NEET MDS Dental Anatomy and Oral Histology

Sample Paper – 6

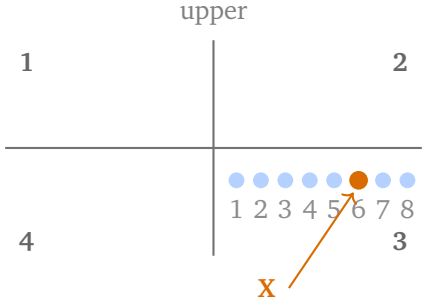
Duration: 11 Minutes **Maximum Marks: 56**

Instructions

- This paper contains **14** Multiple Choice Questions (Single Best Response), modelled on the Dental Anatomy, Embryology and Oral Histology content of **NEET MDS** conducted by NBEMS.
- The **14-question** length matches the number of Dental Anatomy and Oral Histology 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.

Permanent Tooth Morphology

Q1. In the FDI two-digit system the mouth is divided by the grid below, the quadrants being numbered 1 to 4 as seen facing the patient, and the teeth in each quadrant numbered 1 to 8 from the midline backwards. The tooth marked **X**, written as **36**, is the:



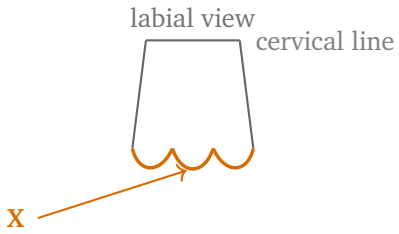
(A) Mandibular left first molar

(B) Mandibular right first molar

(C) Maxillary left first molar

(D) Mandibular left second molar

Q2. The labial view below is of a permanent central incisor a few weeks after eruption. The three rounded elevations marked **X** along its incisal edge, which wear away within a few years of the tooth reaching the occlusal plane, are:



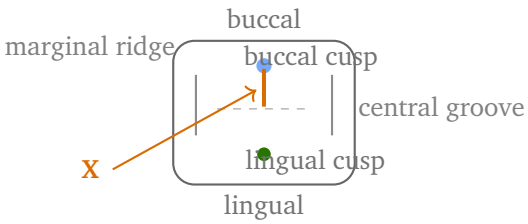
(A) Perikymata

(B) Lobes of the cingulum

(C) Marginal ridges

(D) Mamelons

Q3. The occlusal outline below is of a permanent maxillary first premolar. The single elevation marked **X** descends from the tip of the buccal cusp down its occlusal slope to end at the central groove. It has not united with any other ridge. Elevation **X** is:



(A) A marginal ridge

(B) A transverse ridge

(C) A triangular ridge

(D) An oblique ridge

Q4. The wide, shallow depression on the lingual surface of a permanent maxillary central incisor, bounded mesially and distally by the marginal ridges, incisally by the incisal ridge and cervically by the cingulum, is:

(A) The lingual fossa

(B) The central fossa

(C) A triangular fossa

(D) The developmental groove

Deciduous Dentition and Eruption

Q5. Considering a deciduous mandibular second molar and its permanent successor, the developing premolar tooth germ lies:

(A) Buccal to the deciduous roots, so resorption begins on the buccal surfaces of the roots

(B) Between the divergent deciduous roots, so resorption begins on the interradicular (inner) surfaces of those roots

(C) Directly apical to the root apices, so resorption begins evenly at both apices and travels coronally on all surfaces alike

(D) Lingual to the deciduous crown, so resorption begins at the cervical margin of the crown

Q6. The mixed dentition period, during which deciduous and permanent teeth are present in the mouth together, spans approximately:

(A) 3 to 6 years of age

(B) 5 to 9 years of age

(C) 6 to 12 years of age

(D) 12 to 18 years of age

Enamel

Q7. A small, hard, rounded nodule of ectopic enamel is found on the root surface at the furcation of a maxillary molar. It has formed because cells of Hertwig's epithelial root sheath failed to lose their potential and differentiated into ameloblasts. This nodule is:

(A) An enamel lamella

(B) An enamel pearl

(C) A cementicle

(D) Dens invaginatus

Q8. Which of the following correctly describes the three stages of amelogenesis in their proper order?

