NEET MDS Dental Anatomy and Oral Histology

Sample Paper – 2

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 smallest tooth in the permanent dentition, and the one whose crown is so nearly bilaterally symmetrical that its mesial and distal halves are difficult to tell apart, is the:

(A) Maxillary lateral incisor

(B) Mandibular lateral incisor

(C) Mandibular central incisor

(D) Maxillary central incisor

Q2. After the third molar, the permanent tooth most often congenitally missing, and the tooth that classically presents as a conical peg-shaped crown when it is present but malformed, is the:

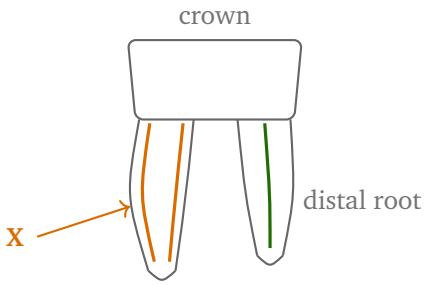
(A) Mandibular second premolar

(B) Mandibular central incisor

(C) Maxillary lateral incisor

(D) Maxillary second premolar

Q3. The diagram below is a proximal view of a permanent mandibular first molar, with the pulp canals drawn in. Considering root marked **X** together with the rest of the tooth, the usual root and canal anatomy of this tooth is:



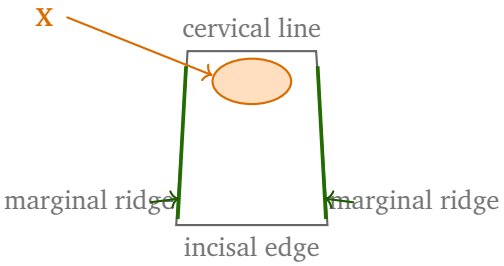
(A) Two roots and usually three canals, two of them in the mesial root

(B) Two roots and two canals, one canal in each root

(C) Three roots and three canals, one canal in each root

(D) One fused root carrying a single wide canal

Q4. The lingual view of a permanent maxillary central incisor is shown below. The rounded bulge marked **X**, occupying the cervical third of the lingual surface, is the:



(A) A mamelon

(B) The cingulum

(C) A marginal ridge

(D) The incisal ridge

Deciduous Dentition and Eruption

Q5. The complete deciduous dentition consists of:

(A) 16 teeth, with the formula I 2/2, C 1/1, M 1/1

(B) 24 teeth, with the formula I 2/2, C 1/1, M 3/3

(C) 20 teeth, with the formula I 2/2, C 1/1, PM 1/1, M 1/1

(D) 20 teeth, with the formula I 2/2, C 1/1, M 2/2

Q6. The tubercle of Zuckerkandl is:

(A) An accessory cusp on the lingual surface of a deciduous maxillary lateral incisor

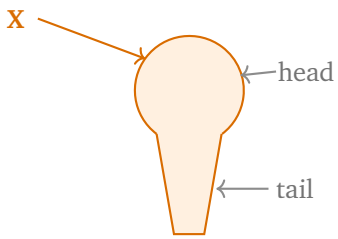
(B) A supernumerary tooth erupting between the deciduous molars

(C) The distal accessory cusp of the deciduous mandibular second molar

(D) The exaggerated cervical ridge on the mesiobuccal aspect of a deciduous first molar

Enamel

Q7. The cross-section below shows a single enamel rod. The keyhole outline marked **X**, with a rounded head and a tapering tail, is produced by:



(A) The rhythmic weekly deposition of enamel matrix by the ameloblast

(B) The angled secretory face of Tomes' process of the ameloblast

(C) Odontoblast processes that have crossed the dentinoenamel junction

(D) The abrupt bending of groups of rods that produces Hunter-Schreger bands

Q8. Mature enamel is the most highly mineralised tissue in the human body. Its composition by weight is approximately:

(A) 96 percent inorganic hydroxyapatite, about 1 percent organic matrix and about 3 percent water

(B) 70 percent inorganic hydroxyapatite, about 20 percent organic matrix and about 10 percent water

(C) 50 percent inorganic hydroxyapatite, about 25 percent organic matrix and about 25 percent water

(D) 45 percent inorganic hydroxyapatite, about 33 percent organic matrix and about 22 percent water

