Register Number: ……..

B.TECH DEGREE EXAMINATIONS: APRIL/ MAY2012

Sixth Semester

BIOTECHNOLOGY

BTY119: Protein Engineering

Time: Three hours **Maximum Marks: 100**

Answer All the Questions:-

PART A (10 x 1 = 10 Marks)

1. Phosphorylation of proteins occurs in which of the following amino acid side chain

A. Serine B. Leucine C. Phynylalanine D. Methionine

2. Separation of proteins in 2D gel electrophoresis is based

A. Charge B. Relative mass and charge

C. Relative molecular Weight D. relative atomic weight of amino acids

3. Which one of the following in not a super secondary structure of proteins?

A. Zinc finger B. Hairpin motif C. Greek key motif D. Beta-alpha-beta motif

4. MALDI-ToF MS helps to determine which of the following nature of proteins?

A. Alpha helix B. Super secondary structures

C. Secondary structure D. Tertiary structure

5. Amino acid which prmotes alpha-helix formation is _____

A. Proline B. Leucine C. Aspartic acid D. Glutamