NEET MDS Dental Anatomy and Oral Histology

Sample Paper – 1

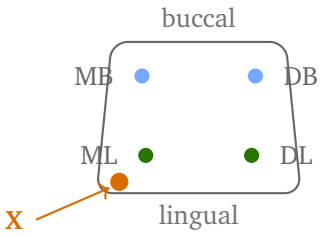
Duration: 11 Minutes **Maximum Marks: 56**

Instructions

- This paper contains **14** Multiple Choice Questions (Single Best Response), modelled on the Dental Anatomy, Embryology and Oral Histology content of **NEET MDS** conducted by NBEMS.
- The **14-question** length matches the number of Dental Anatomy and Oral Histology items you actually meet in the real 240-question paper.
- Each correct answer carries **+4 marks**. There is **negative marking of 1 mark** for every incorrect answer; unattempted questions carry no penalty.
- Every question has **exactly one best answer**. Choose the single most appropriate option.
- Attempt this practice paper in one timed sitting of about **11 minutes**, the pace the real computer-based test demands.

Permanent Tooth Morphology

Q1. The occlusal outline below is of a permanent maxillary first molar. The accessory fifth cusp marked **X**, sitting on the lingual surface of the mesiolingual cusp, is:



(A) The talon cusp

(B) A paramolar tubercle

(C) The cusp of Carabelli

(D) The tuberculum dentale

Q2. The permanent tooth that most characteristically has two roots, one buccal and one lingual, is the:

(A) Maxillary second premolar

(B) Maxillary first premolar

(C) Mandibular first premolar

(D) Mandibular second premolar

Q3. The tooth with the longest root in the permanent dentition is the:

(A) Mandibular first molar

(B) Maxillary central incisor

(C) Mandibular canine

(D) Maxillary canine

Q4. The number of cusps characteristically present on a permanent mandibular first molar is:

(A) Five

(B) Four

(C) Three

(D) Six

Deciduous Dentition and Eruption

Q5. The first permanent tooth to erupt into the oral cavity, at about 6 years of age and without any deciduous predecessor being shed, is the:

(A) Maxillary central incisor

(B) Mandibular lateral incisor

(C) Maxillary first molar

(D) Mandibular first molar

Q6. Compared with a permanent molar, a deciduous molar characteristically shows:

(A) A larger crown with a longer root trunk

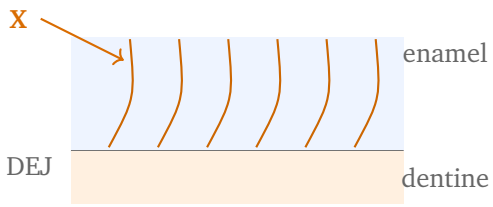
(B) A prominent cervical ridge, a narrower occlusal table and widely divergent roots

(C) Thicker enamel and thicker dentine

(D) A larger pulp chamber with shorter pulp horns

Enamel

Q7. The ground section of enamel below shows the incremental growth lines marked **X**, which run obliquely from the dentinoenamel junction to the surface, where they end as the shallow grooves called perikymata. These lines are the:



(A) Lines of Owen

(B) Lines of von Ebner

(C) Striae of Retzius

(D) Enamel spindles

Q8. Enamel, unlike dentine and cementum, cannot repair itself once the tooth has erupted. The reason is that:

(A) The ameloblasts are lost as the tooth erupts, so no formative cells remain within or on the enamel

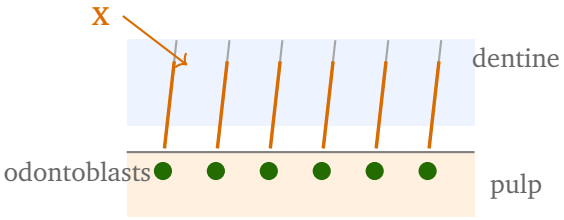
(B) Enamel contains no mineral and therefore cannot be rebuilt