(A) Secretory, presecretory, maturation: matrix is laid down first, the cell then differentiates, and mineral is added last

(B) Presecretory, secretory, maturation: the ameloblast differentiates and reverses its polarity, then lays down the full thickness of partially mineralised matrix, then withdraws matrix and water while mineral floods in

(C) Presecretory, maturation, secretory: the cell differentiates, the crystals grow to full size, and the matrix is laid down over them afterwards

(D) Secretory, maturation, presecretory: matrix and mineral are completed first, and the ameloblast differentiates only as the tooth erupts

Dentine and Pulp

Q9. In a ground section of a tooth root, a dark granular zone is seen within the dentine immediately beneath the cementum, and is attributed to the coalescing and looping terminal portions of the dentinal tubules. This zone is:

(A) Tomes' granular layer

(B) The hyaline layer of Hopewell-Smith

(C) Interglobular dentine

(D) Intermediate cementum

Q10. In dentine, the fine incremental lines that lie about 4 micrometres apart and record the **daily** rhythm of dentine deposition by the odontoblasts are:

(A) Lines of Owen

(B) Lines of von Ebner

(C) The neonatal line

(D) Striae of Retzius

Cementum and Periodontal Ligament

Q11. A root surface has undergone resorption, and over that area the periodontal ligament has itself been destroyed so that alveolar bone comes to lie in direct contact with the root. The repair that characteristically follows is:

(A) New cementum laid down by cementoblasts, restoring the ligament fibre attachment across the defect

(B) Complete regeneration of the resorbed dentine by newly recruited odontoblasts

(C) Formation of a free cementicle within the ligament space over the defect

(D) Deposition of alveolar bone directly onto the root surface, fusing the tooth to the bone as dentoalveolar ankylosis

Q12. The principal fibre group of the periodontal ligament that runs from the cementum just apical to the junctional epithelium, obliquely downwards and outwards to the crest of the alveolar bone, chiefly resists:

(A) Lateral (tipping) forces on the crown, and extrusion of the tooth from its socket

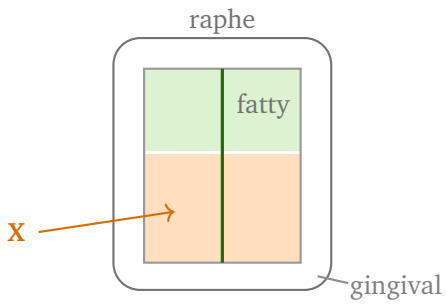
(B) Vertical masticatory forces alone, this being the most numerous group and occupying about two-thirds of the ligament

(C) Displacement of the root apex, thereby protecting the vessels and nerves entering the apical foramen

(D) Separation of adjacent teeth, running from cementum over the alveolar crest into the neighbouring tooth

Oral Mucosa, Salivary Glands and TMJ Histology

Q13. The mucosa of the hard palate is described in four zones, shown schematically below. The posterolateral zone marked **X**, in which the submucosa carries minor mucous salivary glands, is:



(A) The gingival zone

(B) The palatine raphe zone

(C) The fatty zone

(D) The glandular zone

Q14. The only minor salivary glands that are purely serous, and that empty their thin watery secretion directly into the trough surrounding the circumvallate papillae, are the glands of:

(A) Blandin and Nuhn

(B) Weber

(C) von Ebner

(D) Fordyce

Detailed Solutions

Q1.

Solution

Concept – reading an FDI two-digit number: The FDI number is never read as a single number. It is read as two separate digits, the first naming the quadrant and the second naming the tooth within that quadrant.

Step 1 – take the first digit: The first digit is **3**. In the permanent dentition the quadrants run 1, 2, 3, 4 in a clockwise direction as you face the patient.

Step 2 – place quadrant 3: Quadrant 1 is the patient's upper right, quadrant 2 the upper left, quadrant 3 the **lower left**, and quadrant 4 the lower right. So digit 3 puts the tooth in the mandibular left quadrant.

Step 3 – take the second digit: The second digit is **6**. Teeth are counted 1 to 8 from the midline backwards, so 1 is the central incisor, 2 the lateral incisor, 3 the canine, 4 the first premolar, 5 the second premolar, and **6 the first molar**.

Step 4 – combine the two digits: Quadrant 3 plus tooth 6 gives the **mandibular left first molar**, which is the sixth position highlighted in the lower left quadrant of the grid.

Step 5 – cross-check against the other systems: The same tooth is written as $\boxed{6}$ with the Palmer bracket opening to the patient's lower left, and as **19** in the Universal system, which numbers the permanent teeth 1 to 32 continuously.

