NEET MDS Dental Anatomy and Oral Histology

Sample Paper – 5

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. Compared with the permanent maxillary canine, the permanent mandibular canine characteristically shows:

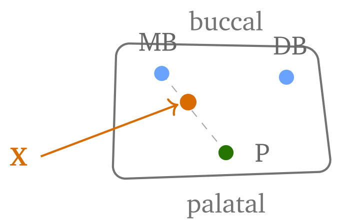
(A) A crown that is narrower mesiodistally, a much less developed cingulum, and a more symmetrical, flatter labial outline

(B) A crown that is wider mesiodistally, with a bulky, well developed cingulum

(C) A markedly more prominent cingulum, carrying heavy mesial and distal marginal ridges and a deep lingual fossa

(D) A crown that is shorter incisocervically, with a blunter cusp tip placed well distal to the long axis

Q2. The diagram below is an occlusal view of the pulp chamber floor of a permanent maxillary first molar during access opening. The orifice marked **X** lies palatal to the mesiobuccal orifice, on the line joining the mesiobuccal and palatal orifices, and is the one most often missed at treatment. The root and canal anatomy of this tooth is best described as:



(A) Two roots and two canals, one buccal and one palatal

(B) Three roots and exactly three canals, one in each root, with no additional canal in any root

(C) Three roots and four canals, the fourth being a second canal (MB2) within the mesiobuccal root

(D) Three roots and four canals, the fourth being a second canal within the palatal root

Q3. In the permanent maxillary first premolar, the relationship between the two cusps is that:

(A) The buccal cusp is longer and sharper than the lingual cusp, so the two cusp tips are of unequal height

(B) The lingual cusp is longer and sharper than the buccal cusp

(C) The two cusps are of equal length and equal sharpness, giving a level occlusal table

(D) The lingual cusp is so poorly formed that it is a non-functional bulge and does not occlude

Q4. The cervical line, that is the cementoenamel junction, curves incisally or occlusally on the proximal surfaces of a tooth. The rule governing this curvature is:

(A) The curvature is greater on the distal surface than on the mesial surface of the same tooth

(B) The curvature is greater on the mesial surface than on the distal surface of the same tooth, and both curvatures decrease from the anterior teeth towards the posterior teeth

(C) The curvature is exactly equal on the mesial and the distal surfaces of every tooth

(D) The curvature is greater on the mesial surface than on the distal surface, and both curvatures increase from the anterior teeth towards the posterior teeth

Deciduous Dentition and Eruption

Q5. The physiologic root resorption that precedes the exfoliation of a deciduous tooth is carried out by:

(A) Odontoclasts, multinucleated cells of the monocyte-macrophage lineage that sit in Howship's lacunae on the resorbing root surface

(B) Odontoblasts, which reverse their activity and dissolve the root dentine they had formed

(C) Cementoblasts, which demineralise the cementum from the periodontal ligament side

(D) The ameloblasts of the reduced enamel epithelium of the succeeding permanent tooth

Q6. A healthy 30-month-old child is brought for a first dental visit. Regarding the eruption of the deciduous incisors and the completion of the deciduous dentition, the correct statement is:

(A) The deciduous incisors erupt only after the deciduous first molars are in place, and the dentition is completed by the deciduous canines

(B) The deciduous incisors are the first teeth to appear, the mandibular centrals preceding their maxillary counterparts, and the dentition is completed by the deciduous second molars at about 2.5 to 3 years of age

(C) The deciduous incisors erupt maxillary before mandibular, and the dentition is completed by the deciduous first molars at about 16 months of age

(D) The deciduous incisors are the last of the deciduous teeth to appear, and the dentition is completed by the deciduous lateral incisors at about 2 years of age

Enamel

Q7. A newly erupted permanent tooth is covered by a delicate organic membrane, the enamel cuticle. It is rapidly worn away by mastication and toothbrushing, but it persists in protected areas such as the cervical region, where it takes up extrinsic stain. This membrane is also known as:

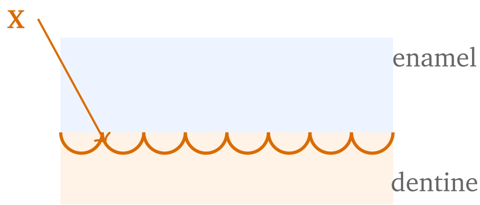
(A) An enamel lamella

(B) The acquired salivary pellicle

(C) An enamel tuft

(D) Nasmyth's membrane, the primary enamel cuticle

Q8. The ground section below shows the dentinoenamel junction marked **X**. It is not a smooth plane but a series of scallops. The functional significance of this scalloping is that it:



(A) Allows ameloblasts to migrate across the junction into the dentine after eruption

