

UNIVERSITY OF JAFFNA  
FIRST EXAMINATION FOR MEDICAL DEGREES –MARCH 2011

**BIOCHEMISTRY PAPER II**

Date: 29.03.2011

Time: 3 Hours

Answer all TEN questions.

Answer Part A and Part B in separate answer books.

**PART A**

1. 1.1 List three tissues in an adult male where the pentose phosphate pathway is active. (15 Marks)
- 1.2 Discuss the significance of pentose phosphate pathway in the above mentioned tissues. (30 Marks)
- 1.3 The results of oral glucose tolerance test performed at the beginning and end of a course of trial with a plant extract are as follows:

		Time (h)				
		0	0.5	1.0	1.5	2.0
Glucose (mg/100mL)	Before treatment	140	250	270	240	200
	After treatment	110	170	150	140	130


**Explain**

- 1.3.1 Blood glucose values observed before the trial. (20 Marks)
  - 1.3.2 Blood glucose values after the trial. (15 Marks)
  - 1.3.3 How the plant extract may have brought about these changes? (20 Marks)
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2. 2.1 Give the steps involved in the
    - 2.1.1 formation of ketone bodies. (30 Marks)
    - 2.1.2 utilization of ketone bodies. (30 Marks)
  - 2.2 'Untreated severe diabetes mellitus leads to ketoacidosis'. Explain. (40 Marks)
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3. 3.1 Diagrammatically show the pathway of iodine metabolism in thyroid gland and indicate the points at which the antithyroid drugs and TSH act. (60 Marks)
  - 3.2 Explain how the serum iron level and total iron binding capacity of serum are affected in
    - 3.2.1 iron deficiency anaemia. (20 Marks)
    - 3.2.2 hepatic disease. (20 Marks)

4. Show how the following conversions are effected in the body. What is/are the biochemical importance of the product in each case?
- 4.1  $\alpha$ -Ketoglutarate to glutamate (30 Marks)  
 4.2 Tryptophan to serotonin (25 Marks)  
 4.3 Histidine to histamine (20 Marks)  
 4.4 Glucose to glycerol-3-phosphate (25 Marks)
5. 5.1 Explain with the help of a diagram how the hydroxylation of certain chemicals / drugs during their detoxification brings about de-repression of heme biosynthesis. (30 Marks)
- 5.2 Write short notes on  
 5.2.1 Cyclooxygenase – 2 (COX-2) (25 Marks)  
 5.2.2 Eicosanoids and reproductive system (25 Marks)  
 5.2.3 Isoenzymes of creatine kinase (20 Marks)
6. 6.1 A 55kg man in nitrogen equilibrium includes 350g (raw weight) of polished rice in his daily diet. Calculate how the approximate percentages of the followings are met by the rice component of his diet.  
 6.1.1 Calories (15 Marks)  
 6.1.2 Protein requirement (15 Marks)
- 6.2 What changes in nitrogen balance of the above individual would you expect if he increases the fish intake by 200g while keeping his diet isocaloric? (30 Marks)
- 6.3 How would you advice the above man to adjust his days' diet menu if he is diabetic. Explain with reasons. (40 Marks)

## PART B

7. 7.1 Give a condition in which serum amylase is elevated. (05 Marks)  
 7.2 Describe a test to measure serum amylase activity. (20 Marks)  
 7.3 Write short notes on structural alterations in chromosomes. (25 Marks)  
 7.4 Explain how insulin controls protein synthesis. (50 Marks)
8. 8.1 Schematically show the metabolism of vitamin D and explain its role in calcium homeostasis. (60 Marks)  
 8.2 Explain autoimmunity taking the followings as examples:  
 8.2.1 Type I diabetes (20 Marks)  
 8.2.2 Systemic lupus erythmatosus (20 Marks)

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9. 9.1 List three different inherited defects that lead to hyperuricemia and gout. **(15 Marks)**
- 9.2 Give the biochemical explanations for the above conditions. **(35 Marks)**
- 9.3 Show how Restriction Fragment Length Polymorphism could be used as the evidence of identity of the skeletal remains of a war victim whose wife and son are alive. **(50 Marks)**
10. 10.1 How will you measure glycemic index of a diet? **(30 Marks)**
- 10.2 "Exclusive breast feeding is recommended for growth, development and immunity of infants up to 4 months of age". Explain. **(40 Marks)**
- 10.3 Draw the serum protein electrophoretic pattern of a liver disease patient. **(20 Marks)**