(C) Enamel is avascular but retains its ameloblasts in a dormant state

(D) Enamel is progressively replaced by dentine with age

Dentine and Pulp

Q9. The section of dentine below shows the structure marked **X**, a cytoplasmic extension running within the dentinal tubule from its cell body at the pulpal border outwards towards the enamel. Structure **X** is the:



(A) Odontoblast process (Tomes' fibre)

(B) Ameloblast process (Tomes' process)

(C) Sharpey's fibre

(D) Enamel rod

Q10. The hydrodynamic theory is the most widely accepted explanation for dentine sensitivity. It proposes that pain arises from:

(A) Direct stimulation of nerve endings lying within the enamel

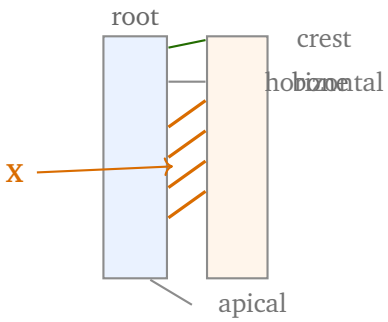
(B) Fluid movement within the dentinal tubules deforming nerve endings at the pulp-dentine border

(C) Odontoblasts acting as receptor cells and transmitting impulses directly to the nerve

(D) Nerve fibres running the full length of every dentinal tubule to the dentinoenamel junction

Cementum and Periodontal Ligament

Q11. The diagram below shows the principal fibre groups of the periodontal ligament. The group marked **X** is the most numerous, runs obliquely from the cementum to attach to bone at a more coronal level, and carries the vertical forces of mastication. It is the:



(A) Alveolar crest group

(B) Oblique group

(C) Horizontal group

(D) Apical group

Q12. Cellular cementum, which contains cementocytes lying in lacunae, is characteristically found:

(A) In the apical third of the root and in the furcation areas

(B) Only in the cervical third of the root

(C) Uniformly over the entire root surface

(D) Covering the enamel of the crown

Oral Mucosa, Salivary Glands and TMJ Histology

Q13. Unlike almost every other synovial joint in the body, the articular surfaces of the temporomandibular joint are covered by:

(A) Hyaline cartilage

(B) Elastic cartilage

(C) Simple squamous epithelium

(D) Fibrocartilage

Q14. The oral mucosa covering the floor of the mouth, the alveolar mucosa and the inner surface of the lips is loosely attached, non-keratinised and mobile. It is classified as:

(A) Masticatory mucosa

(B) Specialised mucosa

(C) Lining mucosa

(D) Keratinised gingival mucosa

Detailed Solutions

Q1.

Solution

Concept – the fifth cusp of the maxillary first molar: The maxillary first molar normally has four cusps, and any fifth cusp is a named accessory feature.

Step 1 – read the position given: The extra cusp sits on the **lingual surface of the mesiolingual cusp**.

Step 2 – name the structure at that site: That is the classic site of the **cusp of Carabelli**.

Step 3 – confirm with the tooth: The cusp of Carabelli is essentially confined to the maxillary **first** molar, which is the tooth the diagram shows.

Step 4 – note its nature: It is a non-functional tubercle, it varies from a faint groove to a well formed cusp, and it does not add a fifth functional cusp to the occlusal table.

Why the other options are wrong:

- A, the talon cusp: is an accessory cusp on the lingual surface of an **incisor**, most often a maxillary lateral incisor, not a molar.
- B, a paramolar tubercle: is an accessory cusp on the **buccal** surface of a molar, so the position is wrong.
- D, the tuberculum dentale: is the lingual tubercle at the cingulum of an **anterior** tooth, again not a molar feature.

Final Answer: The cusp of Carabelli $\Rightarrow$ $\boxed{C}$

Answer: (C) Go Back to Q1

Q2.

Solution

Concept – root number in the premolars: Only one premolar is reliably two-rooted, and the split is buccolingual.