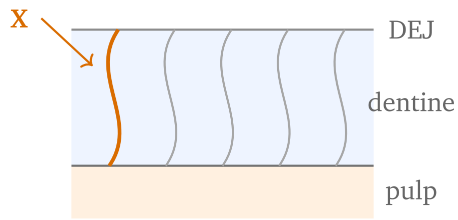
(B) Increases the surface area of the junction and interlocks the two tissues, so that the union resists the shear generated when enamel is loaded against dentine

(C) Marks the sites at which enamel is physiologically resorbed as the tooth erupts

(D) Is a feature of the deciduous dentition only, the junction being smooth in permanent teeth

Dentine and Pulp

Q9. The dentinal tubule marked **X** in the crown below does not run straight from the pulp to the dentinoenamel junction, but follows a gentle S-shaped course with fine waves along it. The correct account of this primary curvature and of the secondary curvatures is:



(A) The primary curvature is S-shaped in the root and straight in the crown, and the secondary curvatures are simply the terminal branches of the tubule

(B) The primary curvature is produced by the tubule crossing the incremental lines of von Ebner, and the secondary curvatures by interglobular dentine

(C) The primary curvature results from resorption of the tubule wall after eruption, and the secondary curvatures from later apposition of peritubular dentine

(D) The primary curvature is the gentle sigmoid course traced by the odontoblast as it is crowded pulpally during dentinogenesis, being most marked in the crown and almost absent beneath the cusp tip and in the root, while the secondary curvatures are the fine sinusoidal waves superimposed along the length of the tubule

Q10. Tertiary dentine is subdivided into reactionary dentine and reparative dentine. The distinction between the two rests on:

(A) Reactionary dentine being laid down by newly differentiated cells, while reparative dentine is laid down by the surviving primary odontoblasts

(B) Reactionary dentine forming in the root only, while reparative dentine forms in the crown only

(C) Reactionary dentine being secreted by the original primary odontoblasts that survive a mild insult, while reparative dentine is secreted by odontoblast-like cells newly differentiated from pulpal progenitor cells after the original odontoblasts have died

(D) Reactionary dentine occurring only in deciduous teeth, while reparative dentine occurs only in permanent teeth

Cementum and Periodontal Ligament

Q11. A histological section of the periodontal ligament of an elderly patient shows small, round to ovoid calcified bodies lying free in the ligament, some of them fused to the cementum surface. These bodies are:

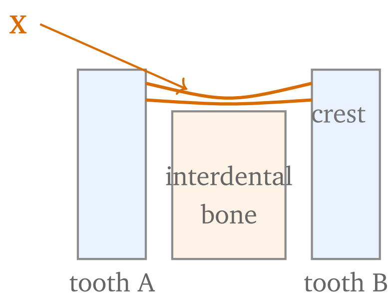
(A) Enamel pearls

(B) Cementicles

(C) Epithelial rests of Malassez

(D) Pulp stones displaced into the ligament

Q12. The fibre group marked **X** in the diagram runs from the cementum of one tooth, over the crest of the interdental bone, to the cementum of the adjacent tooth. It is:



(A) The alveolar crest group

(B) The dentogingival group

(C) The transseptal or interdental group

(D) The circular group

Oral Mucosa, Salivary Glands and TMJ Histology

Q13. The salivary gland whose secretory end pieces are predominantly mucous, so that it contributes the most viscous share of whole saliva, is the:

(A) Parotid gland

(B) Submandibular gland

(C) Glands of von Ebner

(D) Sublingual gland

Q14. The 8 to 12 large papillae set in a V just anterior to the sulcus terminalis are sunk below the level of the tongue surface and are ringed by a deep trench. In these papillae, the taste buds lie:

(A) In the lateral walls of the papilla facing the surrounding trench, with serous glands emptying into the floor of the trench to flush it

(B) On the flat superior surface of the papilla, exposed directly to the oral cavity

(C) Deep within the connective tissue core of the papilla

(D) Not in these papillae at all, but only in the neighbouring filiform papillae

Detailed Solutions

Q1.

Solution

Concept – the two canines are built for the same job in different arches: Both canines are long, single-rooted, single-cusped teeth, so the examiner tests you on the small, consistent differences between them.

Step 1 – compare the mesiodistal width: The mandibular canine crown is distinctly **narrower mesiodistally** than the maxillary canine crown, by about 1 mm on average. This is the single most reliable difference.

Step 2 – compare the crown height: The mandibular canine crown is **longer incisocervically** than the maxillary canine crown. A narrow crown that is also tall gives the mandibular canine its slender, drawn-out look.

Step 3 – compare the lingual surface: The maxillary canine has a bulky, prominent cingulum with heavy marginal ridges and a well marked lingual ridge running from the cingulum to the cusp tip, dividing two distinct fossae. The mandibular canine has a **much smaller, smoother cingulum**, faint marginal ridges and almost no lingual fossa. Its lingual surface is nearly flat.

