

[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 3016

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Unique Paper Code : 2173522009

Name of the Paper : DSE: Biomolecules – II

Name of the Course : **B.Sc. (Prog)**

Semester : IV / VI

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. **All** questions have equal marks.
3. Attempt any **four** questions in all.

Q1. (a) What are enzymes? Discuss briefly the classification of enzymes with examples.

(b) Define the isoelectric point (pI). The given pK_a value of α -carboxyl, the α -amino group and the side chain amino group of lysine are 2.18, 9.06 and 10.54 respectively, calculate pI and discuss its electrophoretic behaviour.

(c) How does carboxypeptidase enzyme help with peptide chain C-terminal residue analysis? Explain with the help of reaction.

(d) Explain caloric value of food and discuss the standard caloric content per gram for different food types.

(4, 4, 4, 3)

Q.2. (a) Describe ATP hydrolysis and discuss its biological significance.

(b) Explain the difference between a competitive and non-competitive enzyme inhibition with example?

(c) What is DCC and what role does it play in peptide synthesis? Discuss with an example.

(d) Define essential amino acids? Name any two giving their structure. (4, 4, 4, 3)

Q.3. (a) Match the following (Any four):

(i) Ribozyme

(A) Electron acceptor to NADH

(ii) Glycolysis

(B) Non-competitive site binding

(iii) t-butyloxycarbonyl (t-BoC)

(C) 2 ATP net, 2 NADH

(iv) NAD^+

(D) Phenylisothiocyanate

(v) Edman reagent

(E) Acid-labile N-protection

(vi) Allosteric

(F) Catalytic RNA

(b) Outline β -oxidation link to Krebs cycle for fatty acid catabolism.

P.T.O.

- (c) Explain temperature and pH effects on enzyme activity with bell-shaped curve graphs.
- (d) Distinguish catabolism (exergonic) and anabolism (endergonic) with energy flow diagram. (4, 4, 4, 3)

Q.4 (a) Compare the role of NAD^+ and FAD as electron carriers in cellular respiration. Mention the type of reactions they usually participate in and where they are regenerated.

- (b) Discuss the Edman's method in primary structure determination of Peptides.
- (c) Describe the principle of the ninhydrin test and write the general reaction showing the formation of the characteristic colour.
- (d) Define the caloric value of food and state the standard caloric contents (kcal/g) of carbohydrates, proteins, and fats. (4, 4, 4, 3)

- Q.5 (a) What do you mean by Active site of Enzymes? What are the main characteristics of the active site?
- (b) Discuss the Merrifield synthesis of polypeptides. Write the advantages associated with the solid-phase peptide synthesis?
- (c) Fill in the blanks with appropriate word:
- (i) High-energy phosphate bond compound is known as
 - (ii) is a process of anaerobic production of ethanol from glucose.
 - (iii) An organic cofactor like FAD (flavin adenine dinucleotide) is called a
 - (iv) At pH 6, basic amino acids migrate toward the..... in electrophoresis.
- (d) Explain the fate of pyruvate under anaerobic conditions in muscle cells and yeast, respectively? (4, 4, 4, 3)

Q.6. (a) Write short note on the following with suitable reactions (**any three**):

- (i) Glycolysis- overview and significance
- (ii) Denaturation of proteins
- (iii) Gabriel Phthalimide synthesis
- (iv) Structure-activity relationship (SAR) of drug molecules

(b) Describe the role of FAD as an organic cofactor (coenzyme) in metabolic reactions?

(3 x 4, 3)