# BDS FIRST PROFESSIONAL EXAMINATION 2007
# ORAL AND TOOTH MORPHOLOGY
## *Model Paper (SEQs)*

**Total No. of SEQs: 15**
**Total Marks: 45** **Time 2 hours 15 min.**
**Note: 3 Marks for each question.**

**Q1. Name the embryological processes (prominences) that are responsible for the development of the face. Specify the processes that fail to fuse in cleft lip and cleft palate. (3)**

**Topic:** Oral Embryology

**Key:**

| ***Processes*** | ***Marks*** |
|---|---|
| Face:<br>Frontonasal (medial and lateral nasal)<br>Right and left Maxillary<br>Right and left Mandibular | (1) |
| Cleft lip:<br>Medial nasal and maxillary | (1) |
| Cleft of primary palate:<br>Frontonasal (medical nasal) and maxillary (palatal shelf) | (0.5) |
| Secondary palate:<br>Palatal shelves of left and right maxillary processes | (0.5) |

**Ref:**

Ten Cate's Oral Histology: Development, Structure, Function. Antonio Nanci. 6th Edition. Mosby.
Chapter 3: Pages 30-53

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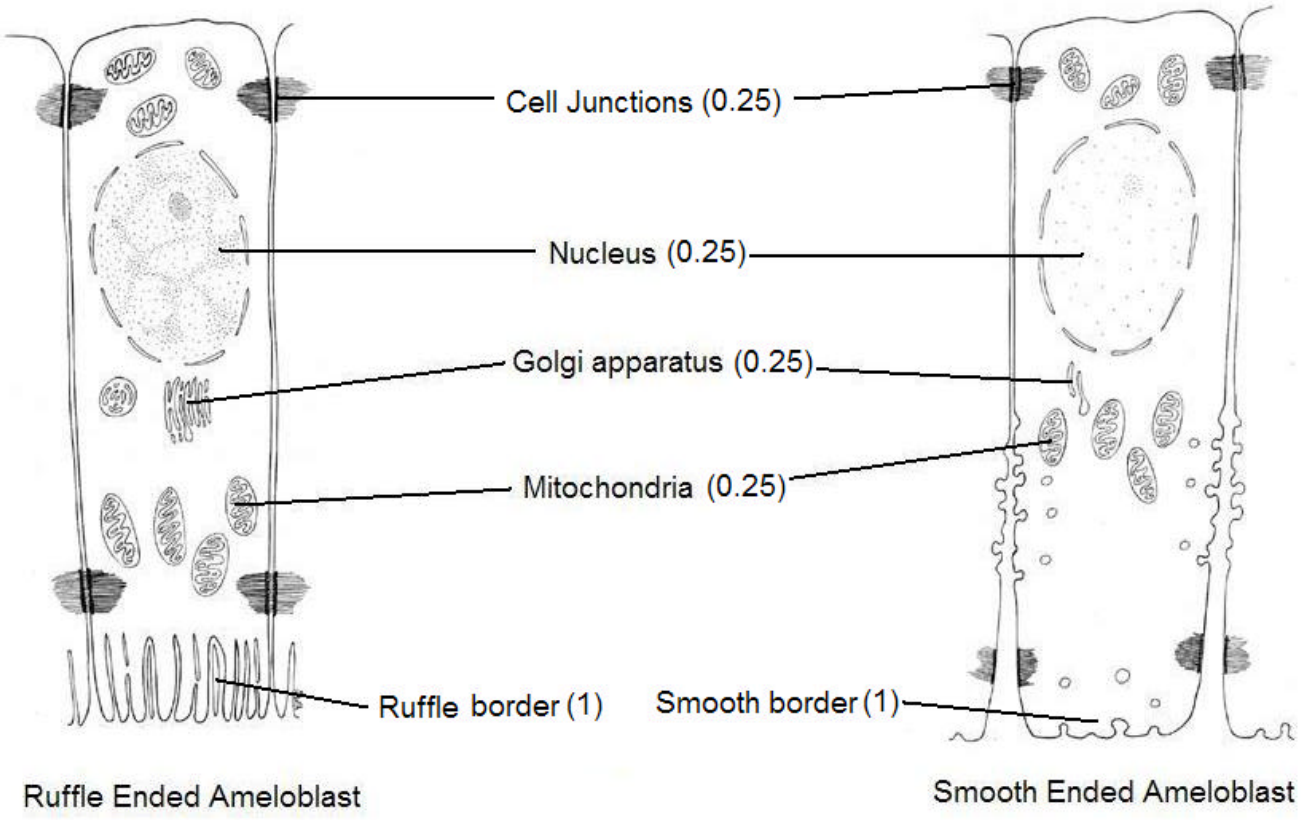
**Q2. Draw and label the two different histological structures of ameloblasts at the stage of enamel maturation. (3)**