Step 4 – compare the outline: The mandibular canine is **more symmetrical**. Its mesial outline is almost straight and continues the line of the root, and its cusp tip lies close to the long axis. The maxillary canine is asymmetrical, with a strongly convex distal outline and a cusp tip that sits labial and slightly distal.

Step 5 – put it together: Narrower mesiodistally, weak cingulum, flat and symmetrical labial and lingual outline is option A.

Why the other options are wrong:

- B, wider mesiodistally with a bulky cingulum: reverses both features. That description belongs to the **maxillary** canine.
- C, more prominent cingulum with heavy marginal ridges and a deep lingual fossa: is again the maxillary canine. The mandibular canine's lingual anatomy is the plainest of the two.
- D, shorter crown with a blunt, distally offset cusp: is wrong on all three counts. The mandibular canine crown is **longer**, and its cusp tip is more **centred** over the long axis, not offset.

Final Answer: Narrower mesiodistally, weak cingulum, more symmetrical $\Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q1

Q2.

Solution

Concept – root number and canal number are not the same thing: The maxillary first molar is the standard example of a tooth that carries more canals than roots.

Step 1 – count the roots: The maxillary first molar has **three roots**: mesiobuccal, distobuccal and palatal. The palatal root is the longest and the most divergent, and the mesiobuccal root is the broadest buccolingually.

Step 2 – count the canals: Because the mesiobuccal root is flattened and broad in the buccopalatal direction, it very often carries **two canals**: MB1 and MB2. Adding the single distobuccal and single palatal canals gives **four canals** in total.

Step 3 – locate MB2 exactly: The MB2 orifice lies **palatal and slightly mesial to the MB1 orifice**, on or just off the line drawn from the mesiobuccal orifice to the palatal orifice. The diagram marks precisely that point as X.

Step 4 – match the stem: The question states that X is palatal to the mesiobuccal orifice and on the MB to P line, which identifies it as MB2 in the mesiobuccal root. Three roots, four canals, the extra one in the mesiobuccal root, is option C.

Step 5 – note why it matters clinically: MB2 is present in the majority of maxillary first molars but is missed in a large share of treatments, because it is fine, often calcified at the orifice, and hidden under a dentine shelf. A missed MB2 is one of the commonest causes of persistent apical periodontitis after root canal treatment on this tooth, which is why troughing the MB to P groove is a routine step.

Why the other options are wrong:

- A, two roots and two canals: describes a **maxillary first premolar** pattern, not a molar. No maxillary first molar has only two roots.
- B, three roots and exactly three canals: is the beginner's answer. It ignores the extra canal in the mesiobuccal root, and it is the assumption that causes MB2 to be missed.
- D, the fourth canal in the palatal root: puts the extra canal in the wrong root. The palatal root is round in cross-section and almost always carries a **single** canal. Extra canals come from flattened roots, and it is the mesiobuccal root that is flattened.

Final Answer: Three roots, four canals, MB2 in the mesiobuccal root $\Rightarrow \boxed{C}$

$\boxed{\text{Answer: (C)}}$ Go Back to Q2

Q3.

Solution

Concept – cusp height in the premolars: A premolar is a transitional tooth, part canine and part molar, and the maxillary first premolar shows this most clearly in its cusps.

Step 1 – state the cusp relationship: In the maxillary first premolar the **buccal cusp is longer and sharper** than the lingual cusp. The difference is roughly 1 mm, so the buccal cusp tip sits noticeably occlusal to the lingual cusp tip.

Step 2 – see the buccal cusp as canine-like: The buccal cusp is long, pointed, and has well defined mesial and distal cusp ridges that meet at a sharp tip. This is why the maxillary first premolar is described as the most canine-like of the premolars, and why it takes over some of the canine's tearing function.

Step 3 – see the lingual cusp: The lingual cusp is **shorter, smaller and more rounded**, and its tip is displaced mesially. It is still fully functional and it occludes.

Step 4 – check the consequence: Because the two cusps differ in height, the occlusal table slopes and the buccal cusp is the tooth's stamp cusp for shearing. Unequal cusp tips is exactly what option A states.

Step 5 – fix the contrast that gets tested: The maxillary first premolar has a long, sharp buccal cusp and a shorter but useful lingual cusp. The mandibular first premolar has a large buccal cusp and a tiny lingual cusp that is often no more than an enlarged lingual ridge. Do not merge the two pictures.

Why the other options are wrong:

- B, lingual cusp longer: is simply reversed. No maxillary premolar has a lingual cusp taller than its buccal cusp.
- C, both cusps equal: is closest to the **mandibular second premolar** of the two-cusped type, where the cusps are nearly level. In the maxillary first premolar the buccal cusp clearly dominates.
- D, a non-functional lingual bulge: describes the **mandibular first premolar**, whose lingual cusp is tiny and does not occlude. The maxillary first premolar's lingual cusp is well formed and functional. This is the intended trap.

