UNIVERSITY OF RUHUNA

FACULTY OF MEDICINE

# 2ND Examination for Medical Degrees
# PHYSIOLOGY - Paper II

MARCH 2015

Time: Three hours

**Answer all five (05) questions. Use a separate book for each question.**

1

1.1 Briefly explain the physiological basis of increased blood pressure and pulse rate seen in a boy who is about to start a running race. (20 Marks)

1.2 Explain the changes you would expect to see in his cardiovascular and respiratory systems during the race. (50 Marks)

1.3 Explain why even after finishing the race his blood pressure, pulse rate and respiratory rate remain high for some time. (30 Marks)

2

2.1 Draw a clearly labeled oxygen-haemoglobin dissociation curve of a healthy adult. (10 Marks)

2.2 Briefly explain the reasons for the shape of the curve. (20 Marks)

2.3 Compared to that of normal healthy adults, state the differences seen in oxygen-haemoglobin dissociation curve of

2.3.1 a foetus.

2.3.2 a person with fever.

2.3.3 a person living at a high altitude. (20 Marks)

2.4 Explain the reasons for the changes and the benefits of those changes in conditions described in 2.3. (50 Marks)

3 A 45 year-old male patient from Anuradhapura was investigated for a renal disease. His investigation findings are shown below.

| Investigation | Result | Reference range |
|---|---|---|
| Haemoglobin | 10 g/dL | 12-15 g/dL |
| Serum $Ca^{++}$ | 8.5 g/dL | 9-11 g/dL |
| Serum parathyroid hormone concentration | 70 pg/mL | 10-55 pg/mL |
| Serum creatinine | 2.5 mg/dL | 0.6-1.2 mg/dL |
| 24-hour urine output | 1500 mL | 1000-2500 mL |
| Urine creatinine | 0.05 mg/dL | Not defined |

3.1 Calculate his creatinine clearance. (25 marks)
(Assume that the blood sample for serum creatinine was drawn during the period of 24- hour urine collection. Also assume that the urine creatinine was assessed in a sample from the 24-hour urine collection).

3.2 Based on the information given above, what is the possible disease condition he is having? (15 marks)

3.3 Explain the physiological basis of abnormalities seen in his

3.3.1 haemoglobin concentration (20 marks)

3.3.2 serum calcium concentration (20 marks)

3.3.3 serum parathyroid hormone concentration (20 marks)

**4**

4.1 Compare the regulatory mechanisms of adrenal medullary and adrenal cortical hormone production and secretion. (30 Marks)

4.2 Describe similarities and differences of the actions of catecholamines and thyroxin. (30 Marks)

4.3 If a doctor has to select only one investigation to assess the thyroid function, serum TSH is considered the best option. However a patient with hypothyroidism can have increased TSH as well as decreased TSH. Comment on this. (40 Marks)

**5.0** Explain the physiological basis of the following.

5.1 Peptic ulcer disease has many treatment options but proton pump inhibitors are considered the most effective. (40 Marks)

5.2 Serum albumin has multiple physiological functions. (30 Marks)

5.3 Levodopa is used as a treatment in Parkinson disease while dopamine is not. (30 Marks)

THE END