

**UNIVERSITY OF JAFFNA, SRI LANKA**  
**FIRST EXAMINATION [1] FOR MEDICAL DEGREES –February 2010**  
**Physiology: Paper II**

**Date: 03. 02. 2010.**

**Time: 03 hours**  
**9.00 AM -12.00 noon.**

**ANSWER ALL THE TEN QUESTIONS**

**Write answers for each part in separate answer book**

**PART A**

1. Blood pressure of a person who came to the hospital with severe diarrhoea was low. He was given 2 liters of isotonic solution as intravenous infusion.
  - 1.1. Write the concentration of the substances in percentage of two different solutions which can be infused to this patient (20 marks)
  - 1.2. Write the osmotic pressure of the solutions mentioned in 1.1 (10 marks)
  - 1.3. Write briefly a physiological mechanism by which water loss is minimized in this patient (35 marks)
  - 1.4. Briefly write a laboratory procedure which can be adopted to measure total body water of a man (35 marks)
  
2.
  - 2.1. Draw and label the different phases of action potential of a nerve fiber (30 marks)
  - 2.2. Briefly describe the refractory period (35 marks)
  - 2.3. Briefly describe the autonomic out flow and its neuro-transmitters (35 marks)
  
3.
  - 3.1. Define pulmonary ventilation (15 marks)
  - 3.2. List the factors that affect pulmonary ventilation (15 marks)
  - 3.3. Describe the physiological mechanism which is involved in the increase of pulmonary ventilation in a patient with untreated diabetes mellitus (30 marks)
  - 3.4. Describe the measurement of FEV1 (30 marks)
  - 3.5. List two other pulmonary function tests (10 marks)
  
4. Urine sample was obtained from a 50 year old man to assess the pancreatic function.
  - 4.1. Briefly describe the physiological mechanisms which causes the changes in urine composition (50 marks)
  - 4.2. List two other endocrine abnormalities that can be assessed by urine analysis (10 marks)
  - 4.3. Describe the basis of assessing the functional status of the endocrines you mentioned in 4.2 from the urine report. (40 marks)
  
5. Write short notes on:
  - 5.1. Corpus luteum in pregnancy (30 marks)
  - 5.2. Consumption of Testosterone by a male athlete (35 marks)
  - 5.3. Female contraceptives (35 marks)

## PART B

6. Mr. Ramanan, 20 years old healthy male, was returning home after new year party in his motor bike. He met with road traffic accident near the university and admitted to the hospital which is 4 kilometers away. On admission, he was found to have fracture of right humerus and bleeding profusely from the wound. His breath smelt of alcohol. His tongue and nails appeared pale. Blood pressure was 80/50 mmHg. Pulse rate was 112 per minute.
- 6.1. Describe briefly the first aid that should have been administered to him (30 Marks)
- 6.2. Describe the mechanisms responsible for the change in blood pressure and pulse rate in relation to (a) loss of blood and (b) the fracture. (40 Marks)
- 6.3. Describe the status of the tissue fluid formation and outline the consequences. (30 Marks)
7. Mr. Ramanan mentioned in question 6 had to be given 5 bags of blood to restore the blood pressure to about 110/70 and pulse rate to 84/min and haemoglobin of 11g/100 ml. His blood group was A+.
- 7.1. Describe the precautions in selecting the donors of blood (15 Marks)
- 7.2. Describe briefly the principles of grouping the blood (25 Marks)
- 7.2. Name the laboratory test that should be done before administering each blood bag and explain the test briefly. (20 Marks)
- 7.3. Describe the change you expect in the Reticulocyte Count in the following days to come and the physiological basis of the change. (25 Marks)
- 7.4. Briefly write the dietary advice to this patient to optimize the process mentioned in 7.3. (15 Marks)
8. 8.1. Describe the effect of severe haemorrhage on glomerular filtration (30 Marks)
- 8.2. Describe the effect of reduced glomerular filtration on blood pH (30 Marks)
- 8.3. Describe micturition (40 Marks)
9. 9.1. Describe the ways of heat exchange between the body and environment with examples of situations that alter the heat exchange (50 Marks)
- 9.2. Describe the physiological basis of increased blood loss from injuries in hot environment. (25 Marks)
- 9.3. Describe the physiological basis of fever (25 Marks)
10. Describe the physiological basis of the following:
- 10.1. Two point discrimination (30 Marks)
- 10.2. Fasciculation (30 Marks)
- 10.3. Double vision (40 Marks)

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