Final Answer: Buccal cusp longer and sharper $\Rightarrow \boxed{A}$

Answer: (A) Go Back to Q3

Q4.

Solution

Concept – the cervical line is a curve, not a ring: On the proximal surfaces the cementoenamel junction sweeps towards the incisal or occlusal, and the size of that sweep follows two fixed rules.

Step 1 – the first rule, mesial versus distal: On any given tooth, the cervical line curvature is **greater on the mesial surface than on the distal surface**. The mesial curve is the deeper one.

Step 2 – the second rule, anterior versus posterior: The curvature is greatest on the anterior teeth and **decreases progressively as you move posteriorly**. It is deepest on the maxillary central incisor and it is almost flat on the molars.

Step 3 – put numbers to it: On the maxillary central incisor the mesial curvature is about 3.5 mm and the distal about 2.5 mm. On the molars both curvatures fall to roughly 0 to 1 mm, and the cervical line is nearly straight.

Step 4 – note the useful shortcut: The distal curvature of a tooth is about 1 mm less than its mesial curvature, and the curvature of any surface is roughly 1 mm less than the same surface of the tooth immediately mesial to it. Both parts of the rule appear only in option B.

Step 5 – state why it matters clinically: The cervical line curvature sets the incisogingival position of a proximal cavity margin and of a crown margin, and it is why the interproximal papilla is tallest between the anterior teeth and flattest between the molars. Ignoring the deeper mesial curve is a common cause of a short mesial margin.

Why the other options are wrong:

- A, greater distally: is reversed. The mesial curvature is always the greater of the two on the same tooth.
- C, equal on both surfaces: is false. The mesial and distal curvatures differ by roughly 1 mm on the anterior teeth. They only approach each other on the molars, where both are close to flat.
- D, mesial greater but curvature increasing posteriorly: gets the first half right and the second half exactly backwards. The curvature **decreases** towards the back of the mouth, which is why molar cervical lines look almost straight. This is the intended trap.

Final Answer: Greater mesially, and decreasing from anterior to posterior $\Rightarrow \boxed{B}$

Answer: (B) Go Back to Q4

Q5.

Solution

Concept – shedding a tooth is a controlled resorption, not a passive loosening: A deciduous tooth is not pushed out. Its root is actively removed by cells.

Step 1 – name the cell: The resorbing cell is the **odontoclast**. It is large and multinucleated, and it is derived from the **monocyte-macrophage lineage** of the blood, exactly like the osteoclast.

Step 2 – describe what it does: The odontoclast attaches to the mineralised root surface by a sealing zone, throws out a ruffled border, and pumps hydrogen ions to dissolve the mineral. It then releases enzymes such as cathepsin K and tartrate-resistant acid phosphatase to digest the exposed collagen.

Step 3 – name the footprint it leaves: The excavated hollow it sits in is a **Howship's lacuna**, the same shallow scalloped bay that osteoclasts leave in bone. Seeing these lacunae on the root surface is the histological proof of active resorption.

Step 4 – note that the process is intermittent: Resorption alternates with quiet periods in which cementoblasts lay down a little repair cementum. The tooth therefore loosens in stages, which is why a shedding tooth can feel firm again for a while.

Step 5 – give the trigger and the endpoint: Pressure from the erupting successor and from the growing masticatory forces starts the process. When enough root has gone that the remaining attachment can no longer hold the crown, the tooth exfoliates.

Why the other options are wrong:

- B, odontoblasts reversing their activity: is not a real phenomenon. Odontoblasts are **formative** cells only. No hard tissue cell in the body switches between forming and resorbing its own matrix.
- C, cementoblasts demineralising cementum: is again a formative cell asked to do a destructive job. Cementoblasts **lay down** cementum, and during shedding they actually repair the intervals between bouts of resorption.
- D, the reduced enamel epithelium of the successor: is an epithelium. It fuses with the oral epithelium to open a path for the erupting permanent tooth, but it does not resorb the deciduous root.

Final Answer: Odontoclasts in Howship's lacunae $\Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q5

Q6.

Solution

Concept – the deciduous dentition opens with incisors and closes with second molars: Two fixed landmarks bracket the whole deciduous eruption story.

Step 1 – the opening landmark: The **deciduous incisors are the first teeth to appear**, and within them the mandibular central incisors come through before their maxillary counterparts. This follows the general rule that mandibular teeth precede maxillary teeth.

Step 2 – the incisor window: All eight deciduous incisors are usually in the mouth across roughly the second half of the first year, the centrals first and the laterals behind them.