**Topic:** Oral Histology




**Key:**

**Ref:**

Ten Cate's Oral Histology: Development, Structure, Function. Antonio Nanci. 6th Edition. Mosby.
Chapter 7: Page 174

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# ORAL AND TOOTH MORPHOLOGY
## *Model Paper (SEQs)*

**Q3. Indicate the origin and fate of the following cells: (3)**
**(a) Odontoblasts**
**(b) Cementoblasts**
**(c) Ameloblasts**
**(d) Periodontal ligament fibroblasts**
**(e) Serous cells of salivary glands**
**(f) Cells of the stratum spinosum of oral epithelium**

**Topic:** Oral Histology

**Key:**

| ***Cell*** | ***Origin*** | ***Fate*** | ***Marks*** |
|---|---|---|---|
| Odontoblasts | Dental papilla, ectomesenchyme, neural crest | Pulp periphery | 0.5 |
| Cementoblasts | Dental follicle, ectomesenchyme | Cementocytes or in PDL on the cementum surface | 0.5 |
| Ameloblasts | Internal enamel epithelium, Dental organ, Ectoderm | Reduced enamel epithelium, junctional epithelium | 0.5 |
| PDL fibroblasts | Dental follicle, ectomesenchyme | In PDL, may undergo cell death | 0.5 |
| Serous cells | Oral epithelium, ectoderm | In gland, may undergo cell death | 0.5 |
| Cells of st. spinosum | Basal cell layer, ectoderm | Lost in oral cavity | 0.5 |

**Ref:**
Ten Cate's Oral Histology: Development, Structure, Function. Antonio Nanci. 6th Edition. Mosby.
Chapters 5, 7, 8, 9, 11 and 12

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## *Model Paper (SEQs)*

**Q4. Explain what you understand by (define) the following terms related to oral mucosa: (3)**
**(a) Lamina propria**
**(b) Masticatory mucosa**
**(c) Attached gingiva**
**(d) Vermillion zone**
**(e) Junctional epithelium**
**(f) Melanocyte**

**Topic:** Oral Histology

**Key:**

**(0.5 marks for each)**

**(a)** Lamina propria: connective tissue underlying epithelium- further subdivided into papillary and reticular lamina propria.

**(b)** Masticatory mucosa: moist lining of the oral cavity capable of withstanding masticatory stresses. Has keratinized epithelium. Covers gingive and hard palate.

**(c)** Attached gingiva: part of masticatory mucosa firmly adherent to the underlying bone, present between free gingiva and alveolar mucosa.

**(d)** Vermillion zone: transitional zone of mucosa present on the lips, between skin of the lips and oral labial mucosa. Redder than oral mucosa, lightly jeratinized.

**(e)** Junctional epithelium: connects the tooth to the gingiva by a basal lamina (hemi-desmosomes)- thus forming the dento-gingival junction. Develops initially by cells of the reduced enamel epithelium.

**(f)** Melanocyte: melanin pigment producing cell present in the deeper layer of epithelium. Distributes/injects melanosomes into adjacent cells.

**Ref:**
Ten Cate's Oral Histology: Development, Structure, Function. Antonio Nanci. 6th Edition. Mosby.
Chapter 12: Pages 329-375

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## *Model Paper (SEQs)*

**Q5. Enumerate 6 functions of saliva. Name the components of saliva that are responsible for each of these functions. (3)**

**Topic:** Oral Physiology

**Key:**

| ***Function*** | ***Components*** | ***Marks*** |
|---|---|---|
| Protection/lubrication | Mucins, glycoproteins, water | 0.5 |
| Digestion | Amylase, lipase | 0.5 |
| Tooth integrity | Calcium, phosphate, fluoride | 0.5 |
| Taste | Gustin, water | 0.5 |
| Buffering | Bicarbonate, phosphate | 0.5 |
| Antibacterial | Lactoferrin, lysozyme, Immunoglobilins, peroxidase, histatins, aggultinins | 0.5 |
| Tissue healing | Peptides, proteins | |
| Pellicle formation | Proteins | |

**Ref:**

Ten Cate's Oral Histology: Development, Structure, Function. Antonio Nanci. 6th Edition. Mosby.
Chapter 11: Pages 300-301

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## *Model Paper (SEQs)*

**Q6. Explain the changes/events that occur inside the temporomandibular joint during:**
**(a) Wide opening of the mouth. (1.5)**
**(b) Right lateral movement of the mandible. (1.5)**

**Topic:** Oral Anatomy

**Key:**

**(a)**
Initial bilateral hinge movement of the condyle in the lower joint compartment.
Followed by bilateral forward gliding movement of the condyle and disk in the upper compartment.

