

PRIMARY EXAMINATION

PHYSIOLOGY

Thursday 5 December 2002

Time allowed: Two hours

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.

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

Question 1

(30 minutes: 25 marks)

A new patient presents to you for an emergency extraction. She reports in her medical history that she is receiving “drug treatment” for her severe asthma, but does not know what these drug(s) are.

What *types* of drugs are most likely to be used to treat severe asthma? Include in your answer a description of how one of these drugs acts, and include a comment on any physiological consequences of this drug that are relevant to your treatment.

Question 2

(30 minutes: 25 marks)

As the consultant dentist to a nursing home, you are asked to treat a 72-year old male patient for acute pulpitis. He has been unable to leave his bed for three weeks because of his severe rheumatoid arthritis. The patient is brought to your clinic, and lifted from his wheel-chair into your dental chair. About 10 minutes later, the patient complains of a dull, crushing pain in his left arm which is spreading up towards his jaw.

- a) Given this patient’s recent history, what is your differential diagnosis of his pain? Give your reasons.
- b) Describe the physiological mechanisms that account for the pain in his arm and neck.
- c) Describe how you would react to this situation.

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

The masticatory system is adapted to a number of functions including chewing and speech. Describe the functional and histochemical properties of the different types of muscle fibres in the masticatory muscles that enable them to meet this range of functions. You are not required to specify the fibre composition of individual named muscles.

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

Write brief notes on *all* of the following:

1. List four important actions of adrenaline which contribute to its effectiveness in the emergency treatment of anaphylactic shock, and identify the receptor mechanisms which are responsible for mediating each of these actions.
2. Blood clotting
3. The buffering properties of saliva and their significance to oral health

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

It is quite common for dental patients to complain of orofacial pain of long duration, for which there are no obvious physical signs (i.e., no lesions). Discuss the physiological mechanisms that can account for this chronic pain.

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

Write brief notes on *all* of the following:

1. The role of carbon dioxide in the control of breathing
2. List the autonomic receptor mechanisms which regulate the secretion of saliva. For each receptor mechanism listed, give one example of an agonist and one example of an antagonist, choosing the most selective agents available.
3. The mechanisms by which fat-soluble and water-soluble hormones influence the activities of their target cells.

End of Paper