Step 3 – the closing landmark: The dentition is completed by the **deciduous second molars**, which are the last of the twenty to erupt, at about **2.5 to 3 years** of age.

Step 4 – apply it to the child in the stem: A 30-month-old child is at about the point where the second deciduous molars are arriving. So this child either has a complete deciduous dentition or is within months of it, which is why this is the right age for the first full examination.

Step 5 – select: Incisors first, mandibular before maxillary, dentition completed by the second molars at 2.5 to 3 years, is option B.

Why the other options are wrong:

- A, incisors after the first molars and completed by the canines: reverses the order at both ends. Incisors come **first**, and the canines erupt **before** the second molars, not after them.
- C, maxillary incisors before mandibular, completed by the first molars at 16 months: is wrong twice. The **mandibular** centrals lead, and the first deciduous molars are followed by the canines and then the second molars, so they cannot complete the arch.
- D, incisors last, completed by the lateral incisors: is entirely reversed. The incisors open the sequence, they do not close it.

Final Answer: Incisors first, mandibular before maxillary, completed by the second deciduous molars at 2.5 to 3 years $\Rightarrow \boxed{B}$

Answer: (B) Go Back to Q6

Q7.

Solution

Concept – an erupting tooth arrives wrapped in the remains of its own formative organ: The last product of the ameloblast is not enamel but a thin organic film left on top of it.

Step 1 – follow the ameloblast to the end: When amelogenesis finishes, the ameloblasts secrete a final thin, structureless **organic layer** over the completed enamel surface. This is the **primary enamel cuticle**.

Step 2 – add the epithelial contribution: The ameloblasts then shorten and, with the outer enamel epithelium, form the reduced enamel epithelium, which stays pressed against the crown until eruption. The material contributed by this epithelium is sometimes called the secondary enamel cuticle.

Step 3 – name the whole covering: The film present on the crown of a **newly erupted** tooth is called **Nasmyth's membrane**, after the anatomist who described it.

Step 4 – follow its fate: It is only about 1 micrometre thick and it has no mineral, so mastication and toothbrushing abrade it away within days or weeks over the functional surfaces.

Step 5 – explain the clinical sign: It survives longest in protected sites such as the cervical third and the interproximal areas, where it readily binds chromogens from food, drink and bacteria. This is why a newly erupted tooth can show a stubborn green or brown cervical stain that scales off easily and does not return once the membrane is gone.

Why the other options are wrong:

- A, an enamel lamella: is a thin sheet-like defect of hypomineralised or organic material running **through the full thickness** of enamel from surface to dentinoenamel junction. It is a fault line within enamel, not a covering on it.
- B, the acquired salivary pellicle: is a real film on the tooth, but it is a **post-eruptive** deposit precipitated from **salivary** glycoproteins, and it re-forms within minutes of polishing. Nasmyth's membrane is a **developmental** product of the ameloblasts, and once lost it never returns. This is the intended trap.
- C, an enamel tuft: is a hypomineralised, brush-like structure that arises **at the dentinoenamel junction** and projects a short way into the inner enamel. It never reaches the surface.

Final Answer: Nasmyth's membrane, the primary enamel cuticle $\Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q7

Q8.

Solution

Concept – two tissues of very different stiffness have to stay joined for a lifetime: Enamel is brittle and rigid; dentine is tougher and more resilient. Their interface is the weak link, and its geometry is the solution.

Step 1 – describe the junction: The dentinoenamel junction is **scalloped**, a run of small domes rather than a flat plane, classically described with the convexities directed towards the dentine and the concavities towards the enamel.

Step 2 – take the first mechanical consequence, area: Turning a flat plane into a scalloped one **increases the surface area** of contact between the two tissues, so the load per unit area of interface falls.

Step 3 – take the second mechanical consequence, interlocking: Each dome sits in a matching hollow, so the two tissues are **mechanically keyed** into each other. A flat interface can be sheared apart by a force parallel to it; a scalloped one cannot slide, because the domes would have to ride out of their sockets first.

Step 4 – link it to function: Every occlusal contact drives enamel against dentine and generates shear along this junction. The scalloping converts that pure shear into a mixture of compression and shear across many small inclined faces, which the interface handles far better.

Step 5 – note where it is most marked: The scalloping is deepest under the cusps and incisal edges, exactly where the occlusal load is heaviest, and it is shallow or absent in the cervical region, where the load is light. That distribution is itself the evidence that its purpose is mechanical.

Step 6 – note the developmental origin: The scallops are the imprint of the pre-ameloblast and pre-odontoblast basement membrane, so the shape is laid down before either hard tissue exists. That is why it is present in every tooth.

Why the other options are wrong:

- A, allowing ameloblasts to migrate into dentine: does not happen. Ameloblasts move **away** from the junction as enamel thickens, and they are lost at eruption. The structures that do cross the junction are odontoblast processes, forming enamel spindles, and they cross in the other direction.
- C, sites of physiological enamel resorption: is false. Enamel is never physiologically resorbed, because it has no cells and no vascular supply once formed.

