FACULTY OF MEDICINE, UNIVERSITY OF RUHUNA

Second Examination for Medical Degrees- November 2021

Biochemistry-Paper II

Answer **All Five** Questions.
Answer each question in a **separate** book.
Marks allocated to each part of a question are shown within parenthesis.
Handover each book separately.

2nd November 2021
2.00 p.m- 5.00 p.m
(Three hours)

1.

1.1 A 67-year-old male patient diagnosed with a tumour compressing the common bile duct was presented with deep icterus. His serum total bilirubin concentration is elevated and there is an elevation of serum alkaline phosphatase concentration in three folds of the upper reference range.

1.1.1 State the type of hyperbilirubinaemia present in this patient with a justification for your answer. (10 marks)

1.1.2 Explain the biochemical basis for the

a. elevated serum total bilirubin. (20 marks)
b. elevated serum alkaline phosphatase concentration. (20 marks)

1.2 1.2.1 Explain the biochemical basis for the premature development of cataract in a patient with poorly-controlled diabetes mellitus. (25 marks)

1.2.2 Explain the factors to be considered in planning a diet for a patient with type 2 diabetes mellitus with a high BMI. (25 marks)

2.

2. 1 Explain the biochemical rationale of the following.

2.1.1 Ketone bodies become an energy source for the brain during prolonged starvation. (25 marks)

2.1.2 Copper deficiency in Menkes syndrome. (25 marks)

2.2 Describe the role of

2.2.1 parathyroid hormone and calcitriol in calcium homeostasis. (25 marks)

2.2.2 LDL and HDL in cholesterol transport. (25 marks)

Contd.

3. A 38-year-old mother of five children with clinical features of anaemia is presented to a physician. Investigations revealed that her blood film is microcytic and hypochromic.

3.1 3.1.1 What is the most likely cause for the development of anaemia in this patient? (5 marks)

3.1.2 State the possible causes for the condition mentioned in 3.1.1. (20 marks)

3.1.3 State the biochemical test to confirm the diagnosis and explain the rationale behind the selection. (25 marks)

3.2 Explain the following.

3.2.1 Development of megaloblastic anaemia in vitamin B_{12} deficiency. (25 marks)

3.2.2 Biochemical significance for the analysis of Bence – Jones protein in multiple myeloma. (25 marks)

4. Explain the following.

4.1 The involvement of G-proteins in the action of cholera toxin. (25 marks)

4.2 The importance of hexose monophosphate pathway in the metabolism of the red blood cell. (25 marks)

4.3 The biochemical significance of administration of lactulose in hyperammonaemia. (25 marks)

4.4 Protein requirement is high in a patient after an acute major tissue injury. (25 marks)

5.

5.1 Identify the significance of the following in recombinant DNA technology.

5.1.1 Restriction endonucleases (10 marks)

5.1.2 Plasmids (10 marks)

5.2 Explain the molecular/biochemical basis of the following.

5.2.1 PCR and RFLP analysis are widely employed in forensic medicine. (30 marks)

5.2.2 Deficiency of adenosine deaminase enzyme exerts deleterious effects on the immune system. (25 marks)

5.3 Explain the biochemical basis for the development of pitting oedema in severe protein energy undernutrition. (25 marks)

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