NEET MDS Dental Anatomy and Oral Histology

Sample Paper – 10

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 tooth that is the largest in the mouth by bulk and is also the widest mesiodistally of all the teeth in the maxillary arch is the:

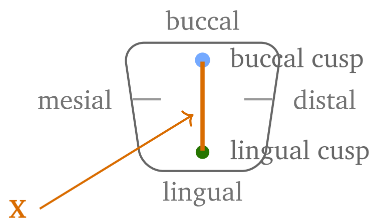
(A) Maxillary second molar

(B) Maxillary first molar

(C) Maxillary central incisor

(D) Maxillary canine

Q2. The occlusal view below is of a permanent mandibular first premolar. The ridge marked **X** is formed by the union of the buccal triangular ridge and the lingual triangular ridge, and it crosses the occlusal surface from the buccal cusp tip to the lingual cusp tip. Ridge **X** is the:



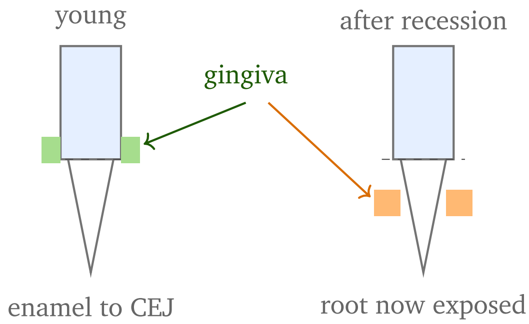
(A) Oblique ridge

(B) Marginal ridge

(C) Cervical ridge

(D) Transverse ridge

Q3. The two diagrams below show the same tooth in a young patient (left) and in the same patient years later after gingival recession (right). The dotted line marks the cementoenamel junction and the shaded band marks the gingival margin. Which statement about the anatomic crown and the clinical crown is correct?



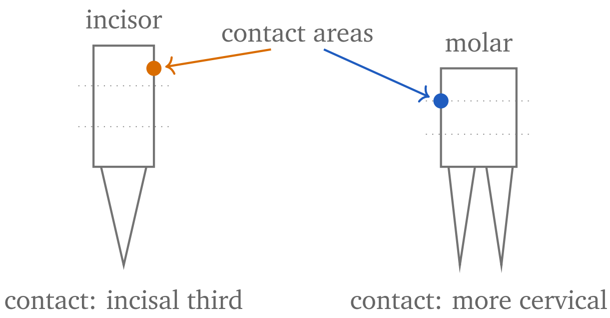
(A) The anatomic crown is the part of the tooth covered by enamel and never changes, while the clinical crown is the part visible in the mouth and becomes longer as the gingiva recedes

(B) The anatomic crown becomes longer as the gingiva recedes, while the clinical crown is fixed for life

(C) The anatomic crown and the clinical crown are always identical in extent

(D) The clinical crown is always shorter than the anatomic crown at every age

Q4. The outlines below compare a maxillary central incisor (left) with a maxillary first molar (right) from the labial or buccal aspect. The dot marks the proximal contact area on each. Which statement about the position of the proximal contact area is correct?



(A) It lies at the cervical third in the anterior teeth and moves incisally as one passes posteriorly

(B) It lies in the incisal third in the anterior teeth and shifts cervically as one passes posteriorly, reaching the junction of the occlusal and middle thirds in the molars

(C) It lies exactly at the middle third on every tooth in both arches

(D) It lies at the cementoenamel junction on all posterior teeth

Deciduous Dentition and Eruption

Q5. The tooth described as the most atypical tooth in either dentition, because its crown form resembles no other tooth, deciduous or permanent, is the:

(A) Deciduous mandibular second molar

(B) Deciduous maxillary second molar

(C) Deciduous mandibular lateral incisor

(D) Deciduous maxillary first molar

Q6. The age at which the deciduous dentition is normally complete in the mouth, with the deciduous second molars being the last teeth to arrive, is about:

(A) 12 to 16 months

(B) 18 to 20 months

(C) 2.5 to 3 years

(D) 4.5 to 5 years

Enamel

Q7. During the maturation stage of amelogenesis, after the full thickness of the enamel matrix has already been laid down, the principal change that takes place in the enamel is:

(A) A large gain in mineral, from roughly 30 percent by weight to about 96 percent, as water and organic matrix are withdrawn

(B) A large gain in organic matrix, with the mineral content falling steadily

(C) Deposition of an additional thickness of matrix over the existing enamel

(D) No change in composition, only a change in the colour of the enamel

Q8. In a ground section, an enamel rod is measured from the dentinoenamel junction to the enamel surface and is found to be longer than the enamel at that site is thick. The best explanation is that:

