

# RESTRICTED USE

**La Trobe University**  
**Semester One Examination**  
**2007**

Student Number:

Seat Number:

Unit Code: HBS3APA

Unit Name: Advanced Physiology A

Paper No: 1

Paper Name: Advanced Physiology A

Reading Time: 0.15 min

Writing Time: 3 hours

Examination Date: 13/06/2007 Examination start time: 0900 hrs

No. of pages (including cover sheet): 14

## ALLOWABLE MATERIALS

- 101 Unmarked except for underlining, highlighting and tabbing non-electronic non-medical translation dictionary by prior arrangement

## ADDITIONAL 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. For Unit code enter HBS3APA.
- 3) Each multiple-choice question is worth 1 mark. No marks will be deducted for incorrect answers. It is suggested that you spend approximately 80 minutes on this section.
- 4) Section B consists of 10 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**

## SECTION B

**ANSWER ANY FIVE (5) OF THE FOLLOWING TEN QUESTIONS**  
**COMPLETE ALL PARTS OF ANY QUESTION WHICH HAS SEVERAL PARTS**  
**START EACH QUESTION ON A NEW PAGE**  
**EACH QUESTION IS WORTH 10 MARKS**

1. You are prescribed a glucocorticoid (a steroid) cream for your eczema. Explain how this drug will have a therapeutic effect.
2. Describe the anatomy of the peripheral nervous system (a diagram may be used). Include the neurotransmitters and receptors that are found at each synapse. Give an example of a drug that acts at each of these sites. You should describe briefly the mechanism of action of the drug and state its clinical use.
3. Describe in point form the pathogenesis of a healing skin wound from time zero to the formation of scar.
4. Discuss the development of cancer.

For question 5:

A group of third year physiology students have planned an experiment to test the hypothesis that exercise increasing of intensity will result in increased secretion of antidiuretic hormone (ADH).  
The experimental protocol requires the subjects to exercise at 4 levels of increasing intensity for 10 minutes at a time.  
The exercise intensity will range from gentle to very vigorous, and will be based on exercise at 4 increasing percentages of predicted maximum heart rate for each subject.  
At the completion of each level of exercise, each subject will collect a urine sample, and will then begin the exercise at the next level.  
The density of each sample will be used as an indirect measure of ADH in the blood.

5.
  - a) Explain any theoretical adaptive advantage associated with the secretion of antidiuretic hormone (ADH) in response to exercise, especially intense exercise.
  - b) Explain why density of urine can be used as an indirect measure of antidiuretic hormone in the blood.
  - c) Comment briefly on whether or not you think this experimental protocol provides a reasonable test of the hypothesis, and briefly state why.

(4 + 4 + 2 marks)

6. Discuss the concept of neural plasticity and its role in brain function, using at least one example (e.g. the NMDA receptor, cerebellar learning, reorganization of somatosensory maps).
7. Discuss the functions in humans of the prefrontal cortex.
8. List four social drugs that are abused and can lead to dependence. For each of these drugs, outline the major routes of administration, mechanism of action and associated signs/symptoms of use.
9. Describe the physiology of pain perception. Give an example of an opioid that is used to treat pain and describe its mechanism of action.
10. Discuss the aetiologies of cerebrovascular disease.