngeal arches and the frontonasal region, and there gives rise to the facial bones, the arch cartilages, the odontoblasts that lay down dentine and the connective tissue of the dental pulp. These cells are the:

(A) Cells of the paraxial mesoderm

(B) Neural crest cells

(C) Cells of the surface ectoderm of the stomodeum

(D) Cells of the endoderm of the foregut

Q10. The endoderm of one pharyngeal pouch proliferates into the surrounding mesenchyme, is later infiltrated by lymphoid tissue, and its remnant persists in the adult as the tonsillar fossa. The lymphoid organ formed from this pouch, and the pouch itself, are the:

(A) Thymus, from the third pouch

(B) Inferior parathyroid, from the third pouch

(C) Superior parathyroid, from the fourth pouch

(D) Palatine tonsil, from the second pouch

Q11. The face develops around the stomodeum from five swellings. The philtrum of the upper lip, the cheeks and the lower lip come respectively from the:

(A) Frontonasal process, the maxillary processes and the mandibular processes

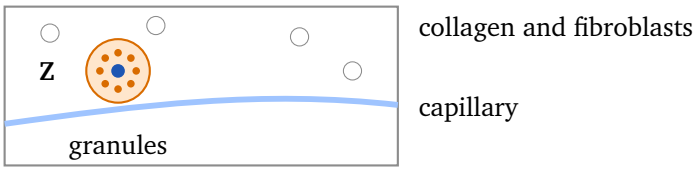
(B) Maxillary processes, the frontonasal process and the mandibular processes

(C) Mandibular processes, the frontonasal process and the maxillary processes

(D) Lateral nasal processes, the mandibular processes and the maxillary processes

General Histology

Q12. The section of loose connective tissue below shows a cell marked **Z** packed with coarse metachromatic granules and lying alongside a small blood vessel. Degranulation of this cell releases histamine and heparin. Cell **Z** is the:



(A) Fibroblast

(B) Plasma cell

(C) Mast cell

(D) Adipocyte

Q13. Under the light microscope, skeletal muscle shows regular cross striations while smooth muscle does not. The reason skeletal muscle appears striated is that:

(A) Its actin and myosin filaments are arranged in register into repeating sarcomeres, so the A and I bands line up across the fibre

(B) Its fibres are multinucleated and the nuclei lie in rows at the periphery

(C) It contains far more mitochondria between the myofibrils than smooth muscle does

(D) Its fibres are longer and thicker than smooth muscle cells

Vascular and Lymphatic Supply of the Head and Neck

Q14. A squamous cell carcinoma sits on the lower lip 2 cm lateral to the midline. The nodes you must examine first, and the reason the exact midline behaves differently, are:

(A) Submental nodes, because the whole lower lip drains to them

(B) Submandibular nodes, because the lateral part of the lower lip drains to them, while the central part drains to the submental nodes

(C) Parotid nodes, because the lower lip drains upwards over the face

(D) Jugulo-omohyoid node, because it is the node of the lower lip

Detailed Solutions

Q1.

Solution

Concept – the exits of the posterior cranial fossa: The floor of the posterior fossa has three main openings for nerves, and each has a fixed content.

Step 1 – read the position given: The opening marked **Y** lies between the petrous temporal bone and the occipital bone.

Step 2 – name the opening in that position: That gap is the **jugular foramen**, formed by the jugular notch of the petrous temporal against the jugular notch of the occipital bone.

Step 3 – recall its nerve content: The jugular foramen transmits the **glossopharyngeal (IX), vagus (X) and accessory (XI)** nerves through its intermediate and posterior compartments.

Step 4 – recall its vascular content: It also transmits the inferior petrosal sinus in front and the beginning of the internal jugular vein behind, the vein arising from the sigmoid sinus.

Step 5 – confirm with the second clue: The question places **Y** lateral to the hypoglossal canal, which is exactly where the jugular foramen sits. Damage here gives the jugular foramen syndrome of Vernet, that is loss of taste from the posterior third of the tongue, palatal and vocal cord palsy, and weakness of sternocleidomastoid and trapezius.

Why the other options are wrong:

- A, the facial and vestibulocochlear nerves: leave through the **internal acoustic meatus**, which the diagram marks separately, higher and more anteriorly on the petrous bone.
- C, the hypoglossal nerve only: passes through the **hypoglossal canal**, again marked separately in the diagram, medial to the jugular foramen.
- D, the vagus and hypoglossal nerves: mixes two different foramina. The vagus uses the jugular foramen while the hypoglossal uses its own canal, so they never share one opening.