(A) The rod does not run in a straight radial line but takes an oblique and wavy course from the dentinoenamel junction to the surface, so its path exceeds the straight-line thickness

(B) The rod is stretched during the sectioning of the specimen

(C) The rod begins in the dentine and only its outer part lies in enamel

(D) The rods run parallel to the dentinoenamel junction rather than across the enamel

Dentine and Pulp

Q9. An elderly patient needs endodontic treatment. Compared with the same tooth in a young adult, the pulp of this tooth is expected to show:

(A) A larger pulp chamber with an increased number of cells and a richer blood supply

(B) A smaller pulp chamber and narrower canals from continued secondary dentine deposition, with fewer cells, fewer vessels and fewer nerves, and more fibrous tissue

(C) A pulp chamber unchanged in size, but with a higher cell count

(D) Complete replacement of the pulp by enamel

Q10. The four classical functions of the dental pulp are:

(A) Formative, nutritive, sensory and resorptive

(B) Formative, sensory, defensive and haematopoietic

(C) Formative, nutritive, sensory and defensive

(D) Nutritive, sensory, defensive and keratinising

Cementum and Periodontal Ligament

Q11. Regarding the two cells of cementum, the cementoblast and the cementocyte, which statement is correct?

(A) The cementocyte lies on the root surface and secretes matrix, and it becomes a cementoblast once it is buried

(B) Both cells lie free in the periodontal ligament and neither is ever enclosed in matrix

(C) The cementoblast lies within a lacuna in the matrix and the cementocyte lies on the surface

(D) The cementoblast lies on the root surface facing the periodontal ligament and secretes cementum matrix, and it becomes a cementocyte when it is trapped within the matrix it has made and comes to lie in a lacuna

Q12. A healthy maxillary central incisor is tested with two instrument handles and is found to move very slightly under pressure. This physiologic tooth mobility:

(A) Is abnormal, because a healthy tooth is rigidly ankylosed to bone and should not move at all

(B) Is about 2 mm horizontally and is permitted by the elasticity of the alveolar bone alone

(C) Is of the order of 0.1 to 0.2 mm horizontally and only about 0.02 mm axially, and it is permitted by the periodontal ligament, whose fibres, ground substance and vessels let the tooth move within its socket

(D) Occurs only in the vertical direction and is permitted by the pulp

Oral Mucosa, Salivary Glands and TMJ Histology

Q13. Compared with the mucosa of the hard palate, the mucosa covering the soft palate is:

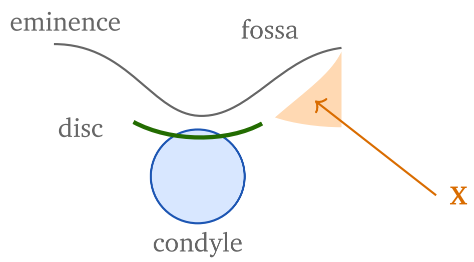
(A) Non-keratinised, distinctly redder because it is more vascular, and movable because it rests on a loose submucosa

(B) Keratinised, pale and firmly bound down to underlying bone

(C) Orthokeratinised and rugose, with a submucosa containing fat anteriorly

(D) Covered by specialised mucosa carrying taste buds throughout

Q14. The sagittal outline below shows the temporomandibular joint. The tissue marked **X** lies behind the articular disc, is loose, richly vascular and well innervated, and is a common source of pain when the disc displaces anteriorly and the condyle loads it. Tissue **X** is the:



(A) Lateral pterygoid tendon

(B) Retrodiscal tissue (bilaminar zone)

(C) Sphenomandibular ligament

(D) Articular eminence

Detailed Solutions

Q1.

Solution

Concept – ranking the teeth by size: Size in dental anatomy is judged by overall bulk of crown and root together, and separately by the mesiodistal width at the widest point of the crown.

Step 1 – narrow to the posterior teeth: No anterior tooth can compete on bulk, because an anterior crown is thin labiolingually and carries a single root.

Step 2 – narrow to the first molars: Within each arch the **first** molar is the largest molar. Molar size decreases as you move distally, so the second molar is smaller than the first, and the third molar is smaller still.

Step 3 – take the maxillary first molar: It is the **largest tooth in the mouth** by bulk. It has the widest crown mesiodistally in the maxillary arch, at roughly 10 mm, and it carries three roots, which no other maxillary tooth reliably does.

Step 4 – confirm both parts of the stem: The stem asks for a tooth that is both the largest by bulk and the widest mesiodistally in the maxillary arch. The maxillary first molar satisfies both, so option B is the answer.

