

Reg. No. :

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**T 3902**

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

Annual Pattern – First Year

Biotechnology

BT1X01 — BIOCHEMISTRY – I

(Regulation 2004)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the major biomolecules, which helps microorganisms to multiply? Explain with examples.
2. Differentiate the terms isotonic, hypertonic and hypotonic and its impact on the biological systems.
3. What is the concentration of  $H^+$  in a solution of 0.1 M NaOH?
4. Name an amino acid found in proteins that can be converted by treatment with strong base into another amino acid found in proteins.
5. What are the different forms of proteins? Give examples.
6. What do you understand about alpha and beta keratins and how they differ in their structures?
7. Define isoelectric pH of the proteins.
8. A pure enzyme was found to contain 1.65% leucine and 2.48% isoleucine by weight. Calculate its minimum molecular weight.
9. Differentiate, saturated and unsaturated fatty acids with example and write in two lines how fatty acids are essential for us.
10. What are Terpenes?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Calculate the pH of a dilute solution that contains a molar ratio of potassium acetate to acetic acid ( $pK_a=4.76$ ) of (1) 2:1 ; (2) 1:3; (3) 5:1; (4) 1:1; (5) 1:10. (10)
- (ii) The pH of a 0.01 M solution of a given acid, HA is 3.80. Calculate  $K'$ , and  $pK'$  of the acid. (6)

Or

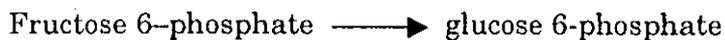
- (b) Write short notes on structure of fibrous protein, keratin with their helical patterns and arrangement of molecules. (16)
12. (a) (i) How proteins can be separated based on electric charge? (8)
- (ii) Write short notes on role of chromatography technique in separation of proteins. (8)

Or

- (b) How glucose can be destructed biochemically? Explain each step individually and provide the quantity of energy consumed and released during the destruction. (16)
13. (a) (i) Define oxidation.
- (ii) Define reduction.
- (iii) Briefly explain the oxidation – reduction reactions using enzymes.
- (iv) About Electron Transport. (2 + 2 + 6 + 6)

Or

- (b) (i) In the following interconversion, which occurs in glycolysis



$K_{eq} = -1.97$

- (1) What is  $\Delta G^\circ$  for the reaction (at 25 C)?
- (2) If the concentration of fructose 6-phosphate is adjusted to 1.5 M and that of glucose 6-phosphate is adjusted to 0.50 M, what is  $\Delta G$ ?
- (3) Why are  $\Delta G$  and  $\Delta G^\circ$  different? (5 + 5 + 2)
- (ii) Why citric acid cycle components are more important biosynthesis intermediates? (14)

14. (a) (i) Paper electrophoresis at pH 6.0 was carried out on a mixture of glycine, alanine, glutamic acid, lysine, arginine and serine.

(1) Which compounds moved fastest toward the anode?

(2) Which moved fastest toward the cathode?

(3) Which remained at or near the origin? (3 + 3 + 2)

(ii) What are the three major types of ribonucleic acids? Explain any one in detail. (8)

Or

(b) (i) Write short notes on oligomeric proteins.

(ii) How will you confirm the sickle hemoglobin?

(iii) Discuss Dissociation and Denaturation of Oligomeric proteins. (5 + 5 + 6)

15. (a) Discuss the following :

(i) Biosynthesis of Triacylglycerols.

(8 × 2)

(ii) Cholesterol Biosynthesis.

Or

(b) (i) Explain in detail the pathway of electron transport.

(ii) What are the three major types of ribonucleic acids? Explain any one in detail. (8 + 8)