Final Answer: Glossopharyngeal, vagus and accessory nerves $\Rightarrow$ B

Answer: (B) Go Back to Q1

Q2.

Solution

Concept – the relations of the sphenoid sinus: The sphenoid sinus hollows out the body of the sphenoid, so its walls are related to whatever sits on or beside that body.

Step 1 – fix the position of the sinus: It lies in the body of the sphenoid and opens into the sphenoethmoidal recess, above and behind the superior concha.

Step 2 – take the roof: The upper surface of the body of the sphenoid carries the **hypophyseal fossa (sella turcica)**, which lodges the **pituitary gland**. So the pituitary lies directly above the roof of the sinus.

Step 3 – use that relation clinically: Because only a thin plate of bone separates the two, the pituitary can be reached by the **trans-sphenoidal approach**, passing through the nose and the sphenoid sinus to the gland.

Step 4 – take the other walls for completeness: The lateral wall relates to the cavernous sinus and its contents, the floor forms the roof of the nasopharynx, and the optic canal lies anterosuperiorly.

Step 5 – match to the question: The question asks specifically for the structure **above the roof** that is approached through the sinus, and that is the pituitary gland.

Why the other options are wrong:

- A, the cavernous sinus: is a **lateral** relation of the sphenoid sinus, not a superior one.
- B, the nasopharynx: lies **below** the floor of the sinus, so it cannot be above the roof.
- C, the pterygoid canal: runs in the base of the pterygoid process, below and lateral to the sinus, and it carries the nerve of the pterygoid canal rather than being a surgical target.

Final Answer: Pituitary gland in the hypophyseal fossa $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q2

Q3.

Solution

Concept – the muscular sling at the angle of the mandible: The angle is where the lower border of the body meets the posterior border of the ramus, and it is gripped by a sling of two muscles.

Step 1 – take the lateral surface: The **masseter** arises from the zygomatic arch and inserts into the lateral surface of the ramus, the angle and the coronoid process.

Step 2 – take the medial surface: The **medial pterygoid** arises mainly from the medial surface of the lateral pterygoid plate and inserts on the medial surface of the ramus and the angle.

Step 3 – put the two together: The two insertions face each other across the angle, forming the pterygomasseteric sling that suspends the mandible.

Step 4 – note the action: Both muscles are **elevators** of the mandible, which is what the question states.

Step 5 – note the clinical use: Because the sling grips the angle, a fracture at the angle is often held in place by these muscles, and stripping them is what destabilises the fragments during fixation.

Why the other options are wrong:

- B, temporalis and lateral pterygoid: the temporalis inserts on the **coronoid process** and anterior border of the ramus, not the angle, and the lateral pterygoid inserts on the pterygoid fovea of the condyle and the disc.
- C, masseter and mylohyoid: the mylohyoid arises from the mylohyoid line on the medial surface of the **body**, forms the floor of the mouth, and is a depressor rather than an elevator.
- D, buccinator and medial pterygoid: the buccinator arises from the alveolar margins and the pterygomandibular raphe, is a muscle of **facial expression** supplied by the facial nerve, and takes no attachment at the angle.

Final Answer: Masseter laterally and medial pterygoid medially $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q3

Q4.

Solution

Concept – reading an eye that sits down and out: The resting position of a paralysed eye is set by the muscles that still work.

Step 1 – read the ptosis: The drooping upper lid means **levator palpebrae superioris** is paralysed, and its motor supply is the oculomotor nerve (III).

Step 2 – read the dilated fixed pupil: The parasympathetic fibres for sphincter pupillae travel in the oculomotor nerve to the ciliary ganglion. Losing them leaves the dilator unopposed, so the pupil is wide and does not react to light.

Step 3 – read the eye position: The oculomotor nerve supplies superior rectus, inferior rectus, medial rectus and inferior oblique. With all four paralysed, only **lateral rectus** (VI) and **superior oblique** (IV) still pull.

Step 4 – work out the resultant: Lateral rectus abducts the eye and superior oblique depresses and intorts it, so the eye settles **down and out**, exactly as the diagram shows.