Dentine and Pulp

Q9. A 34-year-old patient has a slowly progressing occlusal carious lesion. Radiographically the pulp chamber shows a localised deposit of hard tissue only beneath the lesion, while the rest of the chamber is unchanged. This localised deposit is:

(A) Primary dentine

(B) Secondary dentine

(C) Tertiary (reparative) dentine

(D) Mantle dentine

Q10. The unmineralised layer of dentine matrix that lies immediately against the odontoblast cell bodies, is about 10 to 40 micrometres wide, and remains constant in width throughout life because it mineralises at its outer edge as fast as it is formed, is:

(A) Mantle dentine

(B) Predentine

(C) Interglobular dentine

(D) Tomes' granular layer

Cementum and Periodontal Ligament

Q11. The terminal portions of the principal periodontal ligament fibres, which are embedded and mineralised into cementum at one end and into the alveolar bone at the other, and which give the tooth its attachment, are known as:

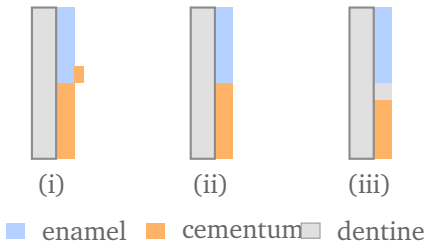
(A) Transseptal fibres

(B) Oxytalan fibres

(C) Circular gingival fibres

(D) Sharpey's fibres

Q12. The three panels below show the possible relationships between cementum and enamel at the cementoenamel junction: (i) cementum overlapping enamel, (ii) an edge to edge meeting, and (iii) a gap that leaves dentine exposed. Their approximate frequencies are:



(A) (i) about 60 percent, (ii) about 30 percent, (iii) about 10 percent

(B) (i) about 10 percent, (ii) about 30 percent, (iii) about 60 percent

(C) (i) about 30 percent, (ii) about 60 percent, (iii) about 10 percent

(D) (i) about 50 percent, (ii) about 25 percent, (iii) about 25 percent

Oral Mucosa, Salivary Glands and TMJ Histology

Q13. The dorsum of the tongue is covered by specialised mucosa and carries four types of lingual papillae. The papillae that are by far the most numerous, are keratinised, and carry **no** taste buds are the:

(A) Filiform papillae

(B) Fungiform papillae

(C) Circumvallate papillae

(D) Foliate papillae

Q14. Histologically, the submandibular gland is best described as:

(A) A pure serous gland with no mucous component

(B) A mixed seromucous gland in which serous acini predominate, with mucous tubules capped by serous demilunes

(C) A mixed seromucous gland in which mucous acini predominate, with only occasional serous demilunes

(D) A pure mucous gland with no serous component

Detailed Solutions

Q1.

Solution

Concept – the smallest tooth and the most symmetrical tooth are the same tooth: Two separate clues are given, and both point to a single incisor.

Step 1 – use the size clue: The **mandibular central incisor** is the smallest tooth in the permanent dentition, with a crown about 8.8 mm long incisocervically and only about 5 mm wide mesiodistally.

Step 2 – use the symmetry clue: Its mesial and distal halves are almost mirror images. The mesial and distal marginal ridges are of nearly equal length, the incisal edge sits at right angles to the long axis, and the mesioincisal and distoincisal angles are both close to 90 degrees.

Step 3 – state the practical consequence: Because there is so little to separate the two halves, the mandibular central incisor is the hardest tooth in the mouth to side, that is to say to call as right or left. The usual aids are the slightly deeper distal cervical line curvature and the developmental depression that is a little more marked on the distal surface of the root.

Step 4 – confirm the pairing: Both clues in the stem, smallest and most bilaterally symmetrical, are satisfied only by the mandibular central incisor, so option C is the single best answer.

Why the other options are wrong:

- A, the maxillary lateral incisor: is small, but it is larger than the mandibular central incisor. It is also markedly **asymmetrical**, with a rounded distoincisal angle and a much more curved distal outline, and it is the most variable tooth in form in the whole mouth.
- B, the mandibular lateral incisor: is very slightly **larger** than the mandibular central incisor and, importantly, its crown is twisted distally on the root so that its incisal edge follows the curve of the arch. That twist makes it clearly asymmetrical.
- D, the maxillary central incisor: is the widest anterior tooth in the mouth, not the smallest, so it fails the very first clue.