Step 5 – note why it matters clinically: Its bulk and its three widely separated roots are exactly why the maxillary first molar is the most demanding tooth to extract in the upper arch and the one whose furcation is most often involved in periodontal breakdown.

Why the other options are wrong:

- A, the maxillary second molar: is a smaller copy of the first molar. Its crown is narrower mesiodistally and its roots are shorter and closer together, often fused.
- C, the maxillary central incisor: is the widest **anterior** tooth at about 8.5 mm, but it is nowhere near a molar in bulk, and it is not the widest tooth in the arch.
- D, the maxillary canine: is the **longest** tooth overall at about 26 mm, but length is not bulk. Its crown is narrow mesiodistally at about 7.5 mm.

Final Answer: Maxillary first molar $\Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q1

Q2.

Solution

Concept – ridges are named by what forms them and where they run: A triangular ridge descends from a cusp tip towards the central part of the occlusal surface. When two triangular ridges from opposite sides meet and join, the continuous ridge they make is given its own name.

Step 1 – identify the two components: The stem says the ridge is formed by the union of the **buccal triangular ridge** and the **lingual triangular ridge**.

Step 2 – read the direction: It crosses the occlusal surface **buccolingually**, that is, transversely across the tooth from the buccal cusp tip to the lingual cusp tip.

Step 3 – name it: A ridge formed by two triangular ridges joining and running transversely across the occlusal surface is a **transverse ridge**.

Step 4 – confirm it on this tooth: The mandibular first premolar is the classic example. Its buccal cusp is large and its lingual cusp is small and non-functional, and a well marked transverse ridge runs between the two, so prominently that it frequently divides the occlusal surface into a small mesial fossa and a larger distal fossa.

Step 5 – note the clinical point: Because the transverse ridge here is strong and often uninterrupted by any developmental groove, a cavity on the mesial side of this premolar can commonly be kept separate from the distal side rather than cutting the ridge away.

Why the other options are wrong:

- A, the oblique ridge: is a ridge running **obliquely** across the occlusal surface of a **maxillary molar**, joining the distobuccal cusp to the mesiolingual cusp. It is not present on a premolar, and its direction is oblique, not transverse.
- B, a marginal ridge: runs along the **mesial and distal margins** of the occlusal surface. It borders the occlusal table rather than crossing it, so both its position and its direction are wrong.
- C, the cervical ridge: is a convexity of the **buccal surface near the cervical line**, not a feature of the occlusal surface at all. It is prominent on deciduous molars.

Final Answer: Transverse ridge $\Rightarrow$ $\boxed{\text{D}}$

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

Q3.

Solution

Concept – two different definitions of the word crown: One definition is anatomical and depends only on the tissue present. The other is clinical and depends on what your eye can see in the mouth on the day you look.

Step 1 – define the anatomic crown: The **anatomic crown** is the part of the tooth **covered by enamel**. Its boundary is the cementoenamel junction, the dotted line in the diagram.

Step 2 – note that it cannot change: Enamel is laid down before eruption and no new enamel is ever formed afterwards, so the extent of the anatomic crown is fixed for life. Attrition and caries may destroy part of it, but the gingiva has no effect on it whatsoever.

Step 3 – define the clinical crown: The **clinical crown** is the part of the tooth **visible in the oral cavity**, that is, the part coronal to the gingival margin.

Step 4 – see why it changes: In the young tooth on the left the gingival margin sits at or slightly above the cementoenamel junction, so the clinical crown is shorter than the anatomic crown. After recession, on the right, the gingival margin has moved apically onto the root, so root surface is now exposed and the clinical crown has become **longer** than the anatomic crown.

Step 5 – put the two together: The anatomic crown is fixed while the clinical crown lengthens with recession, which is exactly what option A states.

Step 6 – note the clinical relevance: This is why a receded tooth looks long, why exposed root cementum becomes sensitive and prone to root caries, and why crown lengthening surgery works by moving the gingival margin apically to expose more tooth for a restoration.

Why the other options are wrong:

- B, the anatomic crown lengthens and the clinical crown is fixed: reverses the two exactly. The gingiva cannot add enamel, so the anatomic crown cannot lengthen.
- C, always identical: is true only at the single moment when the gingival margin happens to coincide with the cementoenamel junction. It is not the general rule.
- D, the clinical crown is always shorter: is true in a young mouth before eruption is complete and before any recession, but it fails in the very situation the diagram shows, where recession makes the clinical crown longer.

Final Answer: Anatomic crown fixed, clinical crown lengthens with recession $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q3

Q4.

Solution

Concept – the contact area moves cervically as you go back in the arch: The proximal contact is the small area where a tooth touches its neighbour. Its height is not the same on every tooth, and the shift follows a simple rule.