Step 5 – put the three signs together: Ptosis, a fixed dilated pupil and a down-and-out eye is the complete third nerve palsy. In an older patient a painful third nerve palsy with pupil involvement suggests a posterior communicating artery aneurysm compressing the nerve.

Why the other options are wrong:

- A, the trochlear nerve: supplies only superior oblique, so a palsy gives vertical diplopia on looking down and in, with a head tilt away from the lesion. There is no ptosis and no pupil change.
- B, the abducens nerve: supplies only lateral rectus, so the eye is pulled **medially** by the unopposed medial rectus. That is the opposite of the position shown, and again the pupil and lid are normal.
- D, the ophthalmic division of the trigeminal nerve: is purely **sensory** to the cornea, forehead and upper lid. A lesion causes loss of the corneal reflex, not paralysis or a dilated pupil.

Final Answer: Oculomotor nerve $\Rightarrow$ C

Answer: (C) Go Back to Q4

Q5.

Solution

Concept – matching a lost eye movement to its muscle and nerve: Each extraocular muscle has one primary action, so the lost movement names the muscle.

Step 1 – read the lost movement: The patient cannot **abduct** the left eye, that is cannot turn it outwards past the midline.

Step 2 – name the muscle that abducts: The only pure abductor of the eyeball is the **lateral rectus**.

Step 3 – name its nerve: Lateral rectus is supplied by the **abducens nerve (VI)**, one of the two exceptions to the rule that III supplies the extraocular muscles.

Step 4 – explain the diplopia pattern: Because the two eyes fail to line up horizontally, the images are side by side, which is horizontal diplopia. It worsens on looking to the left because that is the direction the paralysed lateral rectus should be pulling.

Step 5 – add the clinical note: The abducens nerve has the longest intracranial course and bends over the petrous ridge, so raised intracranial pressure stretches it. That makes a sixth nerve palsy a false localising sign.

Why the other options are wrong:

- A, medial rectus with the oculomotor nerve: the medial rectus **adducts**. Its paralysis would stop the eye turning inwards, which is not what the patient has lost.
- C, superior oblique with the trochlear nerve: the superior oblique depresses the adducted eye and intorts it. Its palsy gives **vertical** diplopia worst on looking down and in, not horizontal diplopia on abduction.
- D, inferior oblique with the oculomotor nerve: the inferior oblique elevates the adducted eye and extorts it, so its loss affects upward gaze in adduction, not abduction.

Final Answer: Lateral rectus, supplied by the abducens nerve $\Rightarrow$ B

Answer: (B) Go Back to Q5

Q6.

Solution

Concept – the one dorsally emerging cranial nerve: Every other cranial nerve leaves the ventral or lateral aspect of the brainstem.

Step 1 – identify the nerve from the clue: The **trochlear nerve (IV)** is the only cranial nerve to emerge from the **dorsal** surface of the brainstem, just below the inferior colliculi.

Step 2 – confirm the second clue: It is also the only cranial nerve that **decussates** completely, so each trochlear nucleus supplies the muscle of the opposite eye.

Step 3 – name the muscle it supplies: The trochlear nerve supplies exactly one muscle, the **superior oblique**.

Step 4 – explain the name: The tendon of superior oblique hooks through the trochlea, a fibrous pulley on the frontal bone, which is where the nerve gets its name.

Step 5 – note the consequence of a lesion: Loss of superior oblique leaves the eye slightly elevated and extorted. The patient tilts the head to the opposite side to compensate and complains most when reading or walking downstairs.

Why the other options are wrong:

- A, the inferior rectus: is supplied by the **oculomotor nerve**, which emerges ventrally from the interpeduncular fossa.
- B, the levator palpebrae superioris: is also supplied by the **oculomotor nerve**, and it moves the eyelid rather than the eyeball.
- D, the superior rectus: is another **oculomotor** muscle. Its nucleus does send crossed fibres, but the nerve itself still emerges ventrally, so it does not fit the clue.

Final Answer: Superior oblique $\Rightarrow$ C

Answer: (C) Go Back to Q6

Q7.

Solution

Concept – what makes the temporomandibular joint different: The TMJ breaks the usual rules of a synovial joint in two ways, and the question tests both.

Step 1 – classify the joint type: It is a **synovial** joint of the **condylar (ellipsoid)** variety, between the condyle of the mandible and the mandibular fossa with the

articular eminence of the temporal bone.