Final Answer: Mandibular central incisor $\Rightarrow$ C

Answer: (C) Go Back to Q1

Q2.

Solution

Concept – teeth at the end of a developmental series are the least stable: The last tooth to form in each class is the one most often missing or malformed, because it is the one whose dental lamina activity is running out.

Step 1 – rank congenital absence: The order of hypodontia is, third molar first, then the **maxillary lateral incisor**, then the mandibular second premolar. Excluding the third molars, as the stem does, leaves the maxillary lateral incisor at the top.

Step 2 – use the peg clue: When the maxillary lateral incisor forms but forms poorly, it appears as a small conical crown that tapers towards the incisal edge, with no mesial or distal contact. This is the classic **peg lateral**.

Step 3 – link the two findings: Absence and the peg form are two grades of one disturbance. The peg lateral is a partial expression of the same genetic tendency that at its full expression deletes the tooth altogether, which is why a peg lateral on one side is so often paired with a missing lateral on the other.

Step 4 – note the clinical relevance: Both presentations create a space and an aesthetic problem in the anterior maxilla, and both are managed by composite build-up, a veneer or a crown after orthodontic space setting.

Why the other options are wrong:

- A, the mandibular second premolar: is a genuinely common congenital absence, but it ranks **after** the maxillary lateral incisor, and it does not present as a peg-shaped crown. Its variation is in cusp number, two-cusped or three-cusped.
- B, the mandibular central incisor: is only rarely congenitally missing, and when the mandibular incisor region is affected it is usually the lateral incisor.
- D, the maxillary second premolar: is occasionally absent but far less often than the maxillary lateral incisor, and it has no peg form.

Final Answer: Maxillary lateral incisor $\Rightarrow$ C

Answer: (C) Go Back to Q2

Q3.

Solution

Concept – root number and canal number are not the same count: A root may carry more than one canal, and the mandibular first molar is the standard example.

Step 1 – count the roots: The permanent mandibular first molar has **two** roots, one mesial and one distal, as the diagram shows.

Step 2 – look at the mesial root: The mesial root, marked **X**, is broad buccolingually and has a deep concavity on its distal surface. It almost always carries **two** canals, the mesiobuccal and the mesiolingual.

Step 3 – look at the distal root: The distal root is rounder and usually carries a **single** wide canal, though a second distal canal is present in a minority of teeth.

Step 4 – add the counts: Two canals in the mesial root plus one in the distal root gives **three canals in two roots**, which is the usual anatomy and matches option A.

Step 5 – note why it matters: This is the first permanent tooth in the mouth and the most frequently root treated. Failing to find the second mesial canal is a common cause of endodontic failure, which is exactly why the examiner separates roots from canals.

Why the other options are wrong:

- B, two roots and two canals: gets the roots right but misses the second mesial canal. Two canals in this tooth is the uncommon variant, not the usual finding.
- C, three roots: is wrong for the standard tooth. A third root can occur as the **radix entomolaris**, a supernumerary distolingual root seen mainly in Mongoloid populations, but it is a variation, not the norm.
- D, one fused root with a single canal: does not describe the mandibular first molar at all. Root fusion with a single canal is a feature of some mandibular third molars.

Final Answer: Two roots and usually three canals $\Rightarrow$ A

Answer: (A) Go Back to Q3

Q4.

Solution

Concept – the landmarks of the lingual surface of an anterior tooth: The lingual surface is bounded at the sides by the marginal ridges and raised at the neck by the cingulum, so that the surface between them is scooped into the lingual fossa.

Step 1 – read the position given: The structure marked **X** lies in the **cervical third** of the lingual surface, in the middle of it, and it is a rounded bulge.

Step 2 – name that structure: That is the **cingulum**, the convex lingual mass of enamel at the cervical third of every anterior tooth. It represents the lingual lobe of the tooth, the fourth of the four developmental lobes of an incisor.

Step 3 – place the marginal ridges: The two green ridges in the diagram, running vertically along the mesial and distal borders of the lingual surface, are the **marginal ridges**. They are linear elevations, not a central bulge, so they cannot be X.

