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**FACULTY OF MEDICINE, UNIVERSITY OF RUHUNA**  
**Second Examination for Medical Degrees – March 2012**  
**Biochemistry Paper II**

Tuesday 13<sup>th</sup> March 2012

2.00 p.m. – 5.00 p.m.

Answer All Six Questions.

(Three hours)

Answer each question in a separate book.

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

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1.
  - 1.1 State the lipoproteins present in a plasma sample in the fasting state. (10 marks)
  - 1.2 Explain the role of HDL in lipoprotein and cholesterol metabolism. (30 marks)
  - 1.3 Explain how lipid based energy is made available to tissues by the action of the following enzymes in the fed and the fasting states.
    - 1.3.1 Lipoprotein lipase (30 marks)
    - 1.3.2 Hormone sensitive lipase (30 marks)
  
2. Explain the following.
  - 2.1 Enzymes are used as therapeutic agents. (25 marks)
  - 2.2 Phospholipase A<sub>2</sub> action in a snake bite victim results in pain, inflammation and extensive haemolysis. (25 marks)
  - 2.3 Fluorouracil is used in combination with methotrexate in chemotherapy. (25 marks)
  - 2.4 Hyperglycaemia is the main cause for chronic complications of diabetes mellitus. (25 marks)
  
3.
  - 3.1 A 56 year old man with persistent lower back pain was found to have the following findings.

**Serum**

i. Total protein	102 g/L
ii. Albumin	33 g/L
iii. Serum protein electrophoretogram	Paraprotein band present between the $\beta$ - $\gamma$ region. $\gamma$ -region has very faint colour.

**Urine**

iv. Urine protein electrophoresis	A protein band parallel to the paraprotein band
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Explain the above findings (i) to (iv). (50marks)
  - 3.2 Describe the molecular mechanisms involved in the action of insulin. (25 marks)
  - 3.3 Explain why neonatal jaundice in the first 24 hours and beyond 10 days of birth needs to be investigated. (25 marks)

4. Explain the biochemical basis for the use of the following in hepatic encephalopathy.
- 4.1 Restriction of protein intake (25 marks)
  - 4.2 A glucose infusion with a thiamin preparation (25 marks)
  - 4.3 Lactulose (25 marks)
  - 4.4 L-ornithine L-aspartate (LOLA) (25 marks)
5. Explain the following.
- 5.1 Limited solubility of cholesterol in bile is a cause for gallstone formation. (25 marks)
  - 5.2 Neuropsychiatric symptoms and abdominal pain are common in uroporphyrinogen I synthase deficiency. (25 marks)
  - 5.3 Gel electrophoresis could be used to detect sickle cell disease. (25 marks)
  - 5.4 List the steps involved in amplifying an isolated human gene (isolated using *EcoRI*) using a plasmid containing an *EcoRI* site. (25 marks)
- 6.
- 6.1 Explain why certain nutrients are deficient in the diet of a pure vegetarian. (25 marks)
  - 6.2 Explain why low protein diet with a greater proportion of high quality protein is recommended for a patient with advanced renal disease. (25 marks)
  - 6.3 Describe the methods used in the assessment of nutritional status of an adult. (25 marks)
  - 6.4 Describe the basic characteristics of a weaning diet. (25 marks)

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