NEET MDS Dental Anatomy and Oral Histology

Sample Paper – 4

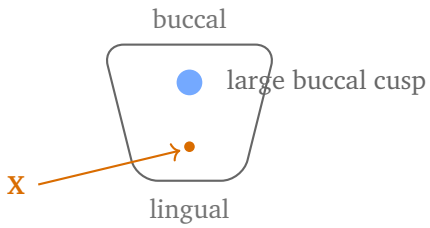
Duration: 11 Minutes **Maximum Marks: 56**

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. The occlusal view below shows a premolar with one large, well developed buccal cusp and one very small, non-functional lingual cusp marked **X**, the two tips together producing the appearance described as “snake eyes”. This tooth is the:



(A) Maxillary first premolar

(B) Maxillary second premolar

(C) Mandibular second premolar

(D) Mandibular first premolar

Q2. Where two adjacent teeth touch, the curved proximal surfaces sweep away from the contact area on all four sides. The four embrasures created around a single contact area are the:

(A) Facial, lingual, occlusal (or incisal) and gingival embrasures

(B) Mesial, distal, facial and lingual embrasures

(C) Mesial, distal, occlusal and gingival embrasures

(D) Facial, lingual, apical and furcal embrasures

Q3. Compared with the permanent maxillary first molar, the permanent maxillary second molar characteristically shows:

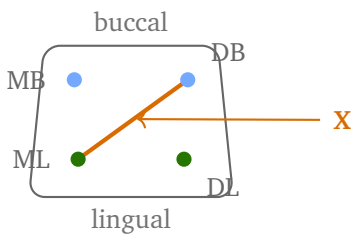
(A) A heart-shaped occlusal outline with three cusps and a fused conical root

(B) A square occlusal outline with a distolingual cusp equal in size to the mesiolingual cusp

(C) A rhomboidal outline with an enlarged distolingual cusp and widely separated roots

(D) A more acutely rhomboidal outline with a distinctly smaller distolingual cusp and roots that are closer together and more distally inclined

Q4. The occlusal view below is of a permanent maxillary first molar. The ridge marked **X**, which runs across the occlusal surface from the mesiolingual cusp to the distobuccal cusp, is the:



(A) Transverse ridge

(B) Oblique ridge

(C) Distal marginal ridge

(D) Triangular ridge of the distobuccal cusp

Deciduous Dentition and Eruption

Q5. A succedaneous tooth is one that takes the place of a shed deciduous tooth. Which of the following statements is correct?

(A) The permanent premolars are succedaneous and take the place of the deciduous molars, while the permanent molars are non-succedaneous and replace nothing

(B) The permanent premolars are succedaneous and take the place of the deciduous canines

(C) All 32 permanent teeth are succedaneous, since each one occupies a site previously held by a deciduous tooth

(D) The permanent molars are succedaneous because they erupt distal to the deciduous second molar

Q6. In the deciduous dentition a consistently larger space is found mesial to the maxillary deciduous canine and distal to the mandibular deciduous canine. These particular spaces are called:

(A) Leeway spaces of Nance

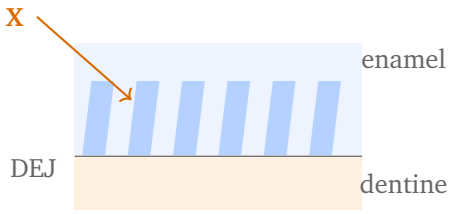
(B) Freeway spaces

(C) Primate spaces

(D) Interproximal spaces of Bolton

Enamel

Q7. Under reflected light, a longitudinal ground section of enamel shows the alternating light and dark zones marked **X**, confined to the inner two-thirds of the enamel and produced by adjacent groups of rods being cut in different directions. These are the:



(A) Striae of Retzius

(B) Enamel lamellae

(C) Hunter-Schreger bands

(D) Perikymata

Q8. Beneath the cusp tips and incisal edges the enamel rods do not run in straight radial rows. Instead they twist and intertwine with neighbouring groups of rods. This arrangement, and its mechanical significance, is best described as:

(A) Gnarled enamel; the interlacing of rods stops a crack from running cleanly along the rod boundaries and so strengthens the cusp against masticatory load

(B) Gnarled enamel; the twisting weakens the cusp tip, which is why cusp tips are the commonest site of enamel fracture

(C) Prismless enamel; the absence of rod boundaries at the cusp tip makes it more acid resistant

(D) A strictly radial rod arrangement; the straight parallel rods direct any fracture line harmlessly away from the cusp tip

Dentine and Pulp

Q9. The first-formed layer of dentine of the crown, roughly 15 to 20 micrometres thick, lying immediately beneath the dentinoenamel junction, containing coarse collagen fibrils orientated at right angles to the junction and slightly less mineralised than the dentine deeper to it, is:

(A) Circumpulpal dentine

(B) Mantle dentine

(C) The granular layer of Tomes

(D) The hyaline layer of Hopewell-Smith

Q10. A radiograph shows a discrete radiopaque mass within the pulp chamber. On histological section the mass is made of dentine containing dentinal tubules and is lined at its periphery by odontoblasts. This denticle is:

(A) A false denticle

(B) A diffuse (linear) pulpal calcification

(C) A true denticle

(D) An attached denticle, a designation based on its structure

Cementum and Periodontal Ligament

Q11. Acellular afibrillar cementum is:

(A) The thick layer of the apical third that houses cementocytes within lacunae

(B) Isolated patches of mineralised ground substance, containing neither cells nor collagen fibrils, deposited on the cervical enamel and having no attachment function

(C) A thin, highly mineralised layer at the cementodentinal junction, of debated origin, that seals off the terminal ends of the dentinal tubules

(D) The bulk of the cervical cementum, into which the embedded collagen fibres of the ligament are anchored

Q12. Which statement about hypercementosis is correct?

(A) It is a resorptive loss of cementum, and the tooth becomes progressively mobile

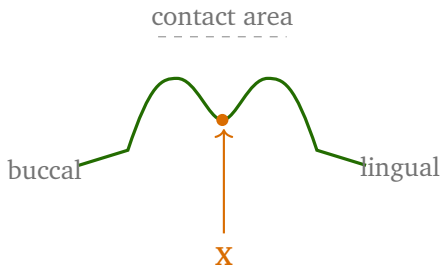
(B) It is an excessive deposition of cementum that may follow chronic periapical inflammation, occlusal trauma or Paget's disease, and it makes extraction difficult because the bulbous root cannot be delivered through the socket

(C) It occurs only in teeth without a functional antagonist, and extraction becomes easier because the periodontal ligament space widens around the bulbous root

(D) It is a premalignant deposition of cementum that must be biopsied before the tooth is removed

Oral Mucosa, Salivary Glands and TMJ Histology

Q13. The buccolingual section below passes through the interdental gingiva beneath the contact area of two adjacent posterior teeth. The saddle-shaped depression marked **X**, lying between the buccal and the lingual papillae, is:



(A) The gingival sulcus, which is keratinised and therefore resistant to plaque

(B) The free gingival groove, which marks the level of the base of the sulcus

(C) The mucogingival junction, where attached gingiva meets alveolar mucosa

(D) The col, which is non-keratinised and is the site at which interdental periodontal disease usually begins

Q14. The parotid duct (Stensen's duct) pierces the buccinator and opens on a small papilla of the buccal mucosa opposite the:

(A) Maxillary second molar

(B) Maxillary first molar

(C) Mandibular second molar

(D) Maxillary canine

Detailed Solutions

Q1.

Solution

Concept – the premolars are told apart by their lingual cusp: All four premolars have a buccal cusp. What separates them is how well the lingual cusp is developed.

Step 1 – read the key finding: The lingual cusp is **very small and non-functional**, so it does not reach the opposing tooth and takes no part in occlusion.

Step 2 – name the tooth with that feature: Only the **mandibular first premolar** has a lingual cusp this reduced. It is often little more than a large cingulum, roughly two-thirds the height of the buccal cusp or less.

Step 3 – confirm with the "snake eyes" clue: Viewed from the occlusal aspect, the single large buccal cusp tip and the tiny lingual cusp tip give the classic "snake eyes" appearance of this tooth. The occlusal table tilts steeply lingually as a result.

Step 4 – add the supporting features: The mesiolingual developmental groove runs between the buccal and the lingual cusps in this tooth, and because the lingual cusp does not occlude, the mandibular first premolar behaves in function almost like a small canine rather than a true posterior tooth.

Step 5 – note the clinical relevance: The reduced lingual cusp means the crown preparation must respect a very thin lingual wall, and it is one reason this premolar is the usual choice for orthodontic extraction in the lower arch.

Why the other options are wrong:

- A, the maxillary first premolar: has **two well developed cusps** of nearly equal height, both functional, and its buccal cusp is longer by only about 1 mm. Its distinguishing feature lies in the root, not in a shrunken cusp.
- B, the maxillary second premolar: also has two functional cusps, and the two are even closer in height than in the maxillary first premolar.
- C, the mandibular second premolar: has a **well developed** lingual cusp, and in fact commonly shows a three-cusp form with two lingual cusps, the mesiolingual being the larger. That is the opposite of a reduced lingual cusp.

Final Answer: Mandibular first premolar $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q1

Q2.

Solution

Concept – an embrasure is a V-shaped spillway that opens out from a contact area: Two adjacent teeth meet at one small contact area. Because the proximal surfaces are convex, they curve away from that point in every direction, and each direction of escape is an embrasure.