Step 4 – see how they work together: The cingulum below and the two marginal ridges at the sides enclose the shallow **lingual fossa**. This is the surface that receives the mandibular incisor edge in centric occlusion.

Step 5 – note the clinical relevance: The cingulum is the standard site for the cingulum rest seat of a removable partial denture, and an exaggerated cingulum is called the tuberculum dentale.

Why the other options are wrong:

- A, a mamelon: is one of the three rounded projections on the **incisal edge** of a newly erupted incisor. It is at the opposite end of the crown from X, and it wears away within a few years of eruption.
- C, a marginal ridge: is at the mesial and distal **borders** of the lingual surface, and is drawn separately in green in the diagram. X is central, not marginal.
- D, the incisal ridge: is the biting edge at the incisal end of the crown, again the opposite end of the tooth from the cervical third.

Final Answer: The cingulum $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q4

Q5.

Solution

Concept – the deciduous dentition is the permanent dentition minus the premolars and the third molars: Once you see which classes are absent, both the count and the formula follow.

Step 1 – list the deciduous teeth in one quadrant: Two incisors, one canine and two molars, which is five teeth.

Step 2 – multiply out: Five teeth per quadrant $\times$ 4 quadrants $=$ **20 teeth** in the complete deciduous dentition.

Step 3 – write the formula: The dental formula is written per half of the mouth, upper over lower. For the deciduous dentition it is **I 2/2, C 1/1, M 2/2**, which totals 10 teeth per half and 20 in all.

Step 4 – check what is absent: There are **no deciduous premolars** and **no deciduous third molars**. The permanent premolars succeed the deciduous molars, and the permanent molars have no deciduous predecessor at all, which is why the permanent dentition has 32 teeth and the deciduous only 20.

Step 5 – note the timing: The set is complete by about 30 months, and it stays intact until the mandibular first permanent molar erupts at about 6 years and the mixed dentition begins.

Why the other options are wrong:

- A, 16 teeth with M 1/1: gives only one deciduous molar per quadrant. There are two, the first and the second deciduous molar, so both the count and the formula are wrong.
- B, 24 teeth with M 3/3: invents a third deciduous molar. No third molar exists in the deciduous series.
- C, 20 teeth with a PM entry: has the right **total**, and is the intended trap, but the formula is wrong. There is no such thing as a deciduous premolar. The teeth in that position are deciduous **molars**, and it is the succeeding **permanent** premolars that replace them.

Final Answer: 20 teeth, I 2/2, C 1/1, M 2/2 $\Rightarrow$ D

Answer: (D) Go Back to Q5

Q6.

Solution

Concept – an eponym for a cervical bulge, not for a cusp: The tubercle of Zuckerkandl is a named exaggeration of the cervical ridge of a deciduous molar.

Step 1 – place it: It lies on the **buccal surface** of a deciduous molar, in the **cervical third**, and it is most prominent towards the **mesial** aspect.

Step 2 – name the tooth: It is most marked on the **deciduous first molar**, where the mesiobuccal cervical ridge is so pronounced that the crown appears to bulge out at the neck.

Step 3 – describe what it is: It is not an extra cusp and it carries no occlusal contact. It is simply an exaggerated cervical ridge of enamel, so the crown is widest at the cervical third and tapers occlusally.

Step 4 – explain why it exists: The deciduous crown is short, so the enamel bulges cervically instead of building height. The bulge also deflects food away from the gingival margin.

Step 5 – note the clinical consequences: The tubercle makes matrix band adaptation and stainless steel crown seating difficult on a deciduous first molar, and it must be reduced when the tooth is prepared. It also means the tooth is widest at the cervix, so cervical caries here is easily missed.

Why the other options are wrong:

- A, a lingual accessory cusp on an incisor: describes a **talon cusp** or an exaggerated tuberculum dentale, both of which are anterior-tooth features. The tubercle of Zuckerkandl is on a molar and is buccal.
- B, a supernumerary tooth: is wrong in kind. The tubercle is part of a normal tooth, not a separate tooth.
- C, a distal accessory cusp on the deciduous second molar: confuses the eponym with a cusp. The tubercle of Zuckerkandl is a cervical ridge, is mesiobuccal, not distal, and belongs to the first deciduous molar.

Final Answer: The exaggerated mesiobuccal cervical ridge of a deciduous first molar $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q6

Q7.

