



## SECOND EXAMINATION FOR MEDICAL DEGREES

## PHYSIOLOGY II

July 2012

TIME: THREE HOURS

Answer all questions. Answer each question in a separate book.

1. A 30 year old lady was admitted to hospital to deliver her third child. Her blood group was O/Rh negative and her husband's blood group was A/Rh positive. The blood group of first child was A/Rh negative and second child was O/Rh negative.
  - 1.1 In relation to the ABO blood group, write possible genotypes in the
    - 1.1.1 father (05)
    - 1.1.2 mother (05)
    - 1.1.3 first child (05)
    - 1.1.4 second child (05)
  - 1.2 The blood group of third child delivered by this mother was A/Rh positive.
    - 1.2.1 List three possible complications that can occur in her next pregnancy (with regards to the foetus) if that foetus happened to be Rh positive. (15)
    - 1.2.2 Explain the physiological basis for the complications listed in 1.2.1. (30)
    - 1.2.3 With explanations, state the actions you would take to prevent development of these complications listed in 1.2.1. (35)
2.
  - 2.1 Giving examples, explain the term 'hypoxia'. (50)
  - 2.2 Explain the physiological basis for the following statements.
    - 2.2.1 Oxygen therapy should be used carefully when treating patients with respiratory failure. (25)
    - 2.2.2 Reduction in peak expiratory flow rate does not confirm the diagnosis of obstructive airways disease. (25)
3. A patient who was taking angiotensin converting enzyme inhibitors (ACE inhibitors) for chronic hypertension, admitted to hospital with orthopnea. On examination he had bilateral pitting ankle oedema. ECG showed tall R waves in  $V_5$ - $V_6$  leads.
  - 3.1 Explain the physiological basis behind the development of
    - 3.1.1 orthopnoea. (20)
    - 3.1.2 bilateral ankle oedema. (20)
    - 3.1.3 tall R waves in  $V_5$ - $V_6$  leads in the ECG. (20)
  - 3.2 Explain the physiological basis behind the use of ACE inhibitors to treat hypertension. (40)

- 4.
- 4.1 Define 'renal clearance'. (10)
  - 4.2 In a healthy person, when measured at the same time, renal clearance of different substances gives different values. Explain the above statement using the clearance of glucose, inulin, albumin and PAH as examples. (60)
  - 4.3 Explain why there is an increased loss of  $\text{Na}^+$  in urine in patients with high blood sugar concentrations. (30)
5. Briefly explain the physiological basis of following statements.
- 5.1 Increased or decreased serum TSH concentrations can be seen in hyperthyroidism (25)
  - 5.2 Activation of sympathetic nervous system increases the blood flow to muscles while it decreases blood flow to many other tissues. (25)
  - 5.3 The mean is a better indicator of central tendency in some samples while the median is better in some others. (25)
  - 5.4 Intravascular fluid volume can be measured directly while intracellular fluid volume cannot be measured directly. (25)

==== The End =====