Step 1 – fix the reference point: The contact area itself is the centre of the picture. Everything is named relative to it.

Step 2 – count the directions of escape: From the contact area, the surfaces diverge **facially**, **lingually**, **occlusally** (or incisally in the anterior teeth) and **gingivally**. That is four directions, so four embrasures.

Step 3 – name the gingival one properly: The gingival embrasure is the space below the contact, and in health it is filled by the interdental papilla. When the papilla recedes, this embrasure opens as a "black triangle".

Step 4 – state the function of each: The occlusal and facial embrasures act as spillways that deflect food away from the contact and towards the buccal and lingual surfaces. The correct contour of the facial and lingual embrasures also directs food onto the gingiva with enough force to massage it but not enough to injure it.

Step 5 – note the clinical point: This is why a restoration or crown must reproduce the embrasure form. An over-contoured proximal surface flattens the embrasure, traps plaque and causes papillary inflammation; an under-contoured one opens the contact and causes food impaction.

Why the other options are wrong:

- B, mesial, distal, facial and lingual: is wrong because mesial and distal are the directions **along** the arch. The contact area already lies on the mesial surface of one tooth and the distal surface of the other, so no embrasure can open in those directions.
- C, mesial, distal, occlusal and gingival: is right for two of the four names only. Occlusal and gingival are genuine embrasures, but mesial and distal are not, and it omits the facial and lingual embrasures entirely.
- D, facial, lingual, apical and furcal: uses two terms that belong elsewhere. "Apical" refers to the root apex and "furcal" to the furcation between roots. Neither has any relationship to a proximal contact area.

Final Answer: Facial, lingual, occlusal (or incisal) and gingival $\Rightarrow$ A

Answer: (A) Go Back to Q2

Q3.

Solution

Concept – the maxillary molars degenerate progressively from first to third: Each successive maxillary molar is a slightly reduced version of the one in front of it, and the reduction falls mainly on the distolingual cusp.

Step 1 – take the occlusal outline: The maxillary first molar is rhomboidal. The second molar is **more acutely rhomboidal**, because its mesiobuccal and distolingual angles become sharper while the mesiolingual and distobuccal angles become more obtuse.

Step 2 – take the distolingual cusp: The distolingual cusp of the maxillary second molar is **distinctly smaller** than that of the first molar. In some second molars it is so reduced that the tooth approaches a three-cusped, heart-shaped form.

Step 3 – take the roots: The three roots of the second molar are **less divergent** than those of the first molar. They are grouped closer together, they incline distally, and the buccal roots may be fused.

Step 4 – combine the three findings: More acutely rhomboidal outline, smaller distolingual cusp, roots closer together and distally inclined. All three appear together only in option D.

Step 5 – note why it matters: The reduced distolingual cusp and the smaller crown make the second molar a less efficient tooth in function, and the closely grouped, distally inclined roots make its endodontic access and its extraction path differ from those of the first molar.

Why the other options are wrong:

- A, heart-shaped outline with three cusps and a fused conical root: describes the maxillary **third** molar, the end point of the same degenerative trend. The second molar has not gone that far.
- B, square outline with equal lingual cusps: is wrong on both counts. No maxillary molar has a square occlusal outline, and the distolingual cusp is never as large as the mesiolingual cusp, which is the largest cusp of the tooth.
- C, enlarged distolingual cusp with widely separated roots: reverses the truth twice over. The distolingual cusp shrinks, not grows, and the roots come closer together, not further apart, as you move distally.

Final Answer: More acutely rhomboidal, smaller distolingual cusp, roots closer together $\Rightarrow$ D

Answer: (D) Go Back to Q3

Q4.

Solution

Concept – ridges on an occlusal surface are named by the cusps they join and the direction they run: Read the two end points of a ridge and its name follows.

Step 1 – read the two ends given: The ridge runs from the **mesiolingual cusp** to the **distobuccal cusp**.

Step 2 – see what that direction means: That course crosses the occlusal surface **obliquely**, cutting diagonally from one corner of the rhomboid to the other rather than straight across it buccolingually.

Step 3 – name it: A ridge running that oblique course is the **oblique ridge**, and it is the single most characteristic occlusal feature of the maxillary first molar.

Step 4 – describe how it is built: It is formed by the union of the distal ridge of the mesiolingual cusp with the triangular ridge of the distobuccal cusp. It is often crossed or notched at its centre by a groove, but it remains continuous enough to divide the occlusal surface into a mesial and a distal fossa.

Step 5 – note the clinical relevance: The oblique ridge separates the central fossa mesially from the distal fossa distally. A conservative cavity preparation on this tooth is designed to **preserve** the oblique ridge and treat the two fossae as separate outlines, because cutting through the ridge weakens the crown considerably.