Solution

Concept – the shape of the rod is the imprint of the cell that made it: An enamel rod is not a pre-formed fibre. It is the record of where one ameloblast secreted matrix, so the geometry of the secretory surface decides the outline.

Step 1 – identify the secretory structure: Once the ameloblast begins secreting enamel it develops a conical, angled projection at its distal end called **Tomes' process**, which is pushed into the forming enamel.

Step 2 – note that the process has two secretory faces: Secretion occurs from a face at the **proximal** part of the process and from a face at the **distal, angled** part. The two faces lay down crystals in two different orientations.

Step 3 – connect each face to a part of the keyhole: The pit in which the angled part of the process sits becomes the rounded **head** of the rod, where the crystals lie roughly parallel to the rod axis. The matrix laid down from the other face fills the space between processes and becomes the **tail**, where the crystals are inclined at an angle to the rod axis.

Step 4 – assemble the pattern: Because the tail of one rod fits between the heads of the rods in the row above, the rods interlock into the familiar keyhole or fish-scale pattern seen in cross-section, roughly 5 micrometres across at the head.

Step 5 – state the consequence: This change in crystal orientation between head and tail is what creates the rod sheath, the organic-rich boundary that is the weak line along which enamel cleaves. So the keyhole outline is an ameloblast phenomenon, and option B is correct.

Why the other options are wrong:

- A, rhythmic weekly deposition: produces the **incremental lines** of enamel. Incremental lines are a record of time, seen in longitudinal section. They do not shape the cross-sectional outline of a single rod.
- C, odontoblast processes crossing the dentinoenamel junction: describes **enamel spindles**. These are odontoblast structures trapped in enamel, entirely separate from rod shape, and they are found only at the dentinoenamel junction.
- D, the bending of groups of rods: describes the origin of **Hunter-Schreger bands**, an optical effect seen in longitudinal ground section when alternating groups of rods are cut along their length or across it. It concerns groups of rods, not the outline of one rod.

Final Answer: The angled secretory face of Tomes' process $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q7

Q8.

Solution

Concept – know the composition of each dental hard tissue by weight: Enamel, dentine, cementum and bone form a descending series of mineral content, and the examiner tests whether you can place each one.

Step 1 – state the mineral fraction of enamel: Mature enamel is about **96 percent inorganic by weight**, and that mineral is **hydroxyapatite**, chemically $Ca_{10}(PO_4)_6(OH)_2$.

Step 2 – account for the remaining 4 percent: About **1 percent** is organic matrix and about **3 percent** is water. The residual organic matrix consists of enamelins and tuftelins, not collagen. Enamel is the only dental hard tissue with no collagen at all.

Step 3 – note the contrast by volume: By **volume** the figures read very differently, roughly 86 percent mineral, 2 percent organic and 12 percent water, because the mineral is so dense. If a question does not state by weight or by volume, take it as by weight.

Step 4 – draw the functional conclusion: This extreme mineral content makes enamel the hardest tissue in the body, about 5 on Mohs' scale, and lets it survive the abrasive loads of a lifetime of chewing. The same content makes it brittle, with a low tensile strength, which is why enamel needs the more resilient dentine beneath it and fractures when that support is undermined by caries.

Step 5 – add the clinical link: Because the tissue is almost entirely hydroxyapatite, it dissolves in acid. This is the basis of the acid-etch technique and of caries itself, with the critical pH for enamel dissolution at about 5.5.

Why the other options are wrong:

- B, 70 percent mineral: is the composition of **dentine**, roughly 70 percent mineral, 20 percent organic (mostly type I collagen) and 10 percent water. That collagen content is why dentine is tougher and less brittle than enamel.
- C, 50 percent mineral: is close to the figure for **bone** on some readings, and is well short of enamel. No dental tissue with only half its weight as mineral could be the most mineralised tissue in the body.
- D, 45 percent mineral: is the composition of **cementum**, roughly 45 to 50 percent mineral, 50 to 55 percent organic and water. Cementum is the least mineralised of the three dental hard tissues, which is why it resorbs less readily than bone but wears easily once exposed.

Final Answer: 96 percent mineral, 1 percent organic, 3 percent water $\Rightarrow$ A

Answer: (A) Go Back to Q8

Q9.