(1.5 marks)

**(b)**
Rotational movement of the RIGHT condyle along a vertical axis in the lower joint compartment.
Forward gliding movement of the LEFT condyle in the upper compartment.

(1.5 marks)

**Ref:**
Ten Cate's Oral Histology: Development, Structure, Function. Antonio Nanci. 6th Edition. Mosby.
Chapter 13: Page 376-398

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## *Model Paper (SEQs)*

**Q7. List the age changes in the following dental tissues:**

**(a) Enamel.** **(1)**

**(b) Dentin.** **(1)**

**(c) Pulp.** **(1)**

**Topic:** Oral Histology

**Key:**

**(a)**

Attrition, wear facets
Discolouration
Reduced permeability, decreased caries
Increased brittleness

(1 mark)

**(b)**

Secondary dentin formation
Intratubular dentin deposition – sclerotic dentin formation
Increased brittleness
Decreased permeability
Dead tract formation

(1 mark)

**(c)**

Decrease in volume of pulp chamber and root canal
Reduced vascular supply
Decrease in cell density
Degeneration of nerves
Dystrophic calcification

(1 mark)

**Ref:**

Ten Cate's Oral Histology: Development, Structure, Function. Antonio Nanci. 6th Edition. Mosby.
Chapters 7 and 8

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## *Model Paper (SEQs)*

**Q8. Tabulate the origin of fibres, location and function of acellular (primary) and cellular (secondary) cementum. (3)**

**Topic:** Oral Histology

**Key:**

| ***Type*** | ***Origin of fibres*** | ***Location*** | ***Function*** | ***Marks*** |
|---|---|---|---|---|
| Acellular | Mostly extrinsic | Cervical margin to apical third | Anchorage | 0.5+0.5+ 0.5 |
| Cellular | Intrinsic | Middle to apical third and furcations | Adaptation and repair | 0.5+0.5+ 0.5 |

**Ref:**

Ten Cate's Oral Histology: Development, Structure, Function. Antonio Nanci. 6th Edition. Mosby.
Chapter 9: Page 248

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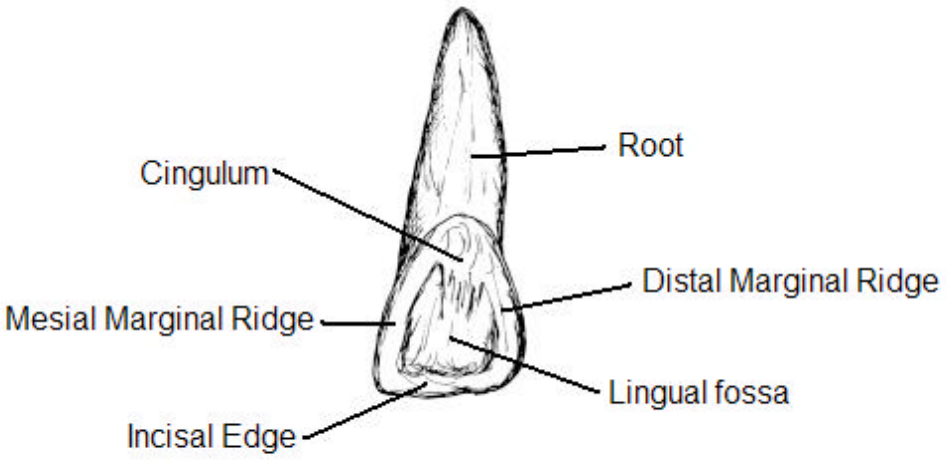
## *Model Paper (SEQs)*

**Q9. Draw and label the lingual view of the maxillary right permanent central incisor. (3)**

**Topic:** Tooth Morphology

**Key:**




Lingual view of Maxillary Right Permanent Central Incisor
(0.5 marks for each feature labeled above)

**Ref:**

Tooth Morphology. Fuller.