Step 1 – take the anterior teeth: On incisors and canines the crown is widest near the incisal edge and tapers towards the cervix, so the contact sits high, in the **incisal third**. On a maxillary central incisor the mesial contact is close to the incisal angle.

Step 2 – move distally: As you pass from the incisors to the canines and then to the premolars, the contact drops away from the incisal edge and comes to lie near the **junction of the incisal and middle thirds**.

Step 3 – reach the molars: On the molars the contact falls further, to the **junction of the occlusal and middle thirds**, and on the distal surfaces of molars it may sit at the middle third.

Step 4 – state the rule that emerges: The contact area moves **progressively cervically** as you move from the anterior teeth to the posterior teeth, which is exactly option B.

Step 5 – explain why the shift happens: Posterior crowns are short occlusocervically and are widest at the middle of the crown, whereas anterior crowns are long and widest near the incisal edge. The contact simply follows the greatest curvature of each proximal surface.

Step 6 – note the clinical relevance: This is why a matrix band and wedge must be placed at a different height for an incisor than for a molar, and why the occlusal embrasure of a molar is small while the incisal embrasure of an incisor is large.

Why the other options are wrong:

- A, cervical in anteriors and moving incisally posteriorly: is the rule stated backwards. The direction of the shift is cervical, not incisal.
- C, exactly the middle third on every tooth: is false. Only certain distal surfaces of molars approach the middle third; anterior contacts are clearly in the incisal third.
- D, at the cementoenamel junction on posterior teeth: would mean the teeth touch at the gingival margin and leave a gap above it, which would trap food. Normal contacts sit well coronal to the cementoenamel junction, and

the space below the contact is the gingival embrasure filled by the interdental papilla.

Final Answer: Incisal third in anteriors, shifting cervically to the junction of occlusal and middle thirds in molars $\Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q4

Q5.

Solution

Concept – most deciduous teeth have a permanent look-alike, but one does not: Deciduous anteriors resemble their permanent successors, and the deciduous second molars closely resemble the permanent first molars of the same arch. One tooth resembles nothing.

Step 1 – check the deciduous anteriors: A deciduous incisor or canine looks like a small, bulbous version of its permanent counterpart, so none of them is atypical.

Step 2 – check the deciduous second molars: The deciduous mandibular second molar is almost a small copy of the permanent mandibular first molar, with five cusps. The deciduous maxillary second molar closely resembles the permanent maxillary first molar, with an oblique ridge and often a cusp of Carabelli.

Step 3 – examine the deciduous maxillary first molar: It is left over. Its crown is neither premolar-like nor molar-like. It is broad buccolingually but very short mesiodistally, it has an extremely prominent cervical ridge on the mesiobuccal aspect, its occlusal table is sharply constricted, and it usually carries only two functional cusps with the lingual cusp small or barely formed.

Step 4 – draw the conclusion: Because it resembles no tooth in either dentition, the deciduous maxillary first molar is described as the **most atypical tooth in either dentition**, so option D is the answer.

Step 5 – note the clinical point: Its squat crown, marked cervical bulge and constricted occlusal table are exactly why a stainless steel crown on this tooth is the hardest to seat and why its proximal boxes are so easy to over-cut.

Why the other options are wrong:

- A, the deciduous mandibular second molar: is the opposite of atypical. It is the deciduous tooth that most closely mimics a permanent tooth, resembling the permanent mandibular first molar.
- B, the deciduous maxillary second molar: also resembles a permanent tooth closely, namely the permanent maxillary first molar.

- C, the deciduous mandibular lateral incisor: is simply a smaller, more bulbous version of the permanent mandibular lateral incisor, so it has a clear look-alike.

Final Answer: Deciduous maxillary first molar $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q5

Q6.

Solution

Concept – the deciduous dentition is complete when the last tooth is in: Completion is dated by the eruption of the last deciduous tooth, not by the first.

Step 1 – recall which tooth comes last: The **deciduous second molars** are the last of the twenty deciduous teeth to erupt.

Step 2 – date those teeth: The mandibular second molar arrives at about 23 to 31 months and the maxillary second molar at about 25 to 33 months.

Step 3 – convert to the usual teaching figure: Rounding those ranges gives a completed deciduous dentition at about **2.5 to 3 years** of age, so option C is the answer.

Step 4 – check the count: At that age all **20** deciduous teeth are present, ten in each arch.

Step 5 – note what happens next: The dentition then stays entirely deciduous and stable until about 6 years of age, when the permanent first molar erupts and the mixed dentition period begins.

