

PRIMARY EXAMINATION

**PHYSIOLOGY**

Thursday 4 December 2003

Time allowed: Two hours

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INSTRUCTIONS TO CANDIDATES

Answer FOUR (4) of the following six (6) questions. If you answer more than four questions, only your *first four* answers will be marked.

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-organised 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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**Question 1**

**(30 minutes: 25 marks)**

Comment on the composition of the gases in the “dead space” in the respiratory system (actual concentrations are not required). What is the significance of this gas mixture in normal quiet breathing? Comment on changes in the dead space and the composition of the gases that it contains, when anaesthetic/analgesic gases are being administered by various methods.

**Question 2**

**(30 minutes: 25 marks)**

Write brief notes on *all* of the following:

- a. Normal blood clotting
- b. The physiology of vomiting, including strategies for dealing with a patient who is nauseous and gagging.
- c. Mechanisms of referred pain in the trigeminal area

**Question 3****(30 minutes: 25 marks)**

Write brief notes on *all* of the following:

- a. the carriage of carbon dioxide by the blood
- b. The mechanism of action of local anaesthetic drugs
- c. The clinical significance of xerostomia

**Question 4****(30 minutes: 25 marks)**

Describe the neural mechanisms that code various aspects of sensation. Frame your answer in the context of the questions that you would ask a patient who complains of a "peculiar feeling" in the lower left area of her mouth.

**Question 5****(30 minutes: 25 marks)**

Describe the mechanisms which regulate the secretion of saliva. When describing the receptor mechanisms, give name an drug that is an antagonist for each receptor type. Include in your answer a discussion of how and why flow rate affects the composition of saliva.

**Question 6****(30 minutes: 25 marks)**

A new patient presents at your surgery for an emergency extraction. He replies in an distracted manner to your questions about his medical history, but does not admit to any relevant medical condition or medication. He is clearly agitated and begins to sweat noticeably when he sees you preparing the local anaesthetic. As you approach with the needle he appears to lose consciousness and makes sudden convulsive and uncontrolled movements.

- a) What is your differential diagnosis this condition?
- b) What factors might have precipitated his loss of consciousness and convulsive movements?
- c) How would you manage this condition?
- d) What precautions would you take to prepare for his next visit, at which you will have to extract five more teeth?