Why the other options are wrong:

- A, transverse ridge: is formed when the triangular ridges of a buccal and a lingual cusp join and cross the occlusal surface **buccolingually at right angles** to the long axis of the arch, as in the premolars. The ridge shown runs diagonally, not straight across, so it is not transverse.
- C, distal marginal ridge: is the raised rounded ridge running buccolingually along the **distal border** of the occlusal surface. It lies at the edge of the tooth, whereas the ridge marked X crosses the middle of the occlusal table.
- D, triangular ridge of the distobuccal cusp: is only **part** of the answer, not the whole. That triangular ridge descends from the distobuccal cusp tip into the central fossa and forms one half of the oblique ridge. Naming the part instead of the whole ridge would ignore the mesiolingual component the question specifies.

Final Answer: Oblique ridge $\Rightarrow$ B

Answer: (B) Go Back to Q4

Q5.

Solution

Concept – succedaneous means "successor": A permanent tooth is succedaneous only if a deciduous tooth had to be shed to make room for it in the same position.

Step 1 – count the deciduous teeth: There are **20** deciduous teeth: incisors, canines and molars.

Step 2 – match each to its successor: Permanent incisors replace deciduous incisors. Permanent canines replace deciduous canines. **Permanent premolars replace deciduous molars.** That accounts for all 20 succedaneous permanent teeth.

Step 3 – account for the rest: The 12 permanent molars erupt **distal** to the deciduous arch, into bone gained by growth at the back of the jaw. No deciduous tooth is shed for them, so they are **non-succedaneous** or accessional teeth.

Step 4 – check the arithmetic: 20 succedaneous plus 12 accessional equals the 32 permanent teeth. Option A is the only statement consistent with this.

Step 5 – note the developmental basis: Succedaneous teeth arise from the **successional lamina**, a lingual extension of the dental lamina from each deciduous tooth germ. The permanent molars arise from a distal extension of the dental lamina itself, which is exactly why they have no predecessor.

Step 6 – note the clinical relevance: Because a premolar develops between the divergent roots of a deciduous molar, periapical infection of that deciduous molar can damage the underlying premolar and produce Turner's hypoplasia. This anatomical relationship only exists because the premolar is the successor of a molar, not of a premolar.

Why the other options are wrong:

- B, premolars replace the deciduous canines: is wrong. The deciduous canines are replaced by the **permanent canines**. Premolars replace deciduous molars, and there are no deciduous premolars at all.
- C, all 32 are succedaneous: is wrong because there are only 20 deciduous teeth to be replaced. Twelve permanent teeth, the molars, can have no predecessor.
- D, molars are succedaneous because they erupt distal to the deciduous second molar: contradicts itself. Erupting distal to the arch is precisely why they are **non**-succedaneous, since nothing is shed to make room.

Final Answer: Premolars are succedaneous and replace the deciduous molars; permanent molars replace nothing $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q5

Q6.

Solution

Concept – spacing in the deciduous arch is normal and desirable: Gaps between deciduous teeth are not a defect. They are the reserve of arch length that the larger permanent teeth will need.

Step 1 – separate the two kinds of spacing: Physiologic or developmental spacing is the generalised scatter of small gaps found throughout the deciduous arch. **Primate spaces** are the specific, larger, constant gaps at two named sites.

Step 2 – fix the two sites: The primate space lies **mesial to the maxillary deciduous canine** and **distal to the mandibular deciduous canine**. The question names exactly these two sites, so the answer is the primate space.

Step 3 – explain the name: They are called primate spaces because they are a permanent feature of the dentition in most non-human primates, where the large canine of the opposing arch occludes into the space. In humans they are present only in the deciduous dentition.

Step 4 – state their timing: Primate spaces are present from the moment the deciduous teeth erupt. They are not created later by jaw growth, which distinguishes them from developmental spacing that becomes more obvious as the jaws grow between 4 and 6 years.

Step 5 – state their clinical value: Together with physiologic spacing they give the arch length that the permanent incisors need, since the permanent incisors are much wider than their deciduous predecessors. A deciduous dentition with no spaces predicts crowding of the permanent incisors. The primate spaces are also used during the early mesial shift of the permanent first molar.

Why the other options are wrong:

- A, leeway space of Nance: is a different quantity altogether. It is the **excess** of the combined mesiodistal width of the deciduous canine and two deciduous molars over that of the permanent canine and two premolars, about 1.8 mm per side in the mandible and 0.9 mm per side in the maxilla. It is not a visible gap mesial or distal to a canine.
- B, freeway space: is the **interocclusal rest space**, the 2 to 4 mm gap between the upper and lower teeth when the mandible is at physiologic rest. It is a vertical measurement used in prosthodontics and has nothing to do with spacing along the arch.
- D, interproximal spaces of Bolton: is a fabricated term. Bolton's name at-

taches to the **tooth size ratio analysis** comparing maxillary and mandibular tooth widths, not to any named space in the deciduous arch.

