UNIVERSITY OF JAFFNA, SRI LANKA

FACULTY OF MEDICINE

FIRST EXAMINATION FOR MEDICAL DEGREES- MAY 2019

BIOCHEMISTRY PAPER II

24.05.2019 **Time: 3 Hours**

Answer all 10 questions.

Marks allotted to each part are indicated in brackets.

Answer Each Question on Separate Answer Book.

1. 1.1 A 25 year old pregnant mother at her first prenatal visit was diagnosed to have diabetes.

   1.1.1 How will you carry out **the test** to confirm that she is diabetic? **(40 Marks)**

   1.1.2 Give the biochemical basis for a pregnant mother to have chances of getting diabetes? **(30 Marks)**

   1.2 Explain how elevated levels of plasma glucose of a diabetic patient can lead to cataract. **(30 Marks)**

2. Give the biochemical basis of the followings:

   2.1 Phenylketonuria. **(30 Marks)**

   2.2 Ammonia is toxic to the brain and brain detoxifies ammonia. **(40 Marks)**

   2.3 Metabolic changes during keto-acidosis. **(30 Marks)**

3. **3.1** A 40 year male patient had severe intermittent chest pain. Lipid profile of this patient had a total cholesterol level of 400mg/dL, LDL cholesterol level of 320 mg/dL and the HDL level of 40 mg/dL.

3.1.1 Explain how the elevated levels of LDL can lead to coronary heart disease. **(40 Marks)**

3.1.2 Explain how the intake of aspirin is beneficial to this patient. **(35 Marks)**

3.2 Explain how the LDL receptors are down regulated? **(25 Marks)**

4. **4.1** Give the biochemical basis for the reduced life span of red blood cells in sickle cell disease. **(30 Marks)**

4.2 Give the different tests that are carried out to find the

4.2.1 Bile pigments in urine **(15 Marks)**

4.2.2 Conjugated and unconjugated bilirubin in serum. **(20 Marks)**

4.2.3 How would the results of the above two tests mentioned in 4.2.1 and 4.2.2 be helpful to differentiate prehepatic- and post hepatic-jaundices. Give reasons. **(35 Marks)**

5. **5.1** Discuss the different acquired hypothyroidic conditions. **(25 Marks)**

5.2 Elaborate how the dietary calcium is assimilated & transported to the tissues and excreted. **(40 Marks)**

5.3 Diagrammatically show the changes in the CK-MB, myoglobin and troponin levels after myocardial infarction and give reasons for these changes. **(35 Marks)**

6. **Explain the biochemical basis of following**

6.1 Patient with chronic kidney disease develops osteopenia. **(45 Marks)**

6.2 'Folate trap'. **(30 Marks)**

6.3 Advantages of consuming green leafy vegetables. **(25 Marks)**

7. **7.1** Draw the "proteoglycan aggregate" found in the extracellular matrix **(20 Marks)**

7.2 Compare the biochemical characteristics of hexokinase and glucokinase. **(30 Marks)**

7.3 Explain diagrammatically the influence of "bile composition" on cholesterol crystallization in human gallbladder bile. **(50 Marks)**

8. **8.1** Diagrammatically show how stem cells develop into B and T cells. **(40 Marks)**

8.2 Give the biological properties of different classes of immunoglobulins. **(50 Marks)**

8.3 Which antigens are considered in "Tissue typing for transplantation"? **(10 Marks)**

9. **9.1** Give the major pathways of purine biosynthesis in brain cells. **(50 Marks)**

9.2 Explain how "Genetic stability" in human cells is maintained. **(50 Marks)**

10. A 40 year-old sedentary male weighing 70kg with height of 160cm sought health advice from a family physician. On investigation both of his waist and hip circumference were 100 cm. His body fat percentage and fasting plasma glucose were 32% and 145mg/dL. His dietary pattern reveals that he consumes 300, 60 and 40g of carbohydrate, fat and mixed protein per a day.

10.1 Explain and comment on his body composition based on the BMI and waist to hip ratio. **(20 Marks)**

10.2 Comment on the calories and ratio of macronutrients which he consumes. **(30 Marks)**

10.3 How many grams of carbohydrate, fat and protein should he consume to have ideal body weight in six months' time? **(30 Marks)**

10.4 Give the dietary advice to reduce his body fat percentage and plasma glucose level. **(25 Marks)**