Why the other options are wrong:

- B, the mandibular right first molar: is **46**, because the lower right is quadrant 4, not quadrant 3.
- C, the maxillary left first molar: is **26**, because the upper left is quadrant 2.
- D, the mandibular left second molar: is **37**. The quadrant digit is right but the tooth digit must be 7, since the second molar is the seventh tooth from the midline.

Final Answer: Mandibular left first molar $\Rightarrow \boxed{A}$

Answer: (A) Go Back to Q1

Q2.

Solution

Concept – an incisor is built from lobes, and the incisal edge shows it: Every incisor develops from four lobes, three labial and one lingual, and the three labial lobes announce themselves at the incisal edge.

Step 1 – count the elevations: The figure shows **three** rounded projections on the incisal edge, one for each of the three labial developmental lobes (mesiolabial, centrolabial and distolabial).

Step 2 – name them: Those three projections are the **mamelons**.

Step 3 – use the timing clue: The question says they wear away within a few years of the tooth reaching the occlusal plane. Mamelons are made only of enamel and carry no functional load, so normal incisal attrition flattens them soon after the tooth comes into occlusion.

Step 4 – draw the clinical inference: Mamelons persisting into adult life are a sign that the incisors are **not meeting in function**, as in an anterior open bite. So their persistence is a diagnostic clue rather than a normal finding.

Step 5 – note the fourth lobe: The fourth, lingual, lobe does not appear at the incisal edge at all. It forms the **cingulum** on the lingual surface, which is why there are three mamelons and not four.

Why the other options are wrong:

- A, perikymata: are the fine, shallow, transverse wave-like grooves on the **labial surface** where the striae of Retzius reach the enamel surface. They run horizontally across the face of the crown, not as projections from the incisal edge.
- B, lobes of the cingulum: is a made-up combination. The cingulum is the single lingual lobe, it lies at the cervical third of the **lingual** surface, and it is not visible in a labial view.
- C, marginal ridges: on an incisor are the linear elevations running along the **mesial and distal borders of the lingual surface**. There are two of them, they bound the lingual fossa, and they are not incisal projections.

Final Answer: Mamelons $\Rightarrow$ D

Answer: (D) Go Back to Q2

Q3.

Solution

Concept – a triangular ridge belongs to one cusp, a transverse ridge belongs to two: The whole distinction rests on how many cusps contribute to the ridge.

Step 1 – define the triangular ridge: A triangular ridge descends from the tip of a **single** cusp towards the central groove of the occlusal surface. It is named triangular because its slopes taper from the cusp tip, and it is one cusp's own property.

Step 2 – define the transverse ridge: When the triangular ridge of a **buccal** cusp joins the triangular ridge of an opposing **lingual** cusp, the two together make one continuous elevation that crosses the occlusal surface **buccolingually**. That union is a **transverse ridge**.

Step 3 – read what the figure shows: The stem says the elevation marked X descends from the tip of **one** cusp, the buccal cusp, to the central groove, and that it has **not** united with any other ridge. Only one cusp contributes to it.

Step 4 – apply the count: One cusp contributing means this is a **triangular ridge**, not a transverse one.

Step 5 – fix the rule in one line: Two triangular ridges joined **buccolingually** equal a transverse ridge. So a transverse ridge always contains two triangular ridges, but a lone triangular ridge, as here, is never a transverse ridge on its own.

Why the other options are wrong:

- A, a marginal ridge: runs along the **mesial and distal borders** of the occlusal surface and bounds it. It does not descend from a cusp tip towards the central groove. The two grey ridges at the edges of the figure are the marginal ridges.
- B, a transverse ridge: would require the buccal cusp's triangular ridge to have **united** with the lingual cusp's triangular ridge and crossed the whole occlusal table. The stem states explicitly that no such union has occurred, and the figure shows the elevation stopping at the central groove.
- D, an oblique ridge: is also a union of two ridges, but it runs **obliquely** across the occlusal surface of the maxillary first **molar**, from the mesiolingual cusp to the distobuccal cusp. Both the direction and the tooth are wrong here.

Final Answer: A triangular ridge $\Rightarrow$ C

Answer: (C) Go Back to Q3

Q4.

Solution

Concept – a fossa is an irregular depression, and each type has its own address: The name of a fossa tells you where on the tooth it sits, so match the boundaries in the stem to the site.

Step 1 – read the tooth: The tooth is a maxillary **central incisor**, an anterior tooth, so any fossa named for a posterior occlusal surface is immediately excluded.

Step 2 – read the surface: The depression lies on the **lingual** surface.