Final Answer: Primate spaces ⇒ C

Answer: (C) Go Back to Q6

Q7.

Solution

Concept – an optical appearance, not a real structure: Some enamel features are actual defects in the tissue. Hunter-Schreger bands are not. They are an illusion created by the way light strikes rods that are cut at different angles.

Step 1 – read the two clues in the stem: The bands are seen under **reflected light**, and they arise because **adjacent groups of rods are cut in different directions**. Both clues point to an optical phenomenon.

Step 2 – name it: These are the **Hunter-Schreger bands**, alternating light and dark zones about 50 micrometres wide running roughly at right angles to the dentinoenamel junction.

Step 3 – explain the optics: Enamel rods do not run in perfectly straight lines. Groups of rods deviate from the radial direction and change direction regularly. A ground section therefore cuts one group of rods longitudinally and the next group more transversely.

Step 4 – link the cut to the appearance: Rods cut longitudinally are called **parazones** and appear light. Rods cut transversely are **diazones** and appear dark. Reversing the direction of the incident light reverses which bands look light and which look dark, and this reversal proves that the bands are an optical effect rather than a structural one.

Step 5 – account for the location given: The bands appear in the **inner two-thirds** of the enamel only. In the outer third the rods straighten out and run in nearly parallel radial rows, so there is no alternation of direction and no banding.

Step 6 – state why the rods deviate at all: The deviation is functional. Rods that change direction resist the propagation of a crack, because a fracture cannot follow a single straight rod boundary from the surface to the dentine.

Why the other options are wrong:

- A, striae of Retzius: are **incremental** lines that record the rhythmic deposition of enamel. They run obliquely from the dentinoenamel junction to the surface and reach it as perikymata. They are a genuine structural feature

with a hypomineralised matrix, not a light effect, and they are not confined to the inner two-thirds.

- B, enamel lamellae: are thin **leaf-like faults** of hypomineralised or organic material that extend from the enamel surface, sometimes as far as the dentine. They are single defects seen in transverse section, not broad alternating bands.
- D, perikymata: are the shallow transverse **grooves on the enamel surface** where the striae of Retzius emerge. They are a surface topography seen with a hand lens or on a replica, and they lie in the outer enamel, not in the inner two-thirds.

Final Answer: Hunter-Schreger bands $\Rightarrow$ C

Answer: (C) Go Back to Q7

Q8.

Solution

Concept – enamel is brittle, so its architecture must resist cracking: Enamel cannot bend and it cannot be repaired. The only defence it has against fracture is the arrangement of its rods.

Step 1 – name the arrangement: Enamel in which groups of rods twist around one another instead of running in straight radial rows is called **gnarled enamel**.

Step 2 – locate it: It is found at the **cusp tips of the molars and premolars** and at the incisal edges, which are exactly the regions that take the highest and most concentrated occlusal load.

Step 3 – work out the mechanics: A brittle solid fails by a crack running along a plane of weakness. In enamel that plane is the rod boundary, where the organic sheath lies.

Step 4 – apply that to gnarled enamel: If the rods twist and interlace, there is **no continuous straight rod boundary** for a crack to follow. The crack has to keep changing direction, which absorbs energy and arrests it. The interlacing therefore **strengthens** the cusp.

Step 5 – rule out the opposite reading: Nature places the most interlaced enamel exactly where the load is highest. This alone tells you the arrangement must be protective rather than weakening, and it is consistent with the same principle behind the deviating rods that produce the Hunter-Schreger bands.

Step 6 – note the clinical relevance: Gnarled enamel is harder to cut and it does not cleave predictably with a chisel, which is why hand instrumentation at a cusp

tip is unreliable and a rotary instrument is used instead.

Why the other options are wrong:

- B, gnarled enamel but weakening the cusp: gets the name right and the mechanics exactly backwards. Interlacing rods resist cleavage, they do not promote it. Cusp fracture in practice follows undermining of the enamel by caries or by a wide cavity preparation, not any intrinsic weakness of gnarled enamel.
- C, prismless enamel: is a real entity but a different one. It is the thin outermost layer, about 30 micrometres thick, in which the crystals run parallel with no rod boundaries at all. It covers the **surface** of most deciduous teeth and parts of permanent teeth, and it has nothing to do with twisting rods at a cusp tip.
- D, a strictly radial arrangement: describes the **outer third** of the enamel over the smooth surfaces, which is the opposite of what the question describes. Straight parallel rods would give a crack a clean uninterrupted path to follow, so this arrangement offers less fracture resistance, not more.