Step 1 – take the maxillary first premolar: It is bifurcated into a **buccal and a lingual root** in roughly 60 percent or more of cases, and it has two canals even when the roots are fused.

Step 2 – match the description: The question specifies one buccal and one lingual root, which is exactly this buccolingual split.

Step 3 – note the clinical point: This is why the maxillary first premolar is the premolar most likely to need two canal preparations, and why its roots are thin and easily fractured during extraction.

Why the other options are wrong:

- A, the maxillary second premolar: is usually **single** rooted with one canal, though it may occasionally have two canals in one root.
- C, the mandibular first premolar: is single rooted. It is known instead for its very small lingual cusp and its occasional bifurcated canal.
- D, the mandibular second premolar: is single rooted, and is known for its two-cusped and three-cusped lingual variants.

Final Answer: Maxillary first premolar ⇒ B

Answer: (B) Go Back to Q2

Q3.

Solution

Concept – comparing root lengths across the dentition: The canines are built to be the longest teeth, because they take the heaviest lateral loads.

Step 1 – narrow to the canines: Both canines are long, so the answer is one of them.

Step 2 – compare the two: The **maxillary canine** has the longest root of any tooth, at roughly 17 mm, and the greatest overall length of about 26 mm.

Step 3 – state why: Its long root anchors it for the canine guidance that protects the posterior teeth in lateral excursion.

Step 4 – note the clinical point: That long root is also why the maxillary canine is the tooth most often impacted after the third molar, and why its extraction is difficult.

Why the other options are wrong:

- A, the mandibular first molar: has two roots but each is shorter than a canine root. Its strength comes from having two roots, not from length.
- B, the maxillary central incisor: has a long crown but a root of only about 13 mm.
- C, the mandibular canine: is the second longest tooth, and its root is shorter than that of the maxillary canine.

Final Answer: Maxillary canine ⇒ D

Answer: (D) Go Back to Q3

Q4.

Solution

Concept – cusp counts of the mandibular molars: The mandibular first molar is the odd one out, because it carries an extra distal cusp.

Step 1 – list the cusps: Mesiobuccal, distobuccal, mesiolingual, distolingual, and a fifth **distal** cusp.

Step 2 – total them: That gives **five** cusps.

Step 3 – name the groove pattern: Those five cusps produce the Y-shaped or cross-shaped groove pattern of the tooth.

Step 4 – contrast with its neighbour: The mandibular **second** molar typically has only four cusps in a plus-shaped groove pattern, which is the standard way of telling the two apart.

Why the other options are wrong:

- B, four: describes the mandibular **second** molar, not the first.
- C, three: is not the count of any mandibular molar. Three cusps is a feature of some mandibular second premolars.
- D, six: is not the typical count, though a rare accessory cusp can occasionally raise it.

Final Answer: Five $\Rightarrow$ A

Answer: (A) Go Back to Q4

Q5.

Solution

Concept – the first permanent tooth to arrive: The first permanent tooth erupts behind the deciduous arch, not into a gap left by a shed tooth.

Step 1 – use the clue about no predecessor: Only the permanent molars have no deciduous predecessor, so the answer must be a first molar.

Step 2 – choose between the arches: The **mandibular** first molar erupts slightly before the maxillary one, at about 6 years.

Step 3 – apply the general rule: Mandibular teeth generally erupt before their maxillary counterparts, which supports the same answer.

Step 4 – note why it matters: Because it arrives behind the deciduous molars and no tooth is shed, parents often mistake it for a deciduous tooth and neglect it. This is why the mandibular first molar is the most commonly carious permanent tooth.

Why the other options are wrong:

- A, the maxillary central incisor: erupts at about 7 to 8 years, and it does replace a shed deciduous incisor.
- B, the mandibular lateral incisor: erupts at about 7 to 8 years and also has a predecessor.
- C, the maxillary first molar: has no predecessor, but it erupts slightly **after** its mandibular counterpart.

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

Answer: (D) Go Back to Q5

Q6.