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# ORAL AND TOOTH MORPHOLOGY
## *Model Paper (SEQs)*

**Q10. Indicate how each of the following teeth are referred to in the Palmer notation, Universal numbering system and the FDI notation:**

**(a) Maxillary right permanent lateral incisor. (0.5)**
**(b) Maxillary left permanent second molar. (0.5)**
**(c) Maxillary right deciduous first molar. (0.5)**
**(d) Mandibular left first premolar. (0.5)**
**(e) Mandibular right permanent canine. (0.5)**
**(f) Mandibular left deciduous second molar. (0.5)**

**Topic:** Tooth Morphology

**Key:**

| *Tooth* | *Palmer* | *Universal* | *FDI* | *Marks* |
|---|---|---|---|---|
| Maxillary right permanent lateral incisor |   | 7 | 12 | 0.5 |
| Maxillary left permanent second molar |   | 15 | 27 | 0.5 |
| Maxillary right deciduous first molar |   | B | 54 | 0.5 |
| Mandibular left first premolar |   | 21 | 34 | 0.5 |
| Mandibular right permanent canine |   | 27 | 43 | 0.5 |
| Mandibular left deciduous second molar |   | K | 75 | 0.5 |

**Ref:**
Tooth Morphology. Fuller.

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## *Model Paper (SEQs)*

**Q11. During cavity preparation a patient feels pain during drilling and irrigation of the cavity. Explain the the mechanisms that may be responsible for this sensitivity. Which of these is the most likely explanation? (3)**

**Topic:** Oral Physiology

**Key:**

1. Dentin contains nerve endings that respond when it is stimulated. (1 mark)
2. Odontoblasts serve as receptors and are coupled to nerves in the pulp. (1 mark)
3. Fluid movement in dentinal tubules due to stimulation is registered by nerves close to the dentin. Most likely mechanism. (1 mark)

**Ref:**

Ten Cate's Oral Histology: Development, Structure, Function. Antonio Nanci. 6th Edition. Mosby.
Chapter 8: Pages 233-236

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## *Model Paper (SEQs)*

**Q12. Explain the reasons why a tooth continues to move throughout its life after eruption. (3)**

**Topic:** Oral Anatomy

**Key:**

1. Accommodation for jaw/bone growth- teeth move 2-3 mm occlusally between ages 14-18.
   (1 mark)

2. Compensation for occlusal wear/attrition. Teeth move occlusally resulting in cementum deposition.
   (1 mark)

3. Accommodation for interproximal wear. Mesial drift due to anterior component of occlusal force and contraction of transseptal ligament.
   (1 mark)

**Ref:**

Ten Cate's Oral Histology: Development, Structure, Function. Antonio Nanci. 6th Edition. Mosby.
Chapter 10: Pages 280-282