Step 6 – note the clinical use: This is the age reference against which delayed eruption is judged. A child of 3 years with an obviously incomplete deciduous dentition deserves investigation for a systemic cause.

Why the other options are wrong:

- A, 12 to 16 months: is far too early. At that age only the incisors and, at the very end of the window, the first molars are in. The canines and second molars are still to come.
- B, 18 to 20 months: is the period of the deciduous **canines**, which erupt at about 16 to 20 months. The second molars have not yet appeared, so the dentition is not complete.
- D, 4.5 to 5 years: is well past completion. By that age the deciduous dentition has been complete for around two years, and interdental spacing is developing in preparation for the permanent incisors.

Final Answer: About 2.5 to 3 years ⇒ $\boxed{C}$

$\boxed{\textbf{Answer: (C)}}$ Go Back to Q6

Q7.

Solution

Concept – enamel is built in two moves, first the matrix, then the mineral: The question restricts itself to the second move, after the full thickness of matrix is already present.

Step 1 – state where the tissue starts: Newly secreted enamel matrix is only about **30 percent mineral** by weight. The rest is water and organic matrix, chiefly amelogenin.

Step 2 – state what maturation does: During maturation the ameloblasts pump mineral in and simultaneously **remove water and reabsorb the organic matrix**. Amelogenin is degraded by proteases and resorbed almost completely.

Step 3 – follow the crystals: As the protein and water leave, the existing hydroxyapatite crystals grow in width and thickness and pack tightly together. No extra thickness of enamel is added; the same layer simply becomes denser.

Step 4 – state where it ends: Mature enamel is about **96 percent mineral** by weight, with only about 3 percent water and 1 percent organic material. It is the most highly mineralised tissue in the body.

Step 5 – match the option: A rise from roughly 30 percent to about 96 percent, achieved by withdrawing water and organic matrix, is exactly option A.

Step 6 – note the clinical relevance: Failure of this stage produces enamel of normal thickness but poor mineral content, which is **hypomineralisation** or hypomaturation. It is a defect of quality, quite unlike a failure of the earlier secretory stage, which produces thin enamel, that is, hypoplasia.

Why the other options are wrong:

- B, a gain in organic matrix with mineral falling: is the exact reverse. Organic matrix is **lost** during maturation and mineral **rises**.
- C, deposition of an additional thickness of matrix: describes the **secretory** stage, which has already finished by definition in this question. The stem states that the full thickness is already laid down.
- D, no change in composition: is plainly false. Maturation is a change in composition and almost nothing else, since the thickness stays the same.

Final Answer: A large mineral gain from about 30 to about 96 percent ⇒ $\boxed{A}$

Answer: (A) Go Back to Q7

Q8.

Solution

Concept – rod length versus enamel thickness: If a rod ran in a perfectly straight line at right angles to the surface, its length would equal the thickness of the enamel. It does not, so the two figures do not match.

Step 1 – state the course of the rod: Each enamel rod extends the **full thickness of the enamel**, from the dentinoenamel junction to the outer surface. It is not interrupted along the way.

Step 2 – state the direction: The rods are set roughly at right angles to the dentinoenamel junction, but they then run **obliquely** outwards, inclining occlusally or incisally over most of the crown, and inclining apically only in the cervical region.

Step 3 – add the waviness: The rods do not run straight. They follow a **wavy, spiralling path**, and in the cervical and cuspal regions groups of rods twist around one another, which is what gnarled enamel is.

Step 4 – draw the geometric conclusion: A path that is oblique and wavy is always **longer** than the straight-line distance between its two ends. The straight-line distance is the enamel thickness, so the rod must be longer than the enamel is thick.

Step 5 – add the second reason: Because the enamel surface has a much larger area than the dentinoenamel junction it covers, the rods must also diverge as they run outwards, which increases their length still further.

Step 6 – match the option: An oblique and wavy course whose path exceeds the straight-line thickness is exactly option A.

Step 7 – note the clinical relevance: Because rod direction changes from region to region, the operator must know it before cutting a cavity. Enamel left with its rods unsupported by dentine fractures under load, which is why cavity margins are finished along the rod direction.

Why the other options are wrong:

- B, stretched during sectioning: is not a real phenomenon. Enamel is 96 percent mineral, it is brittle and rigid, and it cannot be stretched. Grinding a section shortens or fractures structures, it does not lengthen them.
- C, the rod begins in dentine: is false. The enamel rod begins **at** the dentinoenamel junction and lies entirely within enamel. It is the enamel **spindle** that crosses the junction, and that is an odontoblast process, not a rod.