Solution

Concept – dentine is named by when it was laid down and why: Three types, and the deciding clues are timing and whether the deposition is generalised or localised.

Step 1 – define primary dentine: Primary dentine is everything formed **before the root is complete**, that is up to the time the tooth erupts and comes into function. It makes up the bulk of the tooth and its tubules are regular.

Step 2 – define secondary dentine: Secondary dentine is laid down **after root completion**, slowly, throughout life, by the same original odontoblasts. It is deposited **all around** the pulp chamber, though unevenly, being thicker on the roof and floor. It is why the pulp chamber shrinks with age and why an elderly tooth gives a lower response to pulp testing.

Step 3 – define tertiary dentine: Tertiary dentine is laid down only in **response to an insult** such as caries, attrition or a cavity preparation, and only at the **localised site** beneath that insult. It is also called reparative or reactionary dentine.

Step 4 – apply the clues in the stem: The deposit is **localised only beneath the carious lesion**, and the rest of the pulp chamber is unchanged. Localisation to the site of injury is the defining feature of tertiary dentine, so the answer is C.

Step 5 – name the two sub-types: When the original odontoblasts survive a mild insult and lay it down, it is called **reactionary** dentine and it is fairly tubular. When the insult kills them and new odontoblast-like cells differentiate from pulpal stem cells, it is called **reparative** dentine and it is irregular, sparsely tubular or atubular, and may contain trapped cells.

Step 6 – state the clinical value: Slow caries gives the pulp time to wall itself off with tertiary dentine, which is why a slowly progressing lesion may reach considerable depth without pulpal exposure, and why indirect pulp capping works.

Why the other options are wrong:

- A, primary dentine: was formed **before** the tooth erupted, decades before this lesion. It could not be a new deposit appearing under a carious lesion in an adult.
- B, secondary dentine: is a real age change in a 34-year-old, but it is deposited **throughout** the chamber, not at one localised site. The stem explicitly says

the rest of the chamber is unchanged, which rules it out.

- D, mantle dentine: is the first-formed outermost layer of primary dentine, lying just under the dentinoenamel junction. It is a location within primary dentine, formed during development, and has nothing to do with a response to caries.

Final Answer: Tertiary (reparative) dentine ⇒ C

Answer: (C) Go Back to Q9

Q10.

Solution

Concept – dentine is always being built, so there is always an unmineralised layer at the building edge: Matrix is secreted first and mineralised afterwards, so a band of uncalcified matrix must sit permanently between the cells and the hard tissue.

Step 1 – name the layer: That band is **predentine**. It lies immediately against the odontoblast cell bodies at the pulpal surface of the dentine.

Step 2 – describe it: It is 10 to 40 micrometres wide, it is unmineralised, and it stains differently from the mineralised dentine outside it, which is what makes it visible as a pale band in a decalcified section.

Step 3 – describe what it is made of: The odontoblasts secrete type I collagen and ground substance into it. Within predentine the collagen is assembled and the matrix matures.

Step 4 – explain the constant width: At the outer edge of predentine lies the **mineralisation front**, where matrix vesicles and phosphoproteins nucleate hydroxyapatite. Predentine mineralises at that front at the same rate as new predentine is secreted at the odontoblast surface, so its width stays constant while the whole layer migrates pulpally as dentine thickens.

Step 5 – note the protective role: Because it is uncalcified, predentine **resists resorption**. Odontoclasts cannot attach to unmineralised matrix, which is why internal resorption only begins once the predentine layer has been lost, and why an intact predentine layer protects the root canal wall.

Why the other options are wrong:

- A, mantle dentine: is the first-formed dentine, about 20 micrometres thick, but it lies at the **outermost** part of the dentine just beneath the dentinoenamel junction. It is mineralised, and it is at the opposite side of the dentine

from the odontoblasts. Its distinguishing feature is that its collagen fibrils run perpendicular to the junction.

- C, interglobular dentine: is **hypomineralised** rather than unmineralised, and it lies in the circumpulpal dentine where the calcospherites have failed to fuse. It is not a continuous layer next to the odontoblasts, and it is a defect, seen in vitamin D deficiency and fluorosis.
- D, Tomes' granular layer: is the granular zone seen in ground sections of **root** dentine, just beneath the cementum. It is at the periphery of the root, produced by looped terminal tubules or small hypomineralised areas, and again is nowhere near the odontoblast cell bodies.