Step 3 – read the four boundaries: Mesial and distal marginal ridges, the incisal ridge, and the cingulum cervically. Those four structures ring exactly one depression on an anterior tooth.

Step 4 – name it: That depression is the **lingual fossa**. It is the shallow concavity that receives the incisal edges of the opposing mandibular incisors in centric occlusion.

Step 5 – note the clinical relevance: Because it is a broad, shallow, self-cleansing area, the lingual fossa of a maxillary incisor rarely decays unless a lingual pit is present at its cervical end, and it is also the surface guided against in protrusive movement.

Why the other options are wrong:

- B, the central fossa: is the large depression at the middle of the **occlusal** surface of a molar, where the developmental grooves converge. Incisors have no occlusal surface and therefore no central fossa.
- C, a triangular fossa: is the small depression found on the **occlusal** surface of a posterior tooth, just inside a mesial or distal marginal ridge, where a supplemental groove meets it. Again this is a posterior feature.
- D, the developmental groove: is not a fossa at all. It is a shallow linear groove marking the junction between two developmental lobes, so it is a line rather than the wide depression the stem describes.

Final Answer: The lingual fossa $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q4

Q5.

Solution

Concept – resorption follows the successor: Root resorption is not a random process. The deciduous root is resorbed on whichever surface the pressure of the erupting successor falls, so if you know where the tooth germ sits you can predict the resorption pattern.

Step 1 – locate the premolar germ: The permanent premolar germ develops **between the widely divergent roots** of the deciduous molar, that is, in the interradicular (furcation) region.

Step 2 – explain why it lies there: The deciduous molar has a short root trunk and roots that flare out sharply from the cervix. That flare exists precisely to leave room for the developing successor, which is why the divergence is a defining feature of deciduous molars.

Step 3 – convert position into pressure: As the premolar grows and begins to move occlusally, it presses on the surfaces of the deciduous roots that face it, which are the **inner, interradicular surfaces**.

Step 4 – convert pressure into resorption: Pressure recruits odontoclasts to those surfaces first. Resorption of a deciduous molar therefore starts on the **interradicular surfaces** of the roots and then extends apically and outwards, so the roots are hollowed from the inside.

Step 5 – apply the same rule to the anteriors: For a deciduous incisor the permanent successor develops **lingual** to the deciduous root, so there resorption begins on the lingual surface of the root. Same rule, different geometry, which is a favourite examination contrast.

Step 6 – note the clinical consequence: Because a deciduous molar is resorbed from between its roots, a radiograph may show an intact-looking outer root outline while the tooth is already loose. It is also why an over-retained deciduous molar can leave root fragments behind at extraction.

Why the other options are wrong:

- A, buccal to the roots: is false. The germ is not buccally placed, and buccal resorption of the roots is not the pattern seen with deciduous molars.
- C, directly apical with even resorption at both apices: is wrong on the position and therefore on the pattern. If the germ lay only at the apices the resorption would be symmetrical and apical, whereas the actual pattern is asymmetrical and begins between the roots.
- D, lingual to the crown with resorption beginning at the cervical margin: mixes up the two rules. The successor is lingual to the **root** of a deciduous

incisor, not lingual to the crown of a molar, and resorption of the crown is a late event, not the starting point.

Final Answer: Between the divergent roots, resorbing them from their inner surfaces $\Rightarrow$ B

Answer: (B) Go Back to Q5

Q6.

Solution

Concept – three dentition periods, defined by what is in the mouth: The deciduous period, the mixed period and the permanent period are marked out by the arrival of the first permanent tooth and the loss of the last deciduous tooth.

Step 1 – set the starting point: The mixed dentition begins when the **first permanent tooth erupts**, that is the mandibular first molar, at about **6 years**.

Step 2 – set the finishing point: It ends when the **last deciduous tooth is shed**, usually the maxillary canine or second molar, at about **11 to 12 years**.

Step 3 – state the span: So the mixed dentition period runs approximately from **6 to 12 years** of age, which is option C.

Step 4 – name the periods on either side: Before 6 years the mouth holds only deciduous teeth, so that is the **deciduous (primary) dentition period**, complete at about 2.5 to 3 years. After about 12 years only permanent teeth remain, so that is the **permanent dentition period**, whatever the third molars later do.

Step 5 – note why the period matters: The mixed dentition is the window in which the leeway space is used, in which the first permanent molar establishes the occlusion, and in which most interceptive orthodontics is possible. That is precisely why the ages are asked.