- D, rods run parallel to the dentinoenamel junction: is wrong on direction. Rods run **across** the enamel from the junction to the surface. If they ran parallel to the junction they would never reach the surface at all.

Final Answer: An oblique and wavy course longer than the straight-line thickness $\Rightarrow \boxed{A}$

Answer: (A) Go Back to Q8

Q9.

Solution

Concept – the pulp is a tissue that shrinks its own chamber throughout life: The odontoblasts never stop working, so the space the pulp occupies gets smaller every year.

Step 1 – start with the dentine: Once root formation is complete, the odontoblasts continue to lay down **secondary dentine** slowly and continuously on the pulpal wall for the rest of life.

Step 2 – see the effect on the space: Every layer of secondary dentine encroaches on the pulp. The chamber therefore becomes progressively **smaller**, the pulp horns recede, and the root canals narrow. In an elderly molar the chamber may be reduced to a slit and the canals may be almost obliterated.

Step 3 – look at the cells: The cellularity falls. The number of fibroblasts and of undifferentiated mesenchymal cells drops, and the odontoblasts that remain become flatter and less active.

Step 4 – look at the fibres: As the cells fall, collagen accumulates. The ageing pulp becomes progressively **more fibrous**, and this is the basis of the term fibrotic or atrophic pulp.

Step 5 – look at the vessels and nerves: The blood supply is reduced, arteriosclerotic change and calcification may affect the pulpal vessels, and the number of nerve fibres falls.

Step 6 – put the picture together: A smaller chamber and narrower canals from secondary dentine, with fewer cells, fewer vessels, fewer nerves and more fibrous tissue, is precisely option B.

Step 7 – note the clinical relevance: The narrow chamber and calcified canals make access and negotiation difficult in the elderly, the reduced nerve supply blunts the response to pulp testing, and the poor blood supply means the ageing pulp heals badly and tolerates insult less well.

Why the other options are wrong:

- A, larger chamber with more cells and richer blood supply: describes the **young** pulp, not the old one. Every element of it is the reverse of what ageing does.
- C, unchanged chamber with a higher cell count: fails on both halves. The chamber definitely shrinks because secondary dentine deposition never stops, and cellularity definitely falls.
- D, replacement of the pulp by enamel: cannot happen. Enamel is made only by ameloblasts, which are of epithelial origin, sit on the outer enamel surface and are lost at eruption. Nothing in the pulp can form enamel.

Final Answer: Smaller chamber, fewer cells and vessels, more fibrous tissue $\Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q9

Q10.

Solution

Concept – the pulp has four jobs, and each one is named for what it does: Take them one at a time.

Step 1 – formative: The pulp contains the **odontoblasts**, and it is therefore the tissue that forms dentine. It makes primary dentine during development, secondary dentine throughout life, and tertiary dentine in response to injury.

Step 2 – nutritive: The pulp carries the blood vessels that supply the dentine. Its vessels keep the odontoblasts and their processes alive and keep the dentinal tubule fluid supplied, which is why dentine in a vital tooth behaves quite differently from dentine in a root-filled tooth.

Step 3 – sensory: The pulp carries the nerve fibres. It registers pain, and only pain, whether the stimulus is heat, cold, chemical or mechanical.

Step 4 – defensive or protective: The pulp responds to injury. It lays down tertiary dentine beneath a carious lesion, it mounts an inflammatory and immune response through its odontoblasts, dendritic cells and macrophages, and it forms sclerotic dentine to seal the tubules.

Step 5 – combine them: Formative, nutritive, sensory and defensive is the classical set of four, which is option C.

Why the other options are wrong:

- A, includes resorptive: is wrong because resorption is not a pulpal function. Internal resorption is a **pathological** event caused by odontoclasts appearing in an inflamed pulp, not a normal duty of a healthy pulp.

- B, includes haematopoietic: is wrong because the pulp does not make blood cells. Haematopoiesis in the jaws takes place in the marrow spaces of bone, not in the pulp. This option also drops the nutritive function, which is one of the four.
- D, includes keratinising: is wrong on two counts. Keratin is produced by **epithelium**, and the pulp is a connective tissue of mesenchymal origin with no epithelium in it. This option also drops the formative function, which is the most important one of all.

Final Answer: Formative, nutritive, sensory and defensive $\Rightarrow \boxed{C}$

Answer: (C) Go Back to Q10

Q11.

Solution

Concept – one cell, two names, decided by where it ends up: The cementoblast and the cementocyte are the same cell at two stages of its life. The name changes at the moment the cell is buried.

Step 1 – locate the cementoblast: The **cementoblast** lies on the surface of the root, on the periodontal ligament side of the cementum. It is a plump cell with basophilic cytoplasm, plentiful rough endoplasmic reticulum and a prominent Golgi apparatus, which is the profile of an actively secreting cell.