Step 2 – classify the articular covering: This is the first exception. Almost every synovial joint is lined with hyaline cartilage, but both TMJ surfaces are covered with **fibrocartilage**, which resists the shear of chewing better.

Step 3 – account for the disc: This is the second point. An oval **intra-articular disc** of fibrous tissue is attached to the capsule all round and divides the joint into two separate compartments.

Step 4 – name what each compartment does: The **upper** compartment, between disc and temporal bone, allows gliding or translation. The **lower** compartment, between disc and condyle, allows rotation or hinge movement.

Step 5 – read the options against these three facts: Only one option states synovial condylar, fibrocartilage covering and a disc dividing the joint into two compartments, and that is option D.

Why the other options are wrong:

- A, synovial hinge with hyaline cartilage and no disc: wrong on all three counts. Movement is not pure hinging, the covering is fibrocartilage, and a disc is always present.
- B, a cartilaginous joint: is plainly wrong. The TMJ has a capsule, a synovial membrane and synovial fluid, so it is synovial, and cartilaginous joints permit nothing like the range seen here.
- C, synovial condylar with hyaline cartilage: gets the type and the disc right but the covering wrong. Hyaline cartilage is the very feature the TMJ does **not** have.

Final Answer: Synovial condylar joint with fibrocartilage-covered surfaces and an intra-articular disc $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q7

Q8.

Solution

Concept – the submental triangle: It is the single midline triangle of the neck, and it is the only unpaired one.

Step 1 – confirm the boundaries the question gives: On each side the **anterior belly of digastric**, below the **body of the hyoid**, and the floor the two **mylohyoid** muscles meeting at their raphe. The apex points up at the chin.

Step 2 – recall the lymphatic content: It holds the **submental lymph nodes**,

which sit on the mylohyoid.

Step 3 – recall the venous content: The small veins here unite to begin the **anterior jugular veins**, which then run down the front of the neck.

Step 4 – put the two together: So the contents are the submental nodes and the origin of the anterior jugular veins, which is option A.

Step 5 – note the clinical value: The submental nodes drain the tip of the tongue, the floor of the mouth, the lower incisors and the **central** part of the lower lip, so an enlarged submental node points you to a midline lesion.

Why the other options are wrong:

- B, the submandibular gland and lingual nerve: lie in the **submandibular (digastric) triangle**, lateral to the submental triangle and bounded by both bellies of digastric and the mandible.
- C, the carotid bifurcation and internal jugular vein: lie in the **carotid triangle**, much further back and deeper in the neck.
- D, the accessory nerve and deep cervical nodes: the accessory nerve crosses the **posterior** triangle, and the deep cervical chain lies along the internal jugular vein under sternocleidomastoid.

Final Answer: Submental lymph nodes and the beginning of the anterior jugular veins $\Rightarrow$ A

Answer: (A) Go Back to Q8

Q9.

Solution

Concept – the fourth germ layer of the head: The head and face are not built by mesoderm alone, and this is why the head is developmentally special.

Step 1 – trace the origin of these cells: At the time the neural folds fuse, cells at the crest of each fold lose their adhesion, leave the neuroectoderm and migrate away. These are the **neural crest cells**.

Step 2 – follow them into the head: Cranial neural crest cells stream into the frontonasal region and into each pharyngeal arch, where they form the bulk of the arch mesenchyme, often called ectomesenchyme.

Step 3 – match the skeletal derivatives: They form the **facial and most of the skull bones** by intramembranous ossification, together with the arch **cartilages** such as Meckel's cartilage.

Step 4 – match the dental derivatives: The dental papilla is neural crest in origin, so the **odontoblasts that lay down dentine** and the **connective tissue of the dental pulp** are neural crest derivatives. Cementum and the periodontal ligament come from the same source.

Step 5 – confirm against the question: Bone, cartilage, dentine and pulp are all listed, and only the neural crest supplies all four in the head.

Why the other options are wrong:

- A, paraxial mesoderm: does contribute in the head, but it forms the **striated muscle** of the arches and the endothelium of the vessels, not dentine or pulp.
- C, surface ectoderm of the stomodeum: forms the **enamel organ** and hence the ameloblasts and enamel, which is the tissue the question does **not** list.
- D, endoderm of the foregut: lines the pharyngeal pouches and gives glandular derivatives such as the tonsil, thymus and parathyroids, but no skeletal or dental hard tissue.

