FACULTY OF MEDICINE, UNIVERSITY OF RUHUNA

Second Examination for Medical Degrees-April 2019

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.

24^{th} April 2019

2.00 p.m- 5.00 p.m

(Three hours)

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1. 1.1 A female patient with type 2 diabetes mellitus for 10 year duration underwent her routine medical check-up and she was found to have microalbuminuria.

    1.1.1 Explain the biochemical basis for the development of microalbuminuria. *(35 Marks)*

    1.1.2 List the biochemical investigations which could be routinely used to monitor the glycaemic control of this patient. *(15 Marks)*

    1.1.3 Select the best investigation from 1.1.2 and explain the biochemical basis of the investigation. *(25 Marks)*

    1.2 Explain the biochemical basis of the development of hypopigmentation in classical phenylketonuria. *(25 Marks)*

2. 2.1 Explain the biochemical basis of the following.

    2.1.1 Development of jaundice in a patient suspected to have acute viral hepatitis. *(25 Marks)*

    2.1.2 Development of ketoacidosis in a patient with uncontrolled diabetes mellitus. *(35 Marks)*

    2.1.3 Occurrence of hypercholesterolaemia and hypertriglyceridaemia in an obese person who is a chronic alcohol user and a chain smoker. *(40 Marks)*

3 3.1 3.1.1 Explain howabnormalities in nucleotide metabolism could lead to severe combined immunodeficiency (SCID). *(25 Marks)*

    3.1.2 State one modern therapeutic approach for SCID. *(10 Marks)*

    3.1.3 Explain briefly the molecular basis of the therapeutic approach stated in 3.1.2. *(25 Marks)*

    3.2 Explain the biochemical basis of the following.

    3.2.1 Administration of lactulose in chronic liver disease. *(20 Marks)*

    3.2.2 Estimation of serum α-fetoprotein concentration to monitor treatment of testicular cancer. *(20 Marks)*

4. Explain the following.

4.1 Molecular mechanisms involved in the action of insulin at cellular level. *(25 Marks)*

4.2 The role of hexose monophosphate pathway in the prevention of infections. *(25 Marks)*

4..3 Use of carbimazole in the management of Graves' disease. *(25 Marks)*

4..4 Sickle cell disease is the result of a missencemutation. *(25 Marks)*

5. 5.1 A 40- year old male was hospitalized after a motor vehicle accident with a severe concussion, a broken jaw, multiple broken bones, and possible internal injuries.

His height and weight measurements are 160 cm and 50 kg respectively.

Basal metabolic rate (BMR) for a male = 66.5+13.8(W) +5(H)-6.8(A)

Activity factor for a patient confined to bed : 1.2
Stress/Injury factor in skeletal trauma : 1.4

5.1.1 State the type of feeding that would be recommended for the above patient. Give reasons. *(15 Marks)*

5.1.2 Calculate the daily total energy requirement for the above person assuming he was confined to bed during the whole day. *(30 Marks)*

5.2 Briefly explain the main considerations in planning a diet for a patient with tissue injury. *(30 Marks)*

5.3 Explain the biochemical basis.

Continuous supply of vitamin A is essential for the prevention of nyctalopia (delayed adaptation to dim light). *(25 Marks)*

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