Final Answer: Gnarled enamel, and the interlacing resists fracture $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q8

Q9.

Solution

Concept – coronal dentine is laid down in two successive layers: The very first dentine an odontoblast makes is not the same as the dentine it makes afterwards, because the odontoblast itself is still immature when it starts.

Step 1 – read the position: The layer lies **immediately beneath the dentinoenamel junction**, so it is the first dentine formed in the crown.

Step 2 – name it: That first-formed outer layer is **mantle dentine**.

Step 3 – take its thickness and fibrils: It is about **15 to 20 micrometres** thick. Its collagen fibrils are coarse, they are the von Korff fibres, and they are orientated **perpendicular to the dentinoenamel junction**. Both figures in the stem match.

Step 4 – take its mineralisation: Mantle dentine is mineralised by **matrix vesicles** budded from the odontoblasts, and it is roughly 4 percent less mineralised than the dentine deeper to it. The stem says slightly less mineralised, which fits.

Step 5 – contrast it with what follows: All the dentine formed after this layer is **circumpulpal dentine**, which makes up the bulk of the tooth. Its collagen fibrils

are finer, they lie parallel to the junction rather than perpendicular to it, and it mineralises by the growth of existing crystals rather than by matrix vesicles.

Step 6 – note the clinical relevance: Because mantle dentine is slightly less mineralised and its fibrils run perpendicular to the junction, it acts as a shock-absorbing cushion under the brittle enamel and helps to arrest a crack at the dentinoenamel junction.

Why the other options are wrong:

- A, circumpulpal dentine: is the dentine formed **after** mantle dentine and forms the bulk of the tooth surrounding the pulp. It is more mineralised, its fibrils are finer and parallel to the junction, and it is not confined to a 15 to 20 micrometre layer.
- C, the granular layer of Tomes: lies just beneath the **cementum in the root**, not beneath the enamel in the crown. Its granular appearance in ground sections is attributed to looped terminal tubules or to interglobular spaces, and its site alone rules it out.
- D, the hyaline layer of Hopewell-Smith: is also a **root** structure. It is a structureless layer external to the granular layer, at the interface with cementum, and it is thought to help bind cementum to dentine. Again it is in the wrong part of the tooth entirely.

Final Answer: Mantle dentine $\Rightarrow$ B

Answer: (B) Go Back to Q9

Q10.

Solution

Concept – denticles are classified twice over, by structure and by position: The word "true" or "false" answers only one question, namely what the stone is made of. Whether it is free, attached or embedded is a separate classification based on where it sits.

Step 1 – read what the mass is made of: It is made of **dentine containing dentinal tubules**.

Step 2 – read what lines it: It is **lined at its periphery by odontoblasts**.

Step 3 – apply the structural rule: A denticle made of true tubular dentine and lined by odontoblasts is a **true denticle**. Its formation requires epithelial remnants of Hertwig's root sheath within the pulp to induce nearby undifferentiated cells to become odontoblasts, which then lay down real dentine.

Step 4 – contrast with the false denticle: A false denticle has **no tubules and no odontoblastic lining**. It is concentric layers of mineralised tissue laid down around a nidus of degenerating cells, and it shows a target-like lamellated pattern in section.

Step 5 – note which is commoner: False denticles are far more common than true denticles. True denticles are rare precisely because epithelial remnants are needed to trigger them, so the histology described here is the uncommon finding.

Step 6 – note the clinical relevance: Either type can obstruct access to a canal orifice during endodontic treatment, distort the shape of the chamber and cause a file to bind or deviate. Pulp stones are also more frequent with age, in teeth with chronic irritation, and in conditions such as dentine dysplasia.

Why the other options are wrong:

- A, a false denticle: is excluded by the histology given. A false denticle contains **no dentinal tubules** and has no odontoblasts around it, whereas both are described in the question.
- B, a diffuse or linear calcification: is a different entity entirely. Diffuse calcifications are irregular amorphous deposits, usually found in the **root canal** along collagen bundles or blood vessel walls, and they do not form a discrete radiopaque mass in the chamber.
- D, an attached denticle as a structural designation: confuses the two classifications. "Free", "attached" and "embedded" describe the stone's **relationship to the dentine wall**, not its internal structure. A denticle can be true and attached at the same time, so the label "attached" does not answer what the question asks.

Final Answer: A true denticle ⇒ C

Answer: (C) Go Back to Q10

Q11.

Solution

Concept – cementum is classified by two independent features, its cells and its fibrils: "Cellular" or "acellular" tells you whether cementocytes are trapped inside. "Fibrillar" or "afibrillar" tells you whether collagen fibrils are present. Take the two words of the name apart and the tissue defines itself.

