



**ROYAL AUSTRALASIAN COLLEGE
OF
DENTAL SURGEONS**
INCORPORATED
ABN 97 343 369 579

Primary Examination

PHYSIOLOGY

28 November 2005

Time allowed: Two hours

INSTRUCTIONS TO CANDIDATES

Answer FOUR (4) out of SIX (6) questions. ANSWER EACH QUESTION IN A SEPARATE BOOKLET

Each question is of equal value, namely, 25% of the total for the written paper.

Ample time is allowed for your answers, so you should strive to present them in a well organized manner. Diagrams may be used to illustrate your answers where appropriate.

Allow time at the end of the examination to read your answers *carefully*.

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Answer FOUR (4) out of SIX (6) questions

Question 1.

(30 MINUTES: 25 MARKS)

Describe the pathways involved in the perception of dental pain. Include a discussion of the nature of painful stimuli and the manner in which receptors on pain fibres respond to these stimuli. Describe the site and mechanism of action of (i) local anaesthetics, (ii) anti-inflammatory analgesics and (iii) morphine.

Question 2.

(30 MINUTES: 25 MARKS)

A 60 year old patient presenting for dental work admits to breathlessness and has a history of smoking and chronic bronchitis. You notice his fingers are blue (cyanosed) and are sufficiently concerned to send him to the local hospital where they measure his arterial blood gases. The results are P_{O_2} 50 mm Hg (normal 100-75), P_{CO_2} 40 mm Hg (normal 35-45) and pH 7.40 (normal 7.35-7.45). Discuss (i) the structures and physiological mechanisms which normally regulate respiration, (ii) suggest how the disease could lead to the observed blood gases and (iii) suggest how the patient's condition would affect your management.

Question 3.

(30 MINUTES: 25 MARKS)

A 20 year old male presents for dental work. He asks for a local anaesthetic but while you are preparing it he appears pale and sweaty. Before you make the injection he becomes unresponsive, and slumps in the chair. What is the most likely diagnosis and how would you confirm this and deal with the situation? Describe the physiological systems thought to be involved and how they lead to the observed clinical picture.

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Question 4.

(30 MINUTES: 25 MARKS)

An elderly woman presenting for dental work tells you she has recently been diagnosed with atrial fibrillation. Draw the ECG findings you would expect in a rhythm strip and label and explain the main features. Explain how this condition affects the cardiac function. How would this condition affect your dental management of this patient?

Question 5.

(30 MINUTES: 25 MARKS)

Describe how calcium and phosphate uptake and excretion are regulated so that blood levels are maintained approximately constant. Explain how calcium and phosphate can precipitate during the formation of (i) teeth, (ii) bone and (iii) why calcium and phosphate can precipitate in the mouth forming dental calculus.

Question 6.

(30 MINUTES: 25 MARKS)

A middle aged man complains of difficulty swallowing and gagging. In particular he has noticed that meat tends to 'stick in his throat'. Describe the main phases of swallowing and the structures involved. Describe the mechanisms and features of gagging, and strategies that could be used to alleviate this problem.