Why the other options are wrong:

- A, 3 to 6 years: is the settled **deciduous** dentition period. All 20 deciduous teeth are present and no permanent tooth has yet erupted, so by definition the dentition is not mixed.
- B, 5 to 9 years: takes an arbitrary slice. It starts a year too early, before any permanent tooth is in the mouth, and it stops while plenty of deciduous molars and canines are still present.
- D, 12 to 18 years: is the early **permanent** dentition period. By 12 years the deciduous teeth have gone, so no mixing remains.

Final Answer: About 6 to 12 years $\Rightarrow$ C

Answer: (C) Go Back to Q6

Q7.

Solution

Concept – enamel where enamel has no business being: Enamel is normally confined to the crown, so a nodule of enamel on the root is a developmental accident with a specific name and a specific site.

Step 1 – read the mechanism given: Cells of **Hertwig's epithelial root sheath** normally lose their ameloblastic potential before root formation. If a group of them fails to do so, it differentiates into functioning ameloblasts.

Step 2 – follow the consequence: Those aberrant ameloblasts deposit a small mass of enamel on the developing root surface.

Step 3 – name the lesion: That mass is an **enamel pearl**, also called an enameloma or an enamel drop.

Step 4 – confirm with the site: Enamel pearls have a clear predilection for the **furcation** region of molars, and most of all the **maxillary** molars, which is exactly the site the stem gives. Maxillary third and second molars are the commonest hosts.

Step 5 – note what it is made of: A pearl may be enamel alone, enamel with a dentine core, or enamel and dentine with a pulp horn extending into it. The last variety matters because it can be a pathway into the pulp.

Step 6 – note the clinical importance: Enamel has no periodontal ligament attachment, so where a pearl sits there is no true attachment apparatus. A pearl in the furcation therefore acts as a plaque trap and a site of localised periodontal breakdown, and it can be mistaken for calculus during root planing.

Why the other options are wrong:

- A, an enamel lamella: is a thin, leaf-like defect of hypomineralised or unmineralised organic material running from the enamel surface **through the thickness of the enamel** towards the dentinoenamel junction. It is a crack-like fault within crown enamel, not a nodule on the root.
- C, a cementicle: is a small calcified mass of **cementum**, not enamel, lying free in the periodontal ligament or attached to the root surface. The tissue is wrong and the origin is degenerating epithelial rests or calcified fibres, not the root sheath turning ameloblastic.
- D, dens invaginatus: is an **infolding** of the enamel organ into the dental papilla before mineralisation, producing a pit or pouch inside the crown,

classically of a maxillary lateral incisor. It is an invagination into the tooth, the opposite of a nodule projecting from the root.

Final Answer: An enamel pearl $\Rightarrow$ B

Answer: (B) Go Back to Q7

Q8.

Solution

Concept – enamel is built in two passes: The ameloblast first lays down a soft, full-thickness scaffold and only afterwards hardens it. Knowing that there are two working passes, preceded by a preparation phase, fixes the order once and for all.

Step 1 – the presecretory stage: The inner enamel epithelial cell differentiates into an ameloblast. It elongates, its nucleus and organelles **reverse polarity** so that the nucleus moves away from the future enamel surface, and the Golgi apparatus and rough endoplasmic reticulum enlarge for secretion. Crucially, the ameloblast first induces the adjacent dental papilla cells to become odontoblasts, so a layer of dentine is laid down before any enamel appears.

Step 2 – the secretory stage: The ameloblast develops **Tomes' process** at its secretory end and secretes the enamel matrix proteins, chiefly amelogenins with enamelins, ameloblastin and tuftelin. The **full thickness** of enamel is laid down in this stage, but it is only about **30 percent mineralised** and remains soft. Crystals are initiated as thin ribbons that grow in length but not yet in width or thickness.

Step 3 – the maturation stage: The ameloblast shortens, develops a ruffled or smooth border, and now acts as a **transport cell**. It resorbs almost all of the matrix protein and withdraws water, while pumping calcium and phosphate in. The crystals grow in **width and thickness** until they fill the space, and the mineral content rises from about 30 percent to about **96 percent by weight**.

Step 4 – match to the options: Differentiation and polarity reversal, then full-thickness partially mineralised matrix, then removal of matrix and water with mineral influx. That is exactly option B.

