

UNIVERSITY OF JAFFNA, SRI LANKA
 FIRST EXAMINATION FOR MEDICAL DEGREES (1ST) – MARCH 2018

BIOCHEMISTRY PART II

Date: 13.03.2018

Time: 3 Hours

Answer all 10 questions.

Marks allotted to each part are indicated in brackets.

Answer Part A and Part B in separate Answer Books

PART A

1.1 A 23 year old woman was depressed and had not eaten for two weeks. When she was hospitalized her plasma glucose concentration was within normal limit. She was given intravenous feeding and antidepressant medication, and subsequently switched to a 1800kcal diet. In this woman before admitted to the hospital,

1.1 List the hormones, which are responsible for the maintenance of blood glucose level within normal limit in this woman. (15 Marks)

1.2 Name the substrate(s) and energy source(s) in detail which were involved with the maintenance of blood glucose level. (20 Marks)

1.3 Explain the metabolic pathways which are responsible for the maintenance of blood glucose level. (65 Marks)

2. 2.1 Why a hypercholesterolemic patient is advised to avoid alcohol and smoking, and to go for regular exercise while avoiding cholesterol in his diet. (50 Marks)

2.2 Explain the role of Clofibrate in the treatment of hypercholesterolemia patient. (20 Marks)

2.3 Comment on the plasma HDL / LDL cholesterol ratio of the patient before and after Clofibrate treatment. (30 Marks)

3. 3.1 A new born baby had jaundice
- 3.1.1 Explain the reasons for this condition and the basis of the treatment given to such patient. (40 Marks)
- 3.1.2 Give the tests which you would perform with urine and blood to confirm the above mentioned condition. (30 Marks)
- 3.2 Inclusion of eicosapentaenoic acid (EPA) in the diet is useful to a myocardial infarct patient to reduce the risk of further heart attack. Explain. (30 Marks)

4. 4.1 An 8 year old boy infested with hookworm was anaemic.
- 4.1.1 What type of anaemia is he suffering from? (05 Marks)
- 4.1.2 Explain the expected changes in serum iron & TIBC. (15 Marks)
- 4.1.3 How do the above changes could lead to the type of anaemia? (15 Marks)
- 4.2 A 30 year old female from hill area of Sri Lanka had the plasma thyroxin level of 45nmol/l (normal level of thyroxin is 65 – 156 nmol/l). Intake of iodinated salt had improved her plasma total thyroxin level.
- 4.2.1 What are the causes of her condition and how did the intake of iodinated salt improve her condition. (20 Marks)
- 4.2.2 Show the formation of thyroxin in thyroid follicular cell with a labeled diagram. (45 Marks)

5. 5.1 5.1.1 Explain the biochemical basis of phenylketonuria. (30 Marks)
- 5.1.2 Give the biochemical basis of 'maple syrup urine' disease. (15 Marks)
- 5.2 Explain the biochemical basis of giving single intramuscular dose of vitamin K for a neonate. (25 Marks)
- 5.3 Explain the biochemical functions of thiamin. (30 Marks)

Part B

6. A 45 year old male bank officer was diagnosed to have type 2 diabetes. His weight and height were 80 kg and 160 cm respectively. The dietary analysis indicated that, daily he was consuming 400, 60 and 60g carbohydrate, fat and mixed protein respectively.

6.1 Comment on his calorie intake and nitrogen balance. (30 Marks)

6.2 Provide advice to this diabetic patient to have optimal weight for his height. (45 Marks)

6.3 Suggest a useful menu for a day. (25 Marks)

7. 7.1 Discuss the importance of enterohepatic circulation? (40 Marks)

7.2 More than 50% of the human cancers carry p53 gene mutation. Explain the role of p53 gene in "programmed cell death" and human cancers. (60 Marks)

8. 8.1 What is Multiple myeloma? (10 Marks)

8.2 Compare the serum protein electrophoretic pattern of a multiple myeloma patient with that of a normal person. (40 Marks)

8.3 Explain humoral immuno deficiency in multiple myeloma patients. (50 Marks)

9. 9.1 Explain how glucose-6- phosphatase deficiency causes gout? (40 Marks)

9.2 9.2.1 Show how *denovo* biosynthesis of Purine is controlled? (30 Marks)

9.2.2 Show how *denovo* biosynthesis of cholesterol is controlled at transcriptional level? (30 Marks)

10. 10.1 Diagrammatically show the "Termination" of protein synthesis. (20 Marks)
- 10.2 List 5 antibiotics, which inhibit protein synthesis with their site of action. (20 Marks)
- 10.3 DNA undergoes depurination at a rate of 5,000 to 10,000/cell/day at 37°C. Show the DNA repair mechanism, which is involved in the repair of the above changes. (20 Marks)
- 10.4 Cigarette smoke causes benzopyrene-guanine adducts in DNA. Show the mechanism which repairs the above changes in DNA. (40 Marks)