Step 2 – state what it does: It secretes cementum matrix, which is chiefly type I collagen with non-collagenous proteins, and that matrix then mineralises.

Step 3 – follow the transition: When matrix is laid down **rapidly**, some cementoblasts do not retreat fast enough and are surrounded by the very matrix they have just made. A cell buried in this way is now enclosed in a small space called a **lacuna**, and it is renamed a **cementocyte**.

Step 4 – describe the buried cell: The cementocyte is a quieter cell. It has less cytoplasm, fewer organelles and a pyknotic nucleus, and it sends processes out through channels called canaliculi. Those processes are directed mainly **towards the periodontal ligament**, because that is the only source of nutrition, cementum being avascular.

Step 5 – note the fate: Cementocytes deep within thick cementum lie too far from the ligament to survive and they degenerate, leaving empty lacunae.

Step 6 – match the option: A surface cell that secretes matrix and becomes a lacunar cell once trapped in its own matrix is exactly option D.

Why the other options are wrong:

- A, cementocyte on the surface becoming a cementoblast when buried: reverses the two names. The surface secretory cell is the cementoblast, and burial converts it into a cementocyte, not the other way round.
- B, both cells free in the ligament and never enclosed: is false. The whole point of the cementocyte is that it **is** enclosed, in a lacuna within the matrix. A cell that is never enclosed is simply a cementoblast.
- C, cementoblast in a lacuna and cementocyte on the surface: is again the two names swapped. The suffix is the giveaway. A blast is an active surface-forming cell in every hard tissue, and a cyte is the same cell after it has been entombed in its own matrix, exactly as with osteoblast and osteocyte.

Final Answer: Surface cementoblast becomes a cementocyte on being trapped in a lacuna $\Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q11

Q12.

Solution

Concept – a healthy tooth is meant to move a little: The tooth is not fused to bone. It is slung in its socket, and the small movement you feel is normal and necessary.

Step 1 – state that mobility is normal: Every healthy tooth shows some **physiologic mobility**. Its complete absence is the abnormal finding, not its presence.

Step 2 – give the horizontal figure: Horizontal physiologic mobility is of the order of **0.1 to 0.2 mm**, which is barely perceptible and is graded as Miller grade 0 or the borderline of grade 1.

Step 3 – give the axial figure: Axial or vertical mobility, which is intrusion under load, is far smaller, only about **0.02 mm**. This is because the oblique fibres are placed in tension by an axial load, and a fibre resists tension far better than the ligament resists a tipping force.

Step 4 – name the tissue responsible: The **periodontal ligament** permits the movement. Its principal collagen fibre bundles are slightly wavy at rest and can straighten, its ground substance and the fluid in its vessels can be displaced, and this combination lets the tooth shift within its socket and then spring back.

Step 5 – note how the movement occurs in two phases: An initial phase involves displacement within the ligament space itself, and a second phase, under heavier force, involves slight elastic deformation of the alveolar bone. Both together give the small figure quoted.

Step 6 – match the option: Roughly 0.1 to 0.2 mm horizontally, about 0.02 mm axially, permitted by the periodontal ligament, is exactly option C.

Step 7 – note the clinical relevance: This cushioning is what protects the tooth and the bone from the shock of occlusal loading. Its loss in ankylosis leaves the tooth to take the full impact. Mobility that clearly exceeds these figures is pathological and points to attachment loss, occlusal trauma or an apical lesion.

Why the other options are wrong:

- A, a healthy tooth is ankylosed and should not move: is the opposite of the truth. **Ankylosis** is a pathological fusion of cementum or dentine to bone with loss of the ligament. An ankylosed tooth has zero mobility, gives a dull percussion note, and fails to move with orthodontic force.
- B, about 2 mm and permitted by bone alone: is wrong twice over. Two millimetres is roughly ten times the physiologic figure and would be graded as marked pathological mobility. Alveolar bone is rigid and contributes only a trace of elastic give; the ligament is the tissue that permits the movement.
- D, vertical only and permitted by the pulp: is wrong on both counts. Physiologic mobility is predominantly **horizontal**, since the axial figure is ten times smaller. The pulp lies inside the tooth and has no attachment to bone at all, so it cannot govern how the tooth sits in its socket.

Final Answer: About 0.1 to 0.2 mm horizontally, permitted by the periodontal ligament $\Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q12

Q13.

Solution

Concept – the palate carries two quite different mucosae because it does two different jobs: The front of the palate is a hard working surface. The back is a mobile flap.

