

MANIPAL UNIVERSITY

FIRST MBBS DEGREE EXAMINATION – AUGUST 2007

SUBJECT: BIOCHEMISTRY – PAPER I (ESSAY)

Thursday, August 16, 2007

Time: 10:20 – 13:00 Hours.

Maximum Marks: 40

✍ All questions are compulsory. Write brief, clear, relevant and legible answers.

✍ Illustrate your answers with diagrams and flow charts wherever appropriate.

1. Explain gluconeogenesis pathway in liver from lactate to glucose. (5 marks)
2. Classify polysaccharides with examples. Add note on functions of any two. (1+1 = 2 marks)
3. How ketone bodies are formed and utilized? What is the significance of this pathway in fasting state? (3+1 = 4 marks)
4. Name two phospholipids, give their composition and functions. (2 marks)
5. Explain catabolism of tryptophan and formation of specialized compounds from it. (5 marks)
6. Explain transamination reaction with example and give its importance. (1+1 = 2 marks)
7. Describe salient features of competitive enzyme inhibitors with two clinically useful examples. (2+2 = 4 marks)
8. Explain biochemical reasons for the following:
 - 8A. Arginine and lysine content of protein increases its isoelectric pH.
 - 8B. Branched chain amino acid residues in proteins are buried in the interior.
 - 8C. In cirrhosis, plasma albumin is reduced.
 - 8D. Chymotrypsin cuts proteins more frequently when aromatic amino acid content is higher. ($\frac{1}{2} \times 4 = 2$ marks)

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9. Give diagnostic importance of the following investigations in serum/blood.

9A. Amylase.

9B. Acid phosphatase.

9C. Creatine kinase (MB) isoenzyme.

9D. Fasting blood glucose.

($\frac{1}{2} \times 4 = 2$ marks)

10. Enumerate enzyme defects and features of the following:

10A. Maple syrup urine disease.

10B. Galactosemia.

10C. Gaucher's disease.

10D. Refsum's disease.

($1 \times 4 = 4$ marks)

11. Write short notes on:

11A. Secondary structure of proteins.

11B. Glutathione.

11C. Chylomicrons.

11D. S-adenosyl methionine.

($2 \times 4 = 8$ marks)



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SUBJECT: BIOCHEMISTRY – PAPER II (ESSAY)

Friday, August 17, 2007

Time: 10:20–13:00 Hours

Maximum Marks: 40

- ✗ All questions are compulsory. Write brief, clear, relevant and legible answers.
✗ Illustrate your answers with diagrams and flow charts wherever appropriate.

1. Describe the process of protein synthesis in prokaryotes. Indicate the differences between prokaryotic and eukaryotic protein synthesis.
(4+1 = 5 marks)
2. Write the reactions involved in the formation of heme. Porphyrins are exacerbated by the ingestion of drugs which induce the microsomal enzymes. Explain.
(4+1 = 5 marks)
3. Describe the metabolic roles of thiamine and pyridoxine with suitable examples.
(4 marks)
4. Define positive and negative nitrogen balance with examples. A combination of cereals and pulses improves the biological value of both. Explain.
(2 marks)
5. A type 1 diabetic patient has been brought to the casualty in a comatose state with the breath smelling of acetone. What is the acid base disturbance you expect in this patient? What are the compensatory mechanisms that would be active in the patient?
(2 marks)
6. The composition of the cell membrane affects its fluidity. Explain.
(2 marks)
7. A patient has come to the outpatient department with yellowish discoloration of the skin and sclera. The physician suspects the patient has viral hepatitis. What are the biochemical investigations that would be performed in this patient and what changes do you expect if it is viral hepatitis?
(2 marks)

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8. Enumerate the functions and the deficiency manifestations of:

- i) Copper.
- ii) Zinc.
- iii) Fluoride.

(3 marks)

9. Describe the role of helicase and single strand binding proteins in replication with the help of a diagram.

(2 marks)

10. Which are the techniques in molecular biology available for the diagnosis of sickle cell anemia? Describe in detail any one of them.

(3 marks)

11. Define a radioisotope. Describe four applications in medicine of specific radioisotopes.

(2 marks)

12. Give reasons for the following:

12A. Vitamin K injection improves the prothrombin time in patients with obstructive jaundice.

12B. A single t-RNA can bind to more than one codon.

12C. Mutation of UAA codon to UAG codon does not change the sequence of the protein.

12D. Mutation of a ras proto-oncogene causes uncontrolled cell division.

12E. Hyperuricemia is observed in patients with very low activity of hypoxanthine guanine phosphoribosyl transferase.

12F. Azaserine is used as an anticancer agent.

12G. Atrophic gastritis can cause both iron and vitamin B₁₂ deficiency.

12H. Bone osteoclastic activity is increased in patients with chronic renal failure.

(1×8 = 8 marks)