Step 1 – split the name: Acellular means no cells within the matrix. **Afibrillar** means no collagen fibrils at all, so the tissue is essentially mineralised ground substance.

Step 2 – draw the functional conclusion: Cementum attaches the tooth only through the collagen fibres embedded in it. A tissue with **no fibrils can have no attachment function**, so this variety is functionally inert.

Step 3 – locate it: Acellular afibrillar cementum is found as **isolated patches on the cervical enamel**, usually only a few micrometres thick, where cementum spills slightly over the enamel at the cementoenamel junction.

Step 4 – explain how it gets there: During eruption the reduced enamel epithelium over the cervical enamel breaks down early in places. Connective tissue cells then contact the enamel surface and deposit this thin mineralised layer on it.

Step 5 – separate it from intermediate cementum: Intermediate cementum is a different tissue with a different site. It is a thin, poorly defined, **highly mineralised zone at the cementodentinal junction**, chiefly in the apical two-thirds of the roots of molars and premolars. Its origin is debated between Hertwig's epithelial root sheath cells and entrapped root sheath remnants, and it is thought to seal off the terminal ends of the dentinal tubules.

Step 6 – note the clinical relevance of the pair: The acellular afibrillar patches explain why cementum is sometimes found on enamel in a cervical specimen and why they are of no consequence to attachment. Intermediate cementum matters because, by sealing the dentinal tubules, it limits the passage of irritants between an infected canal and the periodontium.

Why the other options are wrong:

- A, the apical layer with cementocytes in lacunae: describes **cellular** cementum, which contradicts the word "acellular" in the name.
- C, the highly mineralised layer at the cementodentinal junction: describes **intermediate** cementum. It is the intended trap, because both tissues are thin and both are structurally odd, but the sites are entirely different: one lies on cervical enamel, the other at the junction of cementum with root dentine.
- D, the bulk of cervical cementum with embedded fibres: describes **acellular extrinsic fibre cementum**, the true attachment cementum of the cervical two-thirds. It is acellular, so half the name fits, but it is dense with embedded collagen fibres and is therefore fibrillar, not afibrillar.

Final Answer: Isolated afibrillar patches on cervical enamel with no attachment function $\Rightarrow$ B

Answer: (B) Go Back to Q11

Q12.

Solution

Concept – cementum keeps its formative cells, so it can go on being deposited for life: Cementoblasts survive in the periodontal ligament throughout life. When they are stimulated they lay down more cementum, and when that deposition becomes excessive it is called hypercementosis.

Step 1 – define the term: Hypercementosis is an **excessive deposition of cementum** on the root surface, beyond what normal physiological deposition would produce. It is a hyperplasia, not a neoplasm.

Step 2 – describe the shape it creates: The deposition is usually heaviest at the apical third, so the root becomes **bulbous or club-shaped**. The radiograph shows a thickened root outline with the periodontal ligament space and the lamina dura following the enlarged contour faithfully, which is what distinguishes it from a periapical lesion.

Step 3 – list the local causes: Chronic **periapical inflammation** of a non-vital tooth, **occlusal trauma** and excessive occlusal load, and a tooth that has lost its antagonist and **over-erupts**. All of these stimulate cementoblasts.

Step 4 – list the systemic causes: Paget's disease of bone, where hypercementosis is typically generalised and affects many teeth at once, acromegaly, and hyperpituitarism. A generalised pattern should always raise the suspicion of Paget's disease.

Step 5 – explain the extraction problem: The socket is shaped to the original root. A bulbous root that is **wider apically than the socket orifice** cannot be delivered along its own path of withdrawal. Simple forceps extraction risks fracturing the root or the alveolar plate.

Step 6 – state what is done about it: Such a tooth needs a surgical approach, with a flap raised, bone removed, and the tooth commonly sectioned. In a multirooted tooth, cementum bridging the furcation makes sectioning essential, so hypercementosis must be identified on the pre-operative radiograph and never discovered mid-extraction.

Why the other options are wrong:

- A, a resorptive loss of cementum with mobility: describes the opposite process. Loss of cementum is **cementum resorption**, seen with excessive orthodontic force, replanted teeth and periapical lesions. Hypercementosis adds tissue, and it does not by itself loosen the tooth.
- C, only in teeth without an antagonist, with easier extraction: is half true and wrongly concluded. Loss of an antagonist is indeed one recognised cause,

but it is only one of several, and the extraction is made **harder**, not easier. The periodontal ligament space is not widened; it follows the bulbous contour at normal width.

- D, a premalignant deposition needing biopsy: is false. Hypercementosis has **no malignant potential** and needs no biopsy. It is a reactive hyperplasia diagnosed on a radiograph, and it is distinct from true cemental neoplasms such as cementoblastoma, which is itself benign.