Step 5 – note the clinical anchor: Each stage has its own disease. Disturbance in the **secretory** stage gives too little matrix and so **hypoplastic** amelogenesis imperfecta, with thin but hard enamel. Disturbance in the **maturation** stage gives full-thickness but soft, poorly mineralised enamel, that is **hypomaturation** amelogenesis imperfecta. Fluorosis likewise strikes the maturation stage.

Why the other options are wrong:

- A, secretory before presecretory: is impossible. A cell cannot secrete enamel matrix before it has differentiated into an ameloblast and reversed its polarity to face the secretion the right way.
- C, maturation before secretory: reverses the two working passes. Crystals cannot grow to full size before the matrix that guides and houses them has been laid down, and there is nothing to mature.
- D, presecretory placed last: is the most wrong of all. It has the ameloblast differentiating only at eruption, whereas in reality the ameloblasts have finished their work and are **lost** at eruption as the reduced enamel epithelium.

Final Answer: Presecretory, secretory, maturation $\Rightarrow$ B

Answer: (B) Go Back to Q8

Q9.

Solution

Concept – the granular layer is a root-only landmark: Some dentine features are seen only in ground sections and only in the root, and the granular layer is the classic one.

Step 1 – read the location: The zone lies in **dentine**, immediately **beneath the cementum**, so it is a root feature. It is never seen under enamel in the crown.

Step 2 – read the appearance: It appears as a **dark granular band** in a ground section. It looks dark because air or debris fills the spaces after the organic material is lost during grinding, and air scatters the transmitted light.

Step 3 – read the explanation offered: The stem attributes it to **coalescing and looping terminal portions of the dentinal tubules**, which is the accepted explanation.

Step 4 – name it: All three features together identify **Tomes' granular layer**, seen in the peripheral root dentine just internal to the cementodentinal junction.

Step 5 – note the neighbouring landmark: Just external to it lies the **hyaline layer of Hopewell-Smith**, a structureless layer that cements the cementum to the dentine. Knowing that the granular layer is inside the hyaline layer keeps the two apart.

Why the other options are wrong:

- B, the hyaline layer of Hopewell-Smith: lies on the **outer** side, that is, between the granular layer and the cementum. It is **structureless and clear**, not granular, and its role is to bind the cementum to the dentine. The stem

says granular, so B is excluded.

- C, interglobular dentine: is **hypomineralised** dentine left where calcospherites failed to fuse. It sits in the **circumpulpal dentine just beneath the mantle dentine in the crown**, it has scalloped margins, and the tubules run through it without interruption. Site and cause are both different, and it is a failure of mineralisation rather than a tubule pattern.
- D, intermediate cementum: is a thin, poorly defined layer at the cementodentinal junction thought to be of root-sheath origin. It is **cementum, not dentine**, so it lies on the wrong side of the junction and cannot be a zone within the dentine.

Final Answer: Tomes' granular layer $\Rightarrow$ A

Answer: (A) Go Back to Q9

Q10.

Solution

Concept – incremental lines are a diary of deposition: Hard tissues are laid down rhythmically, so each tissue carries fine lines for its short cycle and coarse lines for its long cycle. Fix the tissue first, then fix the rhythm.

Step 1 – fix the tissue: The stem says **dentine**. So every enamel line is out before the options are even read.

Step 2 – fix the rhythm: The stem says **daily** and gives a spacing of about **4 micrometres**, which is roughly the amount of dentine an odontoblast lays down in 24 hours.

Step 3 – name the daily dentine line: Those are the **lines (imbrication lines) of von Ebner**. They run at right angles to the dentinal tubules and mark the daily rhythm of matrix deposition.

Step 4 – contrast with the coarse dentine line: About every five days the daily increment is accentuated, and these coarser lines about 20 micrometres apart are the **contour lines of Owen**. Owen's lines therefore represent the **coincidence of the secondary curvatures** of the tubules and, when accentuated by a metabolic disturbance, they record systemic upset rather than a daily event.

Step 5 – state the rule that answers the question: In dentine, **von Ebner is fine and daily; Owen is coarse and periodic or pathological**. The stem asks for fine and daily, so von Ebner is the answer.

Step 6 – note the parallel in enamel: Enamel has the identical two-tier arrangement, with fine daily cross-striations along the rods and coarser weekly striae.

Recognising that both tissues follow the pattern is the safest way to avoid mixing the names.

