

**The coverage of the 2006 examination for HBS3APB included the following instructions:**

**ALLOWABLE MATERIALS**

22. Unmarked, non-electronic non-medical translation dictionary by prior arrangement.

**AND**

**INSTRUCTIONS TO CANDIDATES**

- 1) This examination consists of two sections, A and B.
- 2) Section A consists of 50 multiple-choice questions\*. Answers must be entered on the answer sheet provided. Instructions for completing the answer sheet are on page 2 of this paper – read them carefully.
- 3) Attempt all the multiple choice questions. These are of equal value, 1 mark each. Marks will not be deducted for incorrect answers. It is suggested that you spend approximately 80 minutes on this section.
- 4) Section B consists of 9 short-essay questions. Attempt any five (5) only of the short-essay questions. Each question is worth 10 marks. Start each question on a new page.
- 5) It is suggested that you spend approximately 20 minutes on each of the 5 questions, or 100 minutes in total on Section B.

**This paper MUST NOT BE REMOVED from the examination venue**

\*Note that the Multiple Choice Questions are not provided here. However, there are MCQs for study and practice in the manual for this unit (the last few pages).

## SECTION B

ANSWER ANY FIVE (5) OF THE FOLLOWING NINE (9) QUESTIONS

**Note that questions 8 and 9 offer you internal choice from which you may choose ONE alternative only.**

**PLEASE START EACH ANSWER ON A NEW PAGE  
EACH QUESTION IS WORTH 10 MARKS**

1. Describe, preferably through annotated diagrams (a) the gross structure *and* (b) the conceptual parts of a voltage-gated ion channel (of your choosing) in a ventricular myocyte. Where possible, describe the parts of the channel protein that correspond to the conceptual parts.  
Explain how the ion channel you have selected contributes to the action potential.
2. Discuss the cause of ischaemic heart disease.
3. Describe therapeutic approaches for the treatment of hyperlipidaemia. Your answer should include major drug groups and their mechanisms of action.
4. Explain (preferably using a diagram) the apparatus and method used to obtain the relaxation pressure-volume relation in a normal person. Draw a graph of the changes in lung volume (y-axis) against relaxation pressure (x-axis) in your answer book. Add the scale, values and units for both axes. Indicate on this graph where compliance of the thorax is greatest; give a typical value for the compliance of the thorax
5. Discuss the aetiology and pathogenesis of emphysema.

**Questions 6 to 9 follow on the next page.**

## SECTION B (continued)

6. Describe in point form, and by way of diagrams, how a simple fracture to a long bone heals.
  
7. What changes occur in the structure, organisation and biomechanical properties of the extracellular matrix of articular cartilage in osteoarthritis?

### *Either*

- 8A. Draw a diagram that demonstrates the rotatory, translatory and spin components of a muscle force. Describe what is meant by spurt and shunt muscles with reference to the attachments of the muscle (origin and insertion) and relate this to the relevant force components described previously. Use these concepts to describe the functions of biceps brachii long head.

### *Or*

- 8B. Define a linear envelope EMG signal whilst including in your answer the two main EMG processing steps to obtain a linear envelope signal. Discuss advantages for using a linear envelope signal. Finally, draw a linear envelope EMG signal, highlighting onset, peak amplitude, offset and duration of the EMG signal.

### *Either*

- 9A. Describe the major changes which occur in the woman during pregnancy in the blood and in the function of the maternal cardiovascular system. Indicate how these changes are adaptive to pregnancy. Describe briefly any disorders which may be associated with changes in cardiovascular function and blood in pregnancy.

### *Or*

- 9B. Discuss factors which should be taken into account in the decision to use a drug during pregnancy and during breastfeeding.

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**END OF THE EXAMINATION**