Final Answer: Excessive cementum deposition, several causes, extraction made difficult $\Rightarrow$ B

Answer: (B) Go Back to Q12

Q13.

Solution

Concept – the interdental gingiva is not one papilla but two, joined by a valley: Between two teeth in contact, the gingiva rises into a buccal papilla and a lingual papilla. The tissue joining them beneath the contact area is depressed, and that depression is the col.

Step 1 – read the shape and the site: A **saddle-shaped depression** lying **between the buccal and lingual papillae**, beneath the contact area. That description names one structure only.

Step 2 – name it: It is the **col**.

Step 3 – account for its shape: The col conforms to the shape of the contact area above it. It is therefore **wider and more pronounced between the posterior teeth**, where contact areas are broad, and it may be absent between the incisors, where the contact is nearly a point and the papilla comes to a single peak.

Step 4 – give its histology: The col is covered by **non-keratinised** epithelium, continuous with the junctional epithelium of the two adjoining teeth. It is thin, and it has no keratin layer and no well developed rete pegs.

Step 5 – explain why disease begins here: Three things converge. The site is **inaccessible** to a toothbrush, so plaque accumulates and matures undisturbed. The epithelium is **thin and non-keratinised**, so it is a poor barrier and bacterial products cross it easily. And the underlying tissue is richly vascular, so the inflammatory response is prompt and marked.

Step 6 – state the clinical consequence: The col is therefore the usual starting point of interdental gingivitis and of periodontal disease. It is also the reason that interdental cleaning with floss or an interdental brush achieves what brushing

alone cannot, and the reason a restoration that flattens the contact area alters the col and predisposes the site to inflammation.

Why the other options are wrong:

- A, the gingival sulcus, keratinised: is wrong twice. The sulcus is the shallow **V-shaped groove between the tooth surface and the free gingiva**, about 0.5 to 3 mm deep, not a depression between two papillae. And its inner wall is **non-keratinised**, so it is certainly not resistant to plaque.
- B, the free gingival groove: is a shallow linear depression on the **outer surface** of the gingiva that roughly corresponds to the level of the base of the sulcus. It runs parallel to the gingival margin on the facial aspect and is present in only about half of cases. It has nothing to do with the interdental valley.
- C, the mucogingival junction: is the **scalloped line where the attached gingiva meets the alveolar mucosa**, far apical to the interdental area and marking a change from keratinised to non-keratinised mucosa. The section shown does not reach that level.

Final Answer: The col, non-keratinised and the usual site of onset of interdental periodontal disease $\Rightarrow$ D

Answer: (D) Go Back to Q13

Q14.

Solution

Concept – each major salivary gland has a named duct with a fixed opening: The site of the opening is the anatomical landmark you use both to examine the gland and to cannulate the duct.

Step 1 – trace the parotid duct: It leaves the anterior border of the parotid gland, runs forward across the masseter about a finger's breadth below the zygomatic arch, and turns sharply medially at the anterior border of the masseter.

Step 2 – follow it through the cheek: It **pierces the buccal pad of fat and the buccinator** muscle, then runs forward for a short distance between the buccinator and the mucosa before opening.

Step 3 – fix the opening: It opens on a small parotid papilla on the buccal mucosa **opposite the maxillary second molar**.

Step 4 – note the oblique course: The short oblique run between the buccinator and the mucosa acts as a **valve**. When the cheek is blown out and intra-oral

pressure rises, the buccinator compresses the duct and prevents air being forced back into the gland.

Step 5 – state the length and the secretion: The duct is about 5 cm long. The parotid is a purely **serous** gland, so its secretion is watery and rich in amylase, and it contributes the largest share of saliva during stimulated flow.

Step 6 – state the clinical uses of the landmark: This papilla is where you dry and observe the flow of saliva when assessing the gland, where you look for the erythematous punctum and pus of parotitis, where you check for the papillary swelling of mumps, and where a sialography cannula or a stone is sought. In restorative practice it is the reason isolation of the maxillary molars is difficult without a cotton roll placed against the papilla.

Why the other options are wrong:

- B, the maxillary first molar: is the commonest wrong answer because it is one tooth too far forward. The papilla lies **opposite the second molar**, roughly at the level of the crown of that tooth.
- C, the mandibular second molar: places the opening in the wrong arch. The duct approaches the cheek from above, crossing the masseter well above the occlusal plane, so its opening is at the level of the **maxillary** teeth.
- D, the maxillary canine: is far too anterior. No major salivary duct opens at the canine. The submandibular duct opens at the sublingual caruncle at the base of the lingual frenum, and the sublingual gland drains by many small ducts along the sublingual fold in the floor of the mouth.

Final Answer: Maxillary second molar $\Rightarrow$ A

Answer: (A) Go Back to Q14

Answer Key

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