Why the other options are wrong:

- A, the lines of Owen: are in the right tissue but the wrong rhythm. They are the **coarse, accentuated** lines about 20 micrometres apart, not the fine daily ones the stem specifies.
- C, the neonatal line: is a **single** accentuated incremental line, not a repeating set. It marks the one abrupt environmental change at birth and is found only in the tissues mineralising then, that is, the deciduous teeth and the permanent first molars.
- D, the striae of Retzius: are in the **wrong tissue** altogether. They are the incremental lines of **enamel**, they are roughly weekly rather than daily, and they surface as perikymata. The stem confines itself to dentine.

Final Answer: Lines of von Ebner $\Rightarrow$ B

Answer: (B) Go Back to Q10

Q11.

Solution

Concept – what repairs a root depends on which cells survive next to it: Cementum repair needs a living periodontal ligament to supply cementoblasts. Take the ligament away and the neighbouring bone takes over the surface.

Step 1 – recall the normal sequence: Small areas of root resorption are common and usually silent. When the stimulus stops, cementoblasts from the **surviving periodontal ligament** migrate onto the defect and repair it with new cementum, restoring the fibre attachment.

Step 2 – introduce the condition in the stem: Here the ligament itself has been **destroyed** over the area, so there is no local source of cementoblasts.

Step 3 – see who fills the vacancy: The alveolar bone is the other tissue lining the socket, and its osteoblasts are perfectly able to reach the bare root surface. In the absence of an intervening ligament they deposit **bone directly onto the dentine or cementum**.

Step 4 – name the result: Tooth and bone become continuous, with no ligament space between them. This union is **dentoalveolar ankylosis**.

Step 5 – predict the signs: An ankylosed tooth loses its physiological mobility, gives a **high metallic percussion note** instead of a dull one, and shows **loss of**

the periodontal ligament space on a radiograph. In a growing patient it fails to erupt with its neighbours and appears **infraoccluded**, and orthodontic force will not move it.

Step 6 – carry it one step further: Because the root is now part of the bone remodelling unit, it is resorbed and replaced along with the bone. That progressive process is **replacement resorption**, the usual fate of a replanted avulsed tooth whose ligament has dried out, and it is the reason a knocked-out tooth must be kept moist.

Why the other options are wrong:

- A, repair by new cementum: is what happens when the ligament **survives**, and it is the desirable outcome. The stem removes exactly the condition this option needs, so it cannot occur here.
- B, regeneration of dentine by new odontoblasts: cannot occur from the outside. Odontoblasts line the pulp, they lay dentine only on its **pulpal** surface, and resorbed root dentine is never rebuilt as dentine from the periodontal side.
- C, a free cementicle: is a small calcified body lying **within the ligament**, so it presupposes an intact ligament space. It is an incidental finding of ageing rather than a repair mechanism, and it does not fill a resorption defect.

Final Answer: Bone deposited directly on the root, giving dentoalveolar ankylosis $\Rightarrow$ D

Answer: (D) Go Back to Q11

Q12.

Solution

Concept – name the group from its course, then read its function off its course: Each principal fibre group of the periodontal ligament resists whatever force pulls along its own line.

Step 1 – read the cemental attachment: The fibres arise from cementum **just apical to the junctional epithelium**, that is, at the very top of the root. This is the most coronal of the principal groups.

Step 2 – read the bony attachment: They pass **downwards and outwards to the crest of the alveolar bone**. Only one group runs this course, the **alveolar crest group**.

Step 3 – turn the course into a function: Because the fibres run obliquely down

to the crest, a force that tips the crown sideways puts them under **tension**, so they oppose **lateral tipping** movements.

Step 4 – add the second function: Since they attach coronally on the root and further down on the bone, any attempt to pull the tooth **out of its socket** also stretches them. They therefore resist **extrusion** and hold the tooth in place, which together with Step 3 is option A.

Step 5 – state their supporting role: They also work with the oblique fibres to resist intrusive force, and they keep the whole ligament under slight tension so the tooth is suspended rather than resting on bone.

Step 6 – note the clinical link: The alveolar crest fibres are the first principal group lost in periodontitis as the crest resorbs, which is why increasing tooth mobility and drifting appear early in the disease.

Why the other options are wrong:

- B, vertical masticatory forces alone as the largest group: describes the **oblique** group, which occupies about two-thirds of the ligament and runs from cementum obliquely upwards to bone. The alveolar crest group is small and the word alone makes the statement false in any case.
- C, protecting the apical vessels and nerves: describes the **apical** group, which radiates from the root apex into the surrounding bone. Its attachment is at the far end of the root from the one given in the stem.
- D, running over the alveolar crest into the neighbouring tooth: describes the **transseptal** fibres, which are interdental and connect adjacent teeth. They do not insert into bone at all, whereas the stem clearly states insertion into the alveolar crest.