- D, deciduous teeth only: is false. The scalloping is present in both dentitions.

Final Answer: It increases area and interlocks the tissues against shear $\Rightarrow \boxed{B}$

Answer: (B) Go Back to Q8

Q9.

Solution

Concept – a tubule is the track left behind by a retreating cell: Whatever path the odontoblast takes as it moves pulpally, the tubule records it. So the shape of the tubule is the history of the cell's journey.

Step 1 – explain the primary curvature: As dentine thickens, the odontoblasts retreat towards the pulp. The pulp chamber they are retreating into gets smaller at every step, so the same number of cells has to fit into a shrinking perimeter. The cells **crowd together and are deflected sideways**, and this deflection traces a gentle **S or sigmoid curve**. This is the **primary curvature**.

Step 2 – describe its shape and its regional variation: The S is a broad, gentle double bend, convex towards the apex in its outer part. It is **most pronounced in the crown**, where the crowding effect is greatest, and it is **almost absent beneath the cusp tips and the incisal edge**, and in the **root**, where the odontoblasts converge less and the tubules run nearly straight.

Step 3 – explain the secondary curvatures: Superimposed on that broad S are **fine, regular sinusoidal waves** of much shorter wavelength, the **secondary curvatures**. They reflect the small rhythmic side-to-side movements of the odontoblast during its daily secretory activity.

Step 4 – eliminate on the regional clue alone: The question says the tubule shown is in the **crown** and is S-shaped there. Any option that claims the S belongs to the root and not the crown is contradicted by the diagram itself.

Step 5 – select: Only option D gives both the correct cause of the primary curvature, the correct regional distribution, and the correct account of the secondary curvatures as fine superimposed waves.

Step 6 – note why it matters: Because the tubule is curved and not radial, a bur or a file cuts across tubules at a different angle than you would predict, and a cavity floor exposes tubules obliquely. This affects the pattern of fluid flow and therefore of sensitivity in a preparation.

Why the other options are wrong:

- A, S-shaped in the root and straight in the crown: is exactly reversed. The

S is a **crown** feature, and it is the **root** tubules that are close to straight. It also miscalls the secondary curvatures branches: terminal, lateral and intermediate **branches** are real, but they are separate side channels, not curves of the main tubule.

- B, caused by crossing the lines of von Ebner: confuses two independent things. The **lines of von Ebner** are the fine daily incremental lines of dentine, and tubules do cross them, but that crossing does not bend the tubule. Interglobular dentine is a zone of unmineralised matrix between calcospherites, and it does not create the fine waves either.
- C, resorption and peritubular apposition: is wrong on both halves. The primary curvature is a **developmental** feature, present the moment the dentine forms, so it cannot be produced by post-eruptive resorption. **Peritubular dentine** is real, and it does narrow the tubule lumen with age, but narrowing a tube does not make it wavy.

Final Answer: A developmental sigmoid curve, marked in the crown, with fine superimposed secondary waves $\Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q9

Q10.

Solution

Concept – tertiary dentine is defined by its trigger, and then subdivided by its cell: Tertiary dentine is the dentine formed in response to an insult, laid down only at the threatened spot. The two subtypes are told apart by asking a single question: did the original odontoblasts survive?

Step 1 – take a mild insult: Slow caries, gentle attrition or a shallow preparation irritates the odontoblasts but does not kill them. The **surviving primary odontoblasts** simply up-regulate their secretion and lay down more matrix beneath the affected tubules. This is **reactionary dentine**.

Step 2 – describe reactionary dentine: Because it is made by the same cells that made the primary and secondary dentine, it is relatively **regular and well tubular**, and its tubules are more or less continuous with those of the existing dentine.

Step 3 – take a severe insult: Rapid caries, a deep or hot preparation, or a frank exposure **kills** the odontoblasts under the lesion. The tubules of the dead cells become dead tracts, and there is no cell left to lay down more dentine.

Step 4 – follow the repair: Progenitor cells in the pulp, from the cell-rich zone and the perivascular niche, migrate to the wound and differentiate into

odontoblast-like cells. These new cells then secrete a matrix that seals the injury site. This is **reparative dentine**.

Step 5 – describe reparative dentine: Because it is made in a hurry by newly recruited cells, it is **irregular and atubular or sparsely tubular**, its few tubules do not line up with those of the existing dentine, and cells are often trapped inside it, giving an osteodentine-like appearance.

Step 6 – state the rule in one line and select: Old cells surviving equals reactionary; new cells replacing dead ones equals reparative. That is option C.