Solution

Concept – how a deciduous molar differs from a permanent one: Every difference follows from one fact, that the deciduous tooth is smaller but must house a permanent successor beneath it.

Step 1 – the cervical ridge: Deciduous molars have a **prominent cervical ridge**, especially on the buccal surface of the first molar.

Step 2 – the occlusal table: The crown narrows sharply occlusally, giving a **constricted occlusal table** relative to the cervical width.

Step 3 – the roots: The roots are slender and **widely divergent**, flaring out to make room for the developing permanent premolar between them.

Step 4 – combine them: All three features appear together in option B, so B is the answer.

Why the other options are wrong:

- A, larger crown and longer root trunk: is reversed on both counts. Deciduous molars have **smaller** crowns and a distinctly **shorter** root trunk, which is what allows the roots to diverge so early.
- C, thicker enamel and dentine: is the opposite of the truth. Deciduous enamel and dentine are **thinner**, which is why caries reaches the pulp so much faster in a child.

- D, larger pulp chamber with shorter pulp horns: is half right and half wrong. The pulp chamber is indeed relatively **larger**, but the pulp horns are **higher and longer**, particularly the mesiobuccal horn. That is precisely why a seemingly shallow cavity preparation can expose the pulp.

Final Answer: Prominent cervical ridge, narrow occlusal table, divergent roots ⇒ B

Answer: (B) Go Back to Q6

Q7.

Solution

Concept – incremental lines record rhythmic deposition: Each hard tissue has its own named incremental line, so the name tells you the tissue.

Step 1 – read the tissue: The lines are in **enamel**, running from the dentinoenamel junction to the surface.

Step 2 – name the enamel incremental line: Those are the **striae of Retzius**, produced by the rhythmic, roughly weekly deposition of enamel by ameloblasts.

Step 3 – confirm with the surface clue: Where the striae of Retzius meet the surface, they form the shallow transverse grooves called **perikymata**, which the question describes exactly.

Step 4 – note the related landmark: The single accentuated stria formed at birth is the **neonatal line**, which is present in all deciduous teeth and in the permanent first molar, because those are the only teeth mineralising at birth.

Why the other options are wrong:

- A, the lines of Owen: are accentuated incremental lines in **dentine**, so the tissue is wrong.
- B, the lines of von Ebner: are the fine daily incremental lines of **dentine**, again the wrong tissue.
- D, enamel spindles: are short odontoblast processes that have crossed the dentinoenamel junction into the enamel. They are not incremental lines at all and they do not reach the surface.

Final Answer: Striae of Retzius ⇒ C

Answer: (C) Go Back to Q7

Q8.

Solution

Concept – a tissue can only repair itself if its formative cells survive: Dentine and cementum keep their cells; enamel does not.

Step 1 – recall who makes enamel: Enamel is laid down by **ameloblasts**, which sit on its outer surface during development.

Step 2 – follow their fate: Once amelogenesis is complete the ameloblasts form the reduced enamel epithelium, and this is **lost as the tooth erupts** into the mouth.

Step 3 – state the consequence: Erupted enamel therefore contains no cells and has no cells on its surface. It is acellular and avascular, so no new matrix can ever be formed.

Step 4 – contrast with the other hard tissues: Dentine keeps its odontoblasts at the pulpal surface, so it can lay down reparative dentine. Cementum keeps its cementoblasts in the periodontal ligament, so it can repair resorption. Enamel can only remineralise existing crystals, which is why a cavity never heals but an early white spot lesion can.

Why the other options are wrong:

- B, no mineral content: is plainly false. Enamel is about 96 percent mineral by weight, the most mineralised tissue in the body.
- C, retains its ameloblasts in a dormant state: is exactly what does **not** happen. The ameloblasts are lost, not dormant.
- D, replaced by dentine with age: does not occur. Enamel is not turned over, and it only thins by attrition, abrasion and erosion.

Final Answer: The ameloblasts are lost at eruption $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q8

Q9.