Step 1 – take the hard palate first: It is **masticatory mucosa**. Its epithelium is keratinised, mostly orthokeratinised, it is thrown into rugae anteriorly, it looks pale pink, and over much of its area it is bound directly to the periosteum by a firm, dense submucosa, so it is immovable.

Step 2 – ask what the soft palate has to do: The soft palate must lift and seal against the pharyngeal wall in speech and swallowing, so it has to be **mobile**. It is also not exposed to the abrasion of a bolus being crushed against bone.

Step 3 – deduce the epithelium: Because there is no abrasion to resist, its epithelium is **non-keratinised** stratified squamous. It is classified as lining mucosa.

Step 4 – deduce the colour: The lamina propria of the soft palate is **richly vascular** and the overlying epithelium is thin and non-keratinised, so the blood shows through. The soft palate is therefore visibly **redder** than the hard palate, and the change in colour at the junction is sharp enough to be a useful clinical landmark.

Step 5 – deduce the submucosa: It has a **loose submucosa** containing plentiful minor mucous glands, and it lies over muscle rather than bone. This is what allows it to move.

Step 6 – match the option: Non-keratinised, redder because more vascular, and movable on a loose submucosa is exactly option A.

Step 7 – note the clinical relevance: The vibrating line where the mobile soft palate meets the immobile hard palate is the posterior limit of a maxillary complete denture, and the posterior palatal seal is placed there precisely because the tissue in front is bound down and the tissue behind can be displaced.

Why the other options are wrong:

- B, keratinised, pale and bound to bone: is a description of the **hard** palate, which is the tissue the question asks you to contrast the soft palate against. It is the intended trap.
- C, orthokeratinised and rugose with fat anteriorly: again describes the **hard** palate. The rugae and the fatty anterolateral zone of its submucosa are hard palate features. The soft palate has no rugae.
- D, specialised mucosa with taste buds throughout: is wrong. Specialised mucosa is confined to the **dorsum of the tongue**, where it carries the lingual papillae. A few scattered taste buds do exist on the soft palate, but they do not make it specialised mucosa, and it certainly does not carry them throughout.

Final Answer: Non-keratinised, more vascular and movable $\Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q13

Q14.

Solution

Concept – the disc itself cannot hurt, but the tissue behind it can: The articular disc is avascular and non-innervated in its central load-bearing part. Immediately behind it lies a tissue that is the exact opposite.

Step 1 – locate the tissue: The **retrodiscal tissue** occupies the space **behind the articular disc**, between the posterior band of the disc and the posterior wall of the glenoid fossa, exactly where **X** is marked.

Step 2 – explain the name bilaminar zone: It has two laminae. The **superior** lamina is rich in **elastic** fibres and attaches to the postglenoid spine of the temporal bone. It stretches as the disc translates forwards and it retracts the disc when the mouth closes. The **inferior** lamina is largely **collagenous**, is not elastic, attaches to the back of the condylar neck, and limits how far forward the disc can rotate on the condyle.

Step 3 – describe what lies between the laminae: Between them is loose, highly **vascular** connective tissue, a venous plexus that fills with blood as the condyle translates forwards, and abundant **sensory nerve fibres** from the auriculotemporal nerve.

Step 4 – link it to pain: This vascularity and innervation make it the pain-sensitive tissue of the joint. In anterior disc displacement the disc slips forwards off the condyle, the retrodiscal tissue is dragged over the top of the condyle, and the condyle then loads soft, well innervated tissue that was never built to bear load.

Step 5 – follow the consequence: The result is pain, inflammation and, over time, the fibrous change known as pseudodisc formation as the tissue adapts. This is the anatomical basis of the click and the pain of internal derangement.

Step 6 – match the option: A loose, vascular, innervated tissue lying behind the disc and painful on loading is precisely the retrodiscal tissue, option B.

Why the other options are wrong:

- A, the lateral pterygoid tendon: attaches to the pterygoid fovea of the condylar neck and, by its superior head, to the **anterior** part of the capsule and disc. Its position is in front of the disc, not behind it, so it cannot be the tissue marked.
- C, the sphenomandibular ligament: is an **accessory extracapsular** ligament running from the spine of the sphenoid to the lingula on the medial surface of the ramus. It lies well away from the joint space and takes no part in the intracapsular structure shown.
- D, the articular eminence: is **bone**, the convex anterior slope of the fossa

that the condyle translates across. It is neither soft tissue nor vascular, and it lies in front of the fossa, not behind the disc.

Final Answer: Retrodiscal tissue, the bilaminar zone $\Rightarrow \boxed{\text{B}}$

Answer: (B) **Go Back to Q14**

Answer Key

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