Final Answer: Lateral tipping forces and extrusion $\Rightarrow$ A

Answer: (A) Go Back to Q12

Q13.

Solution

Concept – the hard palate is one mucosa but four submucosae: The epithelium over the whole hard palate is keratinised masticatory mucosa. What changes from zone to zone is what lies **beneath** it, and that is what the four-zone scheme records.

Step 1 – list the four zones: The **gingival** zone around the necks of the teeth, the **palatine raphe** zone along the midline, the **fatty** zone in the anterolateral region,

and the **glandular** zone in the posterolateral region.

Step 2 – read the position marked X: The stem places X **posterolaterally**, that is, in the back half of the palate to either side of the midline.

Step 3 – read the content marked X: The submucosa there contains **minor mucous salivary glands**.

Step 4 – match position and content: Posterolateral plus mucous glands identifies the **glandular zone**, option D.

Step 5 – explain why fat in front and glands behind: Both fat and glandular tissue act as a **cushion** between the mucosa and the bone, absorbing masticatory load without allowing the mucosa to shift. The palatal glands additionally keep the posterior palate lubricated for the bolus.

Step 6 – note the clinical relevance: These two cushioned zones are compressible, so a complete denture rests on tissue of differing displaceability across the palate, which is why relief and selective pressure impression techniques matter. The palatal glands are also the tissue from which most minor-gland tumours of the palate, and the inflammatory swellings of nicotinic stomatitis, arise.

Why the other options are wrong:

- A, the gingival zone: is the **peripheral rim** next to the teeth. It has essentially **no submucosa**, the lamina propria binding straight to the alveolar bone, so it contains neither fat nor glands and it is not posterolateral.
- B, the palatine raphe zone: is the narrow **midline** strip running from the incisive papilla backwards. It too has no true submucosa, being bound directly to the median palatine suture, which is why it is pale, immobile and easily traumatised by a denture. It is midline, not lateral.
- C, the fatty zone: is in the right layer but the wrong half of the palate. It occupies the **anterolateral** region and its submucosa contains **adipose tissue**, not glands. Position and content are both against it.

Final Answer: The glandular zone $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q13

Q14.

Solution

Concept – the minor glands are almost all mucous, with one serous exception: There are some 600 to 1000 minor salivary glands scattered in the lips, cheeks, palate and tongue. They secrete continuously and without stimulation, and almost all of them are mucous or mixed. Only one set is purely serous.

Step 1 – read the secretion: The stem says **purely serous** and **thin and watery**. That single clue already isolates one gland among the minor glands.

Step 2 – read the site: The gland empties into the **trough (moat) around the circumvallate papillae**, on the posterior dorsum of the tongue. They also serve the foliate papillae.

Step 3 – name the gland: Both clues identify the glands of **von Ebner**, the serous glands of the tongue.

Step 4 – explain the design: The taste buds line the **walls of the trough**, not the top of the papilla. A watery serous secretion pumped into the trough continuously **flushes it clean**, washing away the previous stimulus so that the taste buds can respond to the next one. A mucous secretion would clog the trough and blunt taste.

Step 5 – add the enzyme: Von Ebner's glands also secrete **lingual lipase**, which begins the digestion of fat in the mouth and is particularly important in infants, and the von Ebner gland protein that is thought to carry hydrophobic taste molecules to the receptors.

Step 6 – keep the naming straight: Do not confuse the **glands** of von Ebner in the tongue with the **lines** of von Ebner in dentine. The same anatomist is attached to both, and examiners rely on the confusion.

Why the other options are wrong:

- A, the glands of Blandin and Nuhn: are in the right organ but are the wrong type. They are the **anterior lingual glands**, lying near the tip and ventral surface of the tongue, and they are **mixed, predominantly mucous**. Their site also has no circumvallate papillae.
- B, the glands of Weber: are the **mucous** glands lying around and beneath the palatine tonsil, whose secretion flushes the tonsillar crypts. Wrong site and wrong secretion.
- D, Fordyce granules: are not salivary glands at all. They are ectopic **sebaceous** glands in the buccal mucosa and the vermilion of the lip, seen as harmless yellow specks. They secrete sebum, not saliva.

Final Answer: Glands of von Ebner $\Rightarrow$ C

Answer: (C) Go Back to Q14

Answer Key

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