Step 7 – note the clinical use: This is the biological basis of indirect pulp capping. If you leave a thin layer of affected dentine and seal it well, you keep the odontoblasts alive and get well organised reactionary dentine, which is a better barrier than the disorganised reparative dentine that follows an exposure.

Why the other options are wrong:

- A, reactionary from new cells and reparative from surviving odontoblasts: has the two terms swapped. Read the words themselves: *reactionary* means the existing cells *react*; *reparative* means new cells *repair* what was lost.
- B, root versus crown: is not the basis of the distinction at all. Tertiary dentine forms wherever the insult is, and both subtypes can occur in either region.
- D, deciduous versus permanent: is invented. Both subtypes occur in both dentitions, and both are seen daily in deciduous teeth with slowly progressing caries.

Final Answer: Surviving primary odontoblasts versus newly differentiated odontoblast-like cells $\Rightarrow \boxed{C}$

Answer: (C) Go Back to Q10

Q11.

Solution

Concept – name a calcified body by the compartment it sits in: The periodontal ligament has its own calcified body, distinct from those of pulp, enamel and bone.

Step 1 – read the compartment: The bodies lie **within the periodontal ligament**, some free and some attached to the cementum surface.

Step 2 – name them: Calcified bodies in the periodontal ligament are **cementicles**.

Step 3 – describe them: They are small, round to ovoid masses of calcified tissue, usually well under a millimetre across, and they often show concentric lamellae around a central core.

Step 4 – classify them by their relationship to the root: Cementicles are described in three forms. **Free** cementicles lie loose in the ligament. **Attached** or adherent cementicles have fused to the root surface. **Embedded** or interstitial cementicles have been overtaken by continuing cementum deposition and are now buried within the cementum itself. A free cementicle can become attached and then embedded over time, so the three are stages of one process.

Step 5 – give the likely origin: They are thought to begin around a nidus, such as a degenerated epithelial cell rest, a spicule of cementum or bone displaced by trauma, or a calcified Sharpey's fibre bundle. They increase with age, which fits the elderly patient in the stem.

Step 6 – note their significance: Cementicles are a normal age change and cause no symptoms, but they can hamper subgingival instrumentation if they lie on the root surface.

Why the other options are wrong:

- A, enamel pearls: are ectopic droplets of **enamel** on the root surface, produced by misplaced Hertwig's epithelial root sheath cells that retained the ability to differentiate into ameloblasts. They are found at the furcation of molars, are attached to the root rather than lying free, and are far larger than a cementicle.
- C, epithelial rests of Malassez: do lie in the periodontal ligament, and they are the classic ligament inclusion, but they are **clusters of soft-tissue epithelial cells**, remnants of Hertwig's sheath, and they are not calcified. The stem specifies calcified bodies. This is the intended trap.
- D, pulp stones: are calcified, but they lie **inside the pulp chamber or root canal**, enclosed by dentine. They cannot enter the periodontal ligament, since the two compartments communicate only through the narrow apical foramen.

Final Answer: Cementicles $\Rightarrow \boxed{B}$

Answer: (B) Go Back to Q11

Q12.

Solution

Concept – one fibre group joins tooth to tooth instead of tooth to bone: Almost every fibre bundle around a root ends in alveolar bone. One does not.

Step 1 – read the two ends given: The fibres begin in the **cementum of one tooth** and end in the **cementum of the next tooth**. Neither end is in bone.

Step 2 – read the course: They pass **over the crest of the interdental bone**, which is exactly what the diagram shows. That supracrestal course is what makes them a gingival fibre, not a principal periodontal fibre.

Step 3 – name them: Fibres running cementum to cementum over the interdental crest are the **transseptal group**, also called the interdental group.

Step 4 – state their function: Linked end to end from the last molar on one side to the last molar on the other, they form a continuous chain that ties the whole arch together. They maintain the integrity of the arch and hold the teeth in proximal contact.

Step 5 – give the orthodontic point: The transseptal fibres are dense elastic and collagen bundles that **remodel very slowly**, much more slowly than the alveolar bone does. When a rotated tooth is moved, the bone reorganises around its new position within weeks, but these fibres stay stretched and keep pulling the tooth back. They are therefore the group most often blamed for **relapse of rotations** after orthodontic treatment.

Step 6 – give the resulting procedure: This is the rationale for **circumferential supracrestal fiberotomy**, in which the supracrestal fibres are cut with a blade so that they reattach in the corrected position rather than dragging the tooth back.

Why the other options are wrong:

- A, the alveolar crest group: is a **principal** periodontal fibre group. It runs from the cementum just apical to the junctional epithelium **downwards and outwards to the alveolar crest**, so one end is in **bone** and it stays within a single socket. It never bridges to a neighbouring tooth.
- B, the dentogingival group: is a gingival fibre and does begin in cementum, but it runs **outwards and upwards into the lamina propria of the free and attached gingiva** of the same tooth. It ends in soft tissue, not in the cementum of the next tooth.
- D, the circular group: is a gingival fibre that encircles the tooth as a ring **within the free gingiva**, without inserting into cementum at all. It helps to bind the free gingiva against the tooth, and being circular it cannot run between two teeth.