Solution

Concept – what lies inside a dentinal tubule: Each tubule houses the process of the cell that formed it.

Step 1 – name the cell: Dentine is formed by **odontoblasts**, whose cell bodies line the pulpal surface of the dentine, exactly as the diagram shows.

Step 2 – follow its process: Each odontoblast leaves a cytoplasmic extension

behind as it retreats pulpally, and that extension occupies the tubule.

Step 3 – name it: That extension is the **odontoblast process**, also called Tomes' fibre.

Step 4 – match the direction given: The question describes a process running from a cell body at the pulpal border outwards towards the enamel, which is precisely the odontoblast process.

Step 5 – note the clinical link: Because the odontoblast body sits in the pulp while its process extends into dentine, any insult to dentine is registered by a cell that lives in the pulp. This is why deep caries produces pulpal symptoms.

Why the other options are wrong:

- B, Tomes' process of the ameloblast: is the secretory extension of the **ameloblast** and it shapes the enamel rod. It lies in enamel, not in a dentinal tubule. Note the deliberate trap: Tomes' *fibre* is the odontoblast process, while Tomes' *process* belongs to the ameloblast.
- C, Sharpey's fibre: is a collagen fibre from the periodontal ligament embedded into **cementum or alveolar bone**, not a cell process in dentine.
- D, the enamel rod: is the structural unit of **enamel** and lies on the far side of the dentinoenamel junction.

Final Answer: Odontoblast process $\Rightarrow$ A

Answer: (A) Go Back to Q9

Q10.

Solution

Concept – why dentine hurts when it has almost no nerves in it: The puzzle of dentine sensitivity is that stimuli act at the surface while the nerves sit at the pulp.

Step 1 – state the problem: Nerve fibres reach only the innermost part of the tubules, near the pulp-dentine border. They do not extend to the enamel.

Step 2 – give Brannstrom's answer: A stimulus such as cold, air or a sweet solution causes rapid **fluid movement inside the dentinal tubules**.

Step 3 – link fluid movement to pain: That fluid shift mechanically **deforms the nerve endings** lying at the pulpal end of the tubule, and they fire.

Step 4 – check it against observation: Cold causes outward fluid flow and produces the sharper, faster pain, which fits the theory. Blocking the tubules with a desensitising agent stops the flow and stops the pain, which is the treatment the

theory predicts.

Why the other options are wrong:

- A, nerve endings within the enamel: is false. Enamel contains no nerves at all.
- C, odontoblasts as receptor cells: is the old **transduction theory**. It is rejected because odontoblasts have no synapses with nerve fibres and are not excitable.
- D, nerves running the full length of every tubule: is the **direct innervation theory**. It fails because nerve fibres are found in only the inner portion of a minority of tubules.

Final Answer: Fluid movement in the dentinal tubules $\Rightarrow$ B

Answer: (B) Go Back to Q10

Q11.

Solution

Concept – the principal fibre groups are named by their direction: Each group runs a set course between cementum and bone, and each handles a particular force.

Step 1 – read the direction given: The fibres run **obliquely** from cementum to bone.

Step 2 – read the attachment levels: They attach to bone **coronal to** their cemental attachment, which is the defining feature of the oblique group.

Step 3 – use the abundance clue: The **oblique group** is the largest group, occupying about two-thirds of the ligament.

Step 4 – use the function clue: Because they are slung upwards from cementum to bone, vertical occlusal force on the tooth puts them in **tension** rather than compressing the ligament. They convert vertical pressure into tension on the bone, which is why they bear the forces of mastication.

Why the other options are wrong:

- A, the alveolar crest group: runs from cementum just below the junctional epithelium down to the alveolar crest. It resists tilting and lateral movement, and it is a small group.
- C, the horizontal group: runs at right angles to the long axis of the tooth and resists horizontal and tipping forces. The question specifies oblique fibres.

