



FACULTY OF MEDICINE, UNIVERSITY OF RUHUNA  
Second Examination for Medical Degrees - June/July 2002  
BIOCHEMISTRY PAPER II

Friday 21<sup>st</sup> June, 2002

2.00 p.m - 5.00 p.m.

(3 hours)

Answer All Six Questions.

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

1. A sixteen year old girl with spherocytosis was jaundiced with enlargement of the spleen. Bilirubin was not present in the urine.

Plasma analyte	Patient's value	Reference range
(a) Total bilirubin	54 $\mu\text{mol/L}$	< 20
(b) Direct bilirubin	10 $\mu\text{mol/L}$	< 10
(c) Albumin	40 g/L	30 - 50
(d) Alanine transaminase	14 U/L	< 35
(e) Alkaline phosphatase	106 U/L	30 - 120

1.1 Explain results (a) to (e). (50 marks)

1.2 What is the type of hyperbilirubinaemia you expect to find in this patient ? (20 marks)

1.3 Would you expect to find urobilinogen in this patient's urine ?  
Explain your answer. (20 marks)

1.4 State one complication that could arise in this patient. (10 marks)

2 Give biochemical explanations.

2.1 Mutations caused by deletion or insertion of nucleotides in DNA would be more serious than mutations produced by substitution of a nucleotide. (50 marks)

2.2 Hb M is synthesized due to an unacceptable missense mutation. (50 marks)

3. 3.1 Explain the biochemical basis for the following manifestations in Fructose 1,6 - bisphosphatase deficiency.

3.1.1 Fasting hypoglycaemia (20 marks)

3.1.2 Lactic acidosis (20 marks)

3.1.3 Hyperalanaemia (20 marks)

3.2 Describe the dietary interventions for the above enzyme deficiency. (40 marks)

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4. 4.1
- 4.1.1 List three plasma proteins synthesized in the liver that have a role in transporting compounds in blood. (15 marks)
- 4.1.2 Explain the significance of this role. (60 marks)
- 4.2 List the methods used in the diagnosis of lipoprotein disorders, stating the advantages and disadvantages of each method. (25 marks)
5. Explain the biochemical basis of the following.
- 5.1 Many potential anticancer drugs are inhibitors of nucleotide biosynthesis. (25 marks)
- 5.2 Development of muscle cramps and tetany in a subject following total thyroidectomy. (25 marks)
- 5.3 Choline deficiency leads to development of fatty liver. (25 marks)
- 5.4 Vitamin A deficiency leads to poor dark adaptation and dry skin. (25 marks)
6. 6.1 A healthy adult man weighing 55 kg consumes a diet which includes 450 g carbohydrate, 75 g fat and 35 g fish protein. Is this diet adequate in calories and protein? Explain. (20 marks)
- 6.2 If the above adult is in nitrogen equilibrium, what changes would you expect if
- 6.2.1 fish protein is replaced with gelatin? (10 marks)
- 6.2.2 gelatin is added to fish protein diet? (10 marks)
- 6.3 What are the main considerations in planning
- 6.3.1 the diet of an obese diabetic? (20 marks)
- 6.3.2 the diet of a pregnant woman? (20 marks)
- 6.3.3 weaning diet of a six month old infant? (20 marks)

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