Final Answer: Predentine $\Rightarrow$ B

Answer: (B) Go Back to Q10

Q11.

Solution

Concept – a ligament is only as good as the way its ends are fixed: The periodontal ligament is not glued to the tooth. Its fibres are built into the two hard tissues on either side while those tissues are forming.

Step 1 – name the embedded ends: The terminal portions of the principal fibres that are incorporated into cementum and into alveolar bone are the **Sharpey's fibres**.

Step 2 – explain how they get there: As cementoblasts lay down cementum, and osteoblasts lay down bone lining the socket, they deposit matrix **around** the collagen fibre bundles already present. The bundles are then mineralised in place, so the fibre becomes part of the hard tissue.

Step 3 – compare the two ends: On the cemental side the fibres are numerous, closely packed, of small diameter and **fully mineralised**. On the bone side they are fewer, more widely spaced, of larger diameter and only **partially mineralised**, with an unmineralised core.

Step 4 – state the mechanical result: This double embedding is what makes the tooth a gomphosis. Occlusal load is transmitted from cementum through the fibre to bone as **tension**, not compression, which is why the ligament acts as a shock absorber rather than a cushion being crushed.

Step 5 – add the clinical link: Sharpey's fibres are the anatomical basis of orthodontic tooth movement, since the bone-side fibres are remodelled as the socket wall resorbs on one side and forms on the other. They are also why a fibre-rich cemental surface must be preserved during root planing if reattachment is to occur.

Why the other options are wrong:

- A, transseptal fibres: are real periodontal fibres, but they run **from the cementum of one tooth over the alveolar crest to the cementum of the adjacent tooth**. They connect tooth to tooth and are not embedded in bone at all, which is exactly why they survive alveolar bone loss and why they cause orthodontic relapse.
- B, oxytalan fibres: are the **elastic-like** fibres of the ligament. They run mainly in an axial direction, are associated with blood vessels, and are thought to regulate vascular flow. They are not collagen and they are not the attachment mechanism.
- C, circular gingival fibres: encircle the tooth within the free gingiva as part of the **gingival** fibre group. They are not embedded in bone, and their job is to hold the free gingiva against the tooth, not to attach the tooth to its socket.

Final Answer: Sharpey's fibres $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q11

Q12.

Solution

Concept – the cementoenamel junction is a developmental accident, so it varies: Whether cementum reaches enamel depends on whether the reduced enamel epithelium breaks down before or after cementoblasts arrive, and that timing is not fixed.

Step 1 – take the overlap, panel (i): If the reduced enamel epithelium disintegrates early, connective tissue reaches the cervical enamel first, cementoblasts differentiate on it, and cementum is laid **over** the enamel. This is the commonest arrangement, at about **60 percent**.

Step 2 – take the edge to edge meeting, panel (ii): If the timing is exact, cementum simply butts against enamel at the cervical line. This occurs in about **30 percent**.

Step 3 – take the gap, panel (iii): If the reduced enamel epithelium persists too long, cementum never reaches enamel, and a strip of **dentine is left exposed** between them. This occurs in about **10 percent**.

Step 4 – match to the options: 60 percent, 30 percent, 10 percent for (i), (ii), (iii) in that order is option A.

Step 5 – remember the figures as a descending series: The three fall in the

order 60, 30, 10, that is 6 : 3 : 1, which is the easiest way to hold them. Note also that these relationships can all be found around the circumference of a **single** tooth, so they are not mutually exclusive per tooth.

Step 6 – state the clinical relevance: The 10 percent gap is the one that matters. That bare dentine has no covering once the gingiva recedes, so those teeth are the ones that develop cervical hypersensitivity and cervical caries. This is also why aggressive scaling at the cervical margin causes sensitivity.

Why the other options are wrong:

- B, 10, 30, 60: exactly reverses the two extremes. It would make the exposed-dentine gap the usual finding, and if that were true cervical hypersensitivity would be near universal rather than the exception.
- C, 30, 60, 10: promotes the edge to edge meeting to the commonest arrangement. Edge to edge does occur in about 30 percent, so this option swaps the first two figures.
- D, 50, 25, 25: is a plausible-looking set of round numbers but does not match any accepted description. In particular it makes the gap as common as the edge to edge meeting, which is not the case.