Final Answer: Neural crest cells $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q9

Q10.

Solution

Concept – what each pharyngeal pouch becomes: The endodermal pouches give the glands and lymphoid organs of the neck, one set per pouch.

Step 1 – read the adult remnant given: The question says the remnant persists as the **tonsillar fossa**, the recess between the palatoglossal and palatopharyngeal arches.

Step 2 – name the organ that sits there: That fossa lodges the **palatine tonsil**.

Step 3 – trace the pouch it came from: The endoderm of the **second pouch** proliferates into the mesenchyme as buds, which are later invaded by lymphoid tissue to form the tonsil. The buds hollow out to become the tonsillar crypts, and the unfilled part of the pouch stays as the tonsillar fossa.

Step 4 – check the lymphoid clue: The question says the endoderm is **infiltrated by lymphoid tissue**, which fits the tonsil exactly. The lymphocytes themselves arrive from elsewhere, so the pouch supplies only the epithelium.

Step 5 – match pouch and organ together: Palatine tonsil from the second pouch is the only pairing that satisfies both the organ and the remnant.

Why the other options are wrong:

- A, thymus from the third pouch: the thymus does come from the ventral part of the third pouch, but it descends into the thorax and leaves no tonsillar fossa behind.
- B, inferior parathyroid from the third pouch: this pairing is correct in itself, but the parathyroid is an endocrine gland, not lymphoid, and its remnant is nothing like a tonsillar fossa.
- C, superior parathyroid from the fourth pouch: again a correct pairing on its own, but once more endocrine rather than lymphoid, and unrelated to the tonsillar fossa.

Final Answer: Palatine tonsil, from the second pouch $\Rightarrow$ D

Answer: (D) Go Back to Q10

Q11.

Solution

Concept – the five facial swellings: By the fourth week the stomodeum is ringed by one frontonasal process above, two maxillary processes at the sides and two mandibular processes below.

Step 1 – take the philtrum: The **frontonasal process** sends down the medial nasal processes. The two fuse in the midline to give the intermaxillary segment, which becomes the philtrum of the upper lip, the premaxilla and the primary palate.

Step 2 – take the cheeks: The **maxillary processes**, one from the dorsal end of each first arch, grow forward under the eye. They form the cheeks, the lateral parts of the upper lip, the maxilla and the secondary palate.

Step 3 – take the lower lip: The two **mandibular processes** fuse across the midline early, giving the whole **lower lip**, the chin and the lower jaw.

Step 4 – read the question in order: The question asks for philtrum, then cheeks, then lower lip. That gives frontonasal, then maxillary, then mandibular.

Step 5 – note what is left over: The lateral nasal processes are not asked about here. They form the alae of the nose, and the nasolacrimal duct develops in their groove with the maxillary process.

Why the other options are wrong:

- B, maxillary then frontonasal then mandibular: swaps the first two. The

maxillary processes give the lateral upper lip and cheeks but never the midline philtrum.

- C, mandibular then frontonasal then maxillary: puts the mandibular processes at the philtrum, but they lie **below** the stomodeum and can only build the lower lip.
- D, lateral nasal then mandibular then maxillary: the lateral nasal processes form only the alae of the nose and take no part in the lip at all.

Final Answer: Frontonasal process, maxillary processes and mandibular processes $\Rightarrow$ A

Answer: (A) Go Back to Q11

Q12.

Solution

Concept – identifying a connective tissue cell by its granules: Loose connective tissue holds several cell types, and the granule pattern separates them at once.

Step 1 – read the granules: The cell marked **Z** is filled with coarse **metachromatic** granules, that is granules that stain a different colour from the dye applied, purple with toluidine blue.

Step 2 – explain the metachromasia: The granules are metachromatic because they are rich in **heparin**, a strongly sulphated glycosaminoglycan. Only the mast cell and the basophil carry such granules.

Step 3 – read the position: The cell lies alongside a small blood vessel. Mast cells characteristically cluster **perivascularly**, which places them where they can act on vessel walls.

Step 4 – read the released mediators: Degranulation releases **histamine**, which dilates vessels and raises their permeability, and **heparin**, an anticoagulant. Leukotrienes and eosinophil chemotactic factor are released as well.

