

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1370

I

Unique Paper Code : 2492011102

Name of the Paper : Proteins (DSC-2)

Name of the Course : **B. Sc. (H) Biochemistry**

Semester : I

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. There are **6** questions.
3. Attempt any **4** questions.
4. **All** questions carry equal marks. Question no. **1** is compulsory.

P.T.O.

1. (a) Justify the following statements (**any five**) :

- (i) Glycine and Proline are often present at turns of polypeptide chain.
- (ii) Negatively charged and positively charged amino acids are often present near the amino and Carboxy terminal end of the helical segment respectively.
- (iii) Iron should be present in ferrous form in heme part of the hemoglobin.
- (iv) Rotation around peptide bond is restricted.
- (v) Fetal Hb has high affinity for oxygen binding as compared to adult.

(vi) Collagen forms left handed alpha-helix secondary structure.

(b) Define the following proteins with example.

(i) Conjugated proteins

(ii) Multimeric proteins

(iii) Fibrous proteins

(iv) Membrane proteins

(v) Globular proteins (10,5)

2. (a) Differentiate the following :

(i) Parallel and Antiparallel β -pleated sheets.

(ii) Protein sequence and structure databases.

(iii) Conceited and sequential model.

(iv) R and T-state of Hb.

(v) Motif and Domain.

(b) What are the important features of peptide bond?

(c) Mention the effects of following chemicals on protein structure/functions :

(i) Hydrazine

(ii) Performic acid (10,3,2)

3. (a) Describe the steps involved in the synthesis of a dipeptide Gly-Ala using Solid-Phase Peptide synthesis.

- (b) Discuss the various accessory proteins/enzymes involved in protein folding and prevent their misfolding or aggregation.
- (c) Discuss the contributions of following Scientists :
- (i) Linus Pauling
 - (ii) Frederick Sanger
 - (iii) Robert Bruce Merrifield
 - (iv) John Kendrew
 - (v) Christian Anfinsen (5,5,5)
4. (a) Define the cooperativity effect. Discuss the effect of following on binding of oxygen to hemoglobin:
 CO_2 . BPG. H^+ .

- (b) Describe the structure and function of α -Keratin.
- (b) Proteins are diversified in their Biological functions. Explain. (6,5,4)
5. (a) Discuss the experiment which explained that primary structure of proteins contains all the necessary information of protein folding.
- (b) Mention the important forces/bonds responsible for stabilizing the protein structure.
- (c) Determine the sequence of small peptide based on the following observations :
- (i) Complete hydrolysis revealed that heptapeptide peptide contain following amino acids: Val, Asp, Lys, Met, Gly, Leu.

(ii) Reaction with Edman reagent gives PTC-Val adduct formation.

(iii) CNBr treatment released :

(i) Tetrapeptide having Val, Met, Lys and Asp.

(ii) Dipeptide having Gly and Met.

(iii) Free amino acid was released as Leu.

(d) Trypsin treatment released :

(i) Tripeptide containing Val, Lys and Asp

(ii) Tetrapeptide containing Gly. Leu and Met (5,6,4)

6. Write short note on :

(i) Ramachandran plot

- (ii) Alzheimer's Disease
- (iii) Supersecondary structures
- (iv) Sickle cell Anaemia
- (v) Mb structure (15)