



FACULTY OF MEDICINE, UNIVERSITY OF RUHUNA

Second Examination for Medical Degrees - December 2022

Biochemistry-Paper II

Answer All Five Questions.

6th December 2022

Answer each question in a separate book.

2.00 p.m - 5.00 p.m

Marks allocated to each part of a question are shown within parenthesis.

(Three hours)

Handover each book separately.

1. An obese adult male who has been a chain smoker and consumed alcohol on a daily basis was admitted to hospital with a myocardial infarction.
 - 1.1. Name five (05) risk factors for the development of atherosclerosis in the patient, (10 marks) except for the risk factors that are mentioned in the question.
 - 1.2. 1.2.1. State the possible abnormalities that could be present, if a lipid profile (10 marks) was performed within 24 hours from the onset of clinical features of myocardial infarction.
 - 1.2.2. Briefly explain the biochemical basis for the abnormalities stated in 1.2.1. (20 marks)
 - 1.3. Explain the biochemical basis for the development atherosclerosis in this patient. (35 marks)
 - 1.4. Briefly explain five (05) dietary modifications that can be recommended to this (25 marks) patient.
2. Explain the biochemical basis of the following.
 - 2.1. Administration of sodium benzoate in hyperammonaemia. (25 marks)
 - 2.2. Performance of serum protein electrophoresis in multiple myeloma. (25 marks)
 - 2.3. Skeletal muscle cells play an important role in regulating the blood glucose (25 marks) concentration in the fed state.
 - 2.4. Estimation of serum C-reactive protein (CRP) in the diagnosis of an infection. (25 marks)
3. Explain the following.
 - 3.1. Haemorrhagic disease of the newborn is less common among the babies who (25 marks) have received intramuscular injection of vitamin K immediately after birth.
 - 3.2. Development of megaloblastic anaemia in vitamin B₁₂ deficiency. (25 marks)
 - 3.3. The role of ferritin in the metabolism of iron. (25 marks)
 - 3.4. Development of premature cataract in patients with poorly controlled diabetes (25 marks) mellitus.

Cont.

4. The following assumptions are important for the calculations in questions 4.1.1 and 4.1.2.

Efficiency of conversion of dietary proteins to milk proteins - 70%

Digestibility of a mixed diet - 85%

Safe level of intake of proteins in an adult - 0.75 g/kg

Average protein content of breast milk - 11.5 g/L

- 4.1.1 Calculate the daily protein requirement for a 30-year-old healthy woman of 60 kg body weight. (20 marks)
- 4.1.2 Calculate her daily protein requirement if she is lactating and produces 750 mL of milk per day. (25 marks)
- 4.2. Explain the main considerations in planning a diet for a patient with a severe tissue injury. (30 marks)
- 4.3. Explain the biochemical basis of using phototherapy in the treatment of exaggerated physiological jaundice in newborn. (25 marks)

5.

- 5.1. Explain the biochemical basis for the development of the following conditions.

5.1.1. Hyperuricaemia in hypoxanthine-guanine phosphoribosyltransferase (HGPRT) deficiency. (20 marks)

5.1.2. Mental retardation in classical phenylketonuria. (25 marks)

5.2. Describe the molecular basis of polymerase chain reaction (PCR). (15 marks)

5.3. Briefly explain the importance of PCR technique on the following.

5.3.1. As a diagnostic tool (20 marks)

5.3.2. In forensic medicine (20 marks)