Final Answer: Overlap 60 percent, edge to edge 30 percent, gap 10 percent $\Rightarrow$ A

Answer: (A) Go Back to Q12

Q13.

Solution

Concept – of the four lingual papillae, only one is purely mechanical: Three types carry taste buds and are gustatory. One does not, and it is the one that covers the tongue.

Step 1 – take the filiform papillae: They are fine, hair-like, conical projections about 2 to 3 mm long, and they cover the entire anterior two-thirds of the dorsum in rows parallel to the sulcus terminalis. They are the most **numerous** papillae by far.

Step 2 – note that they are keratinised: Filiform papillae are the only papillae that are heavily keratinised, which is exactly what allows them to grip and manipulate food against the palate.

Step 3 – note that they carry no taste buds: They have no taste buds at all. Their role is purely **mechanical** and tactile, so all three clues in the stem, most

numerous, keratinised and no taste buds, converge on option A.

Step 4 – add the clinical links: Hypertrophy of filiform papillae with retained keratin gives **hairy tongue**. Their atrophy in iron, folate or vitamin B12 deficiency gives the smooth, bald **atrophic glossitis**, and their patchy loss with erythematous zones gives geographic tongue.

Why the other options are wrong:

- B, fungiform papillae: are mushroom-shaped, red because their thin non-keratinised epithelium lets the underlying vessels show through, and number only about 200 to 300, scattered mainly at the tip and lateral margins. They **do** carry taste buds, so the stem excludes them.
- C, circumvallate papillae: number only about 8 to 12, sit in a V just in front of the sulcus terminalis, and are the largest papillae. Each is surrounded by a trench that carries hundreds of taste buds on its walls, into which the serous **glands of von Ebner** pour their secretion to flush the trench. Being both few and gustatory, they fail two clues.
- D, foliate papillae: are vertical folds on the posterior lateral border of the tongue, rudimentary in humans, few in number and again **taste-bud bearing**. They are clinically notable only because their lymphoid tissue can swell and be mistaken for a tumour.

Final Answer: Filiform papillae $\Rightarrow$ A

Answer: (A) Go Back to Q13

Q14.

Solution

Concept – classify each major salivary gland by its acinar type: Parotid, submandibular and sublingual form a gradient from purely serous to predominantly mucous, and the submandibular sits in the middle.

Step 1 – classify the submandibular gland: It is a **mixed, seromucous** gland, meaning it contains both serous and mucous secretory units.

Step 2 – state which type predominates: The **serous** component predominates, in a ratio of roughly 9 serous to 1 mucous. So the gland is mixed but serous-dominant.

Step 3 – describe the demilune: The mucous tubules are capped at their blind ends by crescents of serous cells, the **serous demilunes** or crescents of Gianuzzi. In conventional fixation these appear as half-moons sitting on the mucous unit,

and their secretion reaches the lumen through intercellular canaliculi.

Step 4 – add the modern caveat: Rapid cryofixation studies show that in life the serous cells and the mucous cells actually lie side by side around the same lumen, and the demilune appearance is largely a shrinkage artefact of routine fixation. The classical description is still the one examinations expect.

Step 5 – note the output: Despite being the second largest gland, the submandibular contributes the **largest share of unstimulated whole saliva**, about 60 to 65 percent, because it secretes continuously at rest. The parotid takes over on stimulation.

Step 6 – add the clinical link: Its mixed, more viscous secretion, together with the upward and forward course of Wharton's duct against gravity, is why about 80 percent of salivary calculi form in the submandibular gland.

Why the other options are wrong:

- A, a pure serous gland: describes the **parotid**, which is almost entirely serous and produces a thin, watery, amylase-rich secretion. The submandibular has a definite mucous component, so it is not pure serous.
- C, a predominantly mucous mixed gland: describes the **sublingual** gland, which is mixed but mucous-dominant and produces the most viscous of the major gland secretions. This option simply reverses the submandibular ratio.
- D, a pure mucous gland: describes the **palatine** glands and the posterior lingual glands, which are minor glands. No major salivary gland is purely mucous.

Final Answer: Mixed seromucous, serous predominant, with serous demilunes $\Rightarrow$ B

Answer: (B) Go Back to Q14

Answer Key

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