UNIVERSITY OF JAFFNA, SRI LANKA
FIRST EXAMINATION FOR MEDICAL DEGREES –March 2021
Physiology: Paper II

Date: 17.03.2021 Time: 03 hours

ANSWER ALL THE **TEN** QUESTIONS

1. Explain briefly the physiological basis of the following:
   - 1.1. When blood flow to an organ is occluded, that organ becomes blue (25 Marks)
   - 1.2. People living at altitudes of about 3000 meters have blood haemoglobin of about 18 g/dl (25 Marks)
   - 1.3. Patients with diseases of bone marrow can develop micro-haemorrage all over the skin (purpura) (25 Marks)
   - 1.4. Neutrophils accumulate in areas of bacterial infection (25 Marks)

2. A patient was brought to the hospital with right sided chest injury. The right chest was more prominent than the left. The patient complained of progressively worsening dyspnea. The right chest was more resonant on percussion and breath sounds were not heard in the right chest. The respiratory rate was 30/minute on admission.
   - 2.1. Identify the condition with reasons (15 Marks)
   - 2.2. Outline the immediate action to be taken with reasons (15 Marks)
   - 2.3. Explain the reason/s for the absence of breath sounds in right chest (30 Marks)
   - 2.4. Explain the physiological basis of the respiratory rate (40 Marks)

3. The blood pressure and pulse of the patient mentioned in question 2 were 90/65 mm Hg and 90/minute. The pulse volume was reduced (thready pulse).
   - 3.1. Briefly describe the nervous regulation of blood pressure and heart rate (40 Marks)
   - 3.2. Describe the physiological basis of change in:
   - 3.2.1. Systolic and diastolic blood pressures (30 Marks)
   - 3.2.2. Pulse rate (15 Marks)
   - 3.2.3. Pulse volume (15 Marks)

4. Describe the physiological basis of the following:
   - 4.1. Patients with left heart failure complain of difficulty in breathing when lying flat (50 Marks)
   - 4.2. Dilatation of ventricles is disadvantageous for cardiac function (25 Marks)
   - 4.3. Thickening of ventricular walls facilitates cardiac function in chronic hypertension (25 Marks)

5. Describe the physiological basis of increasing body weight in the following conditions:
   - 5.1. Hypothyroidism (40 Marks)
   - 5.2. Acromegaly (30 Marks)
   - 5.3. Cushing's disease (30 Marks)

6. Explain the physiological basis of the following:

6.1. Stimulation of ulnar nerve produces multiple sensations in the little finger (35 Marks)

6.2. Pinprick on the left leg results in flexion of the left knee in normal person but in a patient with complete transaction of the spinal cord at T12, extension of right knee also is seen on pricking left leg (30 Marks)

6.3. Sudden stretch of biceps tendon results in contraction of the biceps but excessive force on the same tendon results in relaxation of the muscle (35 Marks)

7. Describe:

7.1. Receptors in retina (50 Marks)

7.2. Transmission of sound in middle ear (50 Marks)

8. Describe:

8.1. Secretion of HCl in stomach (25 Marks)

8.2. Regulation of HCl secretion in stomach (50 Marks)

8.3. Mechanisms that protect the gastric mucosa from HCl (25 Marks)

9. Describe the physiological basis of the following:

9.1. Creatinine clearance is reduced in patients with severe diarrhoea (50 Marks)

9.2. Calcium excretion in urine increases in hyperparathyroidism (50 Marks)

10. Describe briefly:

10.1. Ejaculation (25 Marks)

10.2. Impotence (25 Marks)

10.3. Menstruation (25 Marks)

10.4. Regulation of milk secretion by breast (25 Marks)