- D, the apical group: radiates from the root apex to surrounding bone, resisting luxation and protecting the vessels and nerves at the apical foramen. It is a small group.

Final Answer: Oblique group $\Rightarrow$ B

Answer: (B) Go Back to Q11

Q12.

Solution

Concept – two kinds of cementum for two different jobs: Cementum is laid down in an acellular form for attachment and a cellular form for adaptation.

Step 1 – take acellular cementum: It is formed first, is laid down slowly, and covers the **cervical two-thirds** of the root. It has no cells within it, and it is the tissue that anchors the Sharpey's fibres.

Step 2 – take cellular cementum: It is formed later and faster. Because it is laid down quickly, cementoblasts get trapped within their own matrix and become **cementocytes in lacunae**.

Step 3 – locate it: It is found in the **apical third of the root and in the furcation** areas of multirooted teeth.

Step 4 – explain why there: Those are the sites that must adapt throughout life, because cementum is deposited apically to compensate for occlusal attrition and to allow continued eruption. Rapid deposition is what makes it cellular.

Why the other options are wrong:

- B, only in the cervical third: is where **acellular** cementum lies. The two are reversed.
- C, uniformly over the entire root: is false. The distribution is regional, and the cervical and apical portions differ.
- D, covering the enamel of the crown: does not happen normally. Cementum may slightly overlap enamel at the cervical margin in about 60 percent of teeth, but it never covers the crown.

Final Answer: Apical third and furcation areas $\Rightarrow$ A

Answer: (A) Go Back to Q12

Q13.

Solution

Concept – the TMJ is a synovial joint that breaks the usual rule: Almost every synovial joint uses hyaline cartilage on its articular surfaces. The TMJ does not.

Step 1 – state the exception: The articular surfaces of the condyle and the glenoid fossa are covered by **fibrocartilage**, technically a dense fibrous tissue with cartilage cells.

Step 2 – explain why: The TMJ develops intramembranously from a secondary cartilage, not from a primary cartilaginous model like a limb joint.

Step 3 – note the functional advantage: Fibrocartilage is more resistant to the shearing and compressive loads of mastication, and unlike hyaline cartilage it retains a better capacity to repair.

Step 4 – add the disc: The intra-articular disc is also fibrocartilage, and it divides the joint into an upper compartment for translation and a lower compartment for rotation.

Why the other options are wrong:

- A, hyaline cartilage: is what covers almost every **other** synovial joint, which is exactly the rule the TMJ breaks. This is the intended trap.
- B, elastic cartilage: is found in the external ear and the epiglottis, where flexibility with recoil is needed. It has no role in a load-bearing joint.
- C, simple squamous epithelium: is an epithelium, not a skeletal tissue, and no articular surface is lined by it.

Final Answer: Fibrocartilage $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q13

Q14.

Solution

Concept – the oral mucosa is classified by what it has to withstand: Three types, each matched to its function.

Step 1 – read the sites given: Floor of the mouth, alveolar mucosa and the inner surface of the lips.

Step 2 – read the features given: Loosely attached, non-keratinised and mobile.

Step 3 – match to the type: Both the sites and the features define **lining mucosa**, which covers about 60 percent of the oral cavity.

Step 4 – explain the logic: Lining mucosa is not exposed to the friction of food, so it does not keratinise. It sits on a loose submucosa, which gives it the mobility needed for speech, chewing and swallowing.

Why the other options are wrong:

- A, masticatory mucosa: covers the **hard palate and the attached gingiva**. It is keratinised and bound down tightly to bone, so it is the opposite of what is described.
- B, specialised mucosa: covers the **dorsum of the tongue** and carries the lingual papillae and taste buds. The sites listed have no papillae.
- D, keratinised gingival mucosa: is simply masticatory mucosa under another name, and the question explicitly says the tissue is non-keratinised.

Final Answer: Lining mucosa $\Rightarrow$ $\boxed{\text{C}}$

Answer: (C) Go Back to Q14

Answer Key

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