Step 5 – name the cell and its role: All three clues converge on the **mast cell**. It carries IgE on its surface, and cross-linking of that IgE by antigen triggers degranulation, which is the basis of the immediate type I hypersensitivity reaction seen in urticaria and anaphylaxis.

Why the other options are wrong:

- A, the fibroblast: is a spindle-shaped cell with pale cytoplasm and an oval nucleus. It has no metachromatic granules and its job is to secrete collagen and ground substance.

- B, the plasma cell: has a clock-face nucleus and intensely basophilic cytoplasm from its rough endoplasmic reticulum, but no granules. It secretes antibody rather than histamine.
- D, the adipocyte: is a large signet-ring cell whose cytoplasm is a single fat droplet pushing the nucleus flat against the membrane. It stores lipid and releases no mediators of this kind.

Final Answer: Mast cell $\Rightarrow$ C

Answer: (C) Go Back to Q12

Q13.

Solution

Concept – why some muscle looks striped and some does not: Striations are an optical effect produced by how the contractile filaments are arranged, not by how much of them there is.

Step 1 – look at skeletal muscle filaments: Actin and myosin are packed into **sarcomeres**, the repeating unit from one Z line to the next.

Step 2 – see what the sarcomere produces optically: The **A band** holds the myosin and is anisotropic, so it looks dark. The **I band** holds only actin and is isotropic, so it looks light.

Step 3 – see why the bands line up: The sarcomeres of neighbouring myofibrils are held **in register** by desmin at the Z discs. Every A band therefore lies beside every other A band across the whole width of the fibre.

Step 4 – get the striation: That alignment turns a molecular repeat into a visible alternating dark and light stripe across the fibre.

Step 5 – contrast with smooth muscle: Smooth muscle has the same actin and myosin, but the filaments run **obliquely** and anchor to scattered dense bodies and to the membrane instead of Z discs. There are no sarcomeres and no register, so no stripes appear, only a uniformly eosinophilic cytoplasm with a single central cigar-shaped nucleus.

Why the other options are wrong:

- B, multinucleation with peripheral nuclei: is a true feature of skeletal muscle and useful for telling it from smooth or cardiac muscle, but nuclei sit outside the myofibrils and contribute nothing to the banding.
- C, more mitochondria: mitochondria do lie between myofibrils, and red fibres hold more than white ones, yet cardiac muscle is the richest in mito-

chondria of all and its striations come from sarcomeres, not from them.
- D, longer and thicker fibres: size has no bearing on banding. A short skeletal fibre is still striated and a long smooth muscle cell, such as those in the pregnant uterus, is still not.

Final Answer: Actin and myosin arranged in register into repeating sarcomeres $\Rightarrow$ A

Answer: (A) Go Back to Q13

Q14.

Solution

Concept – lymphatic drainage of the lower lip: The lower lip is the one place where a couple of centimetres decides which node group you examine.

Step 1 – take the lateral part of the lower lip: Lymph from the lateral two-thirds of the lower lip runs to the **submandibular nodes**, which lie on the surface of the submandibular gland in the digastric triangle.

Step 2 – take the central part: Lymph from the **central** part of the lower lip, the strip at the midline, drains instead to the **submental nodes** on the mylohyoid.

Step 3 – explain why the midline is different: The central lower lip develops from the fused mandibular processes and its lymphatics follow that midline plane down to the chin. Because both sides drain there, a midline growth can spread to the submental nodes of **both** sides.

Step 4 – apply this to the patient: The tumour sits 2 cm lateral to the midline, so it is in the lateral territory and the **submandibular nodes** are the first station to examine.

Step 5 – follow the lymph onward: Both the submental and submandibular nodes drain on into the **deep cervical chain**, chiefly the jugulo-omohyoid node, so the neck must be assessed fully whatever the site.

Why the other options are wrong:

- A, submental nodes for the whole lower lip: is the classic trap. The submental nodes take only the **central** strip, not the lateral part where this tumour sits.
- C, parotid nodes: receive lymph from the scalp, the auricle and the **lateral part of the upper** face and eyelids, never from the lower lip.
- D, the jugulo-omohyoid node: is a **second** station and is best known as the node of the tongue. It receives from the lip only after the submandibular or submental nodes.

Final Answer: Submandibular nodes for the lateral lower lip, submental for the central part $\Rightarrow$ 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	C	5	B
6	C	7	D	8	A	9	B	10	D
11	A	12	C	13	A	14	B		