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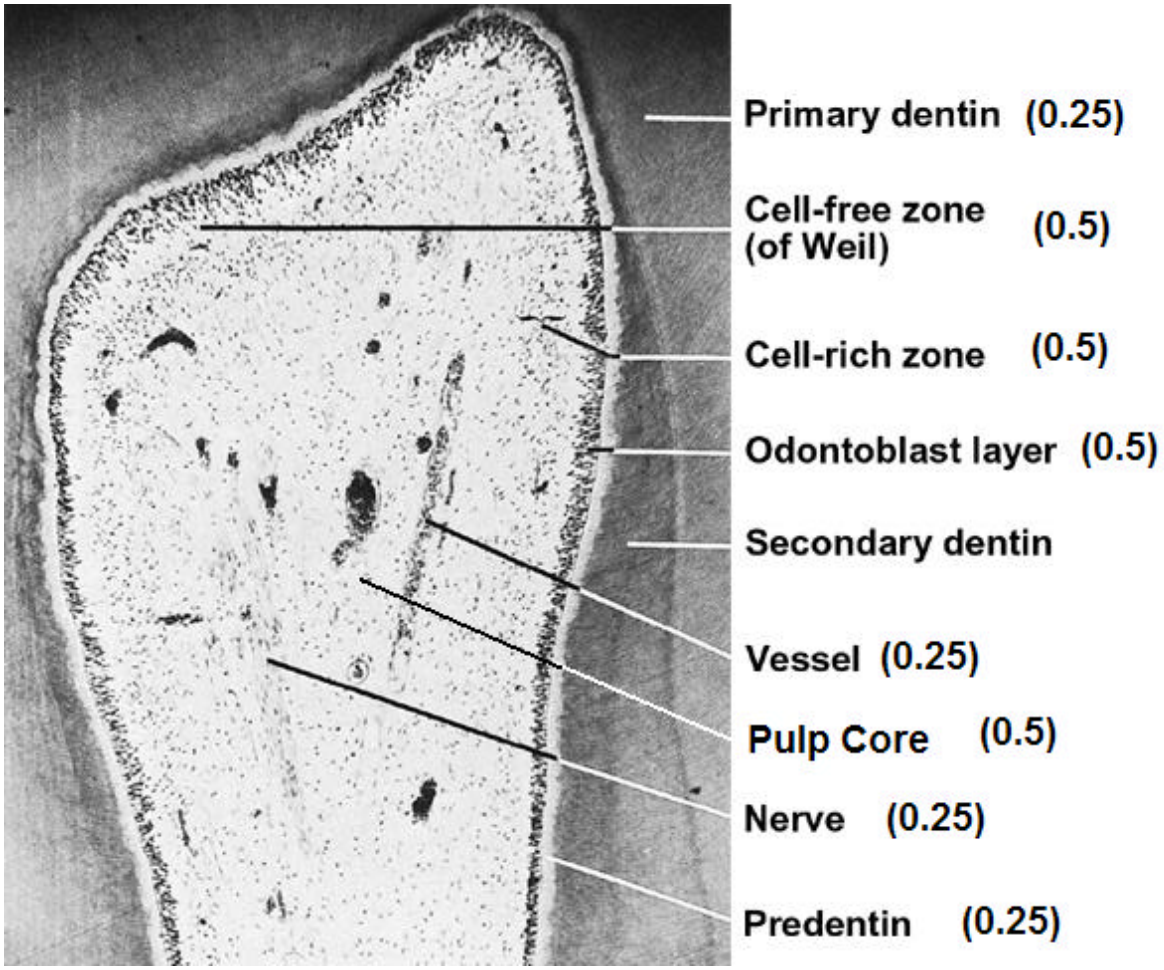
## *Model Paper (SEQs)*

**Q13. Draw and label the histological structure of the pulp, clearly indicating the different zones of the pulp. (3)**

**Topic:** Oral Histology

**Key:**




**Ref:**

Ten Cate's Oral Histology: Development, Structure, Function. Antonio Nanci. 6th Edition. Mosby.
Chapter 8: Page 216

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## *Model Paper (SEQs)*

**Q14. Tabulate the time of eruption, Number of cusps, names of the roots, and names of the root canals of the following teeth:**

**a) Maxillary permanent first molar. (1)**

**b) Mandibular permanent first molar. (1)**

**c) Maxillary first premolar. (1)**

**Topic:** Tooth Morphology

**Key:**

| Tooth | Time of eruption | Number of cusps | Name of roots | Name of root canals | Marks |
|---|---|---|---|---|---|
| Maxillary permanent first molar | 6-7 | 4-5 | Palatal, mesiobuccal. distobuccal | Palatal, mesiobuccal. distobuccal | 0.25+0.25+ 0.25+0.25 |
| Mandibular permanent first molar | 6-7 | 5 | Mesial, distal | Mesiobuccal, mesiolingual, distal (may be 2 distal canals) | 0.25+0.25+ 0.25+0.25 |
| Maxillary first premolar | 9-11 | 2 | Variable. One or bifid (buccal, lingual) | Variable. Buccal, lingual | 0.25+0.25+ 0.25+0.25 |

**Ref:**

Ten Cate's Oral Histology: Development, Structure, Function. Antonio Nanci. 6th Edition. Mosby.
Chapter 10: Pages 275-298
& Tooth Morphology. Fuller.

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## *Model Paper (SEQs)*

**Q15. There is accidental exposure of the pulp during cavity preparation. The dentist covers the exposed pulp using a calcium hydroxide cement. Explain the response of the pulp to this injury. (3)**

**Topic:** Oral Histology

**Key:**

| | ***Marks*** |
|---|---|
| Initial response by tissue macrophages and neutrophils | (1 mark) |
| Inflammatory response initiated by lymphocytes and mast cells. Pulp may undergo necrosis | (1 mark) |
| Undifferentiated cells will turn into odontoblasts and produce reparative (tertiary) dentin calcific bridge. | (1 mark) |

**Ref:**

Ten Cate's Oral Histology: Development, Structure, Function. Antonio Nanci. 6th Edition. Mosby.
Chapter 8: Pages 192-239