Final Answer: The transseptal or interdental group ⇒ $\boxed{\text{C}}$

Answer: (C) Go Back to Q12

Q13.

Solution

Concept – the three major glands are classified by the acini they contain: Serous acini give a thin, watery, enzyme-rich fluid; mucous acini give a thick, mucin-rich fluid. Each major gland sits at a different point on that scale.

Step 1 – take the parotid: It is **purely serous**. Its acinar cells have round basal nuclei and dark apical zymogen granules, and it supplies most of the amylase in saliva.

Step 2 – take the submandibular: It is **mixed but predominantly serous**, roughly 90 percent serous acini. Its few mucous acini are capped by **serous demilunes**, which is its histological hallmark.

Step 3 – take the sublingual: It is **mixed but predominantly mucous**. Mucous acini dominate, and the sparse serous cells are present almost entirely as demilunes on the mucous acini. So the sublingual is the mucous member of the three.

Step 4 – read the acinar appearance: Mucous cells appear pale, foamy or empty on a routine haematoxylin and eosin section, because the mucin is washed out during processing, and their nuclei are flattened against the basal cell membrane. Sublingual sections therefore look strikingly pale next to a parotid section.

Step 5 – connect structure to secretion: Because it is mucous, the sublingual gland contributes the **most viscous** share of whole saliva. The stem's phrase about the most viscous share is the giveaway.

Step 6 – note the flow rate: The sublingual gland contributes only about 5 percent of the total salivary volume, against roughly 60 to 65 percent from the submandibular and 20 to 25 percent from the parotid at rest, but its small volume is highly viscous and does much of the lubrication.

Why the other options are wrong:

- A, the parotid: is at the opposite end of the scale. It is **purely serous** and produces the thinnest, most watery saliva of all.
- B, the submandibular: is mixed, so it is the tempting near-miss, but it is predominantly **serous**, not mucous. It contributes the largest **volume** of resting saliva, which is a different claim from being the most viscous. This is the intended trap.

- C, the glands of von Ebner: are **minor** glands, not major ones, and they are **purely serous**. They empty into the trench of the circumvallate papillae to wash it out between tastes.

Final Answer: Sublingual gland $\Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q13

Q14.

Solution

Concept – a taste bud has to be flushed to keep working: Where a taste bud is placed on a papilla is dictated by the need to clear the last stimulus before the next one arrives.

Step 1 – identify the papilla from the stem: Eight to twelve large papillae in a V just anterior to the sulcus terminalis, sunk below the surface and ringed by a trench, are the **circumvallate papillae**.

Step 2 – locate the taste buds: The taste buds sit in the **lateral walls of the papilla**, facing into the surrounding trench. Each circumvallate papilla carries a large number of them, which is why so few papillae account for so much of the tongue's taste function.

Step 3 – note what the superior surface carries: The flat top of a circumvallate papilla is covered by keratinised epithelium and carries **no** taste buds. It is built to resist abrasion.

Step 4 – add the glands: The purely serous **glands of von Ebner** open by ducts into the **floor of the trench**.

Step 5 – explain the design: The serous secretion continually washes the trench out. It dissolves the tastant so that it can reach the taste pore, and then it flushes the residue away so the bud is reset for the next stimulus. Placing the buds in the sheltered wall of a trench that is constantly rinsed, rather than on an exposed abraded surface, is what makes this work. That is option A.

Step 6 – note the innervation: The circumvallate papillae lie behind the sulcus terminalis in developmental terms and are supplied by the **glossopharyngeal nerve** for both taste and general sensation, unlike the anterior two-thirds of the tongue, whose taste travels in the chorda tympani.

Why the other options are wrong:

- B, on the flat superior surface: is the intuitive but wrong answer. That surface is **keratinised** and abraded by food, and no taste bud survives there.

It is the fungiform papillae that carry buds on their upper surface, because they are small, rounded and not sunk into a trench.

- C, deep in the connective tissue core: is impossible. A taste bud is an **epithelial** organ, and it must open onto a free surface through a taste pore to sample dissolved chemicals. A bud buried in connective tissue could receive nothing.
- D, only on the filiform papillae: is false. **Filiform** papillae are the most numerous papillae on the tongue, they are keratinised and conical, and their job is purely **mechanical**, gripping food and giving the tongue its rough texture. They carry **no** taste buds at all.

Final Answer: In the lateral walls facing the trench, flushed by serous glands $\Rightarrow$ $\boxed{A}$

Answer: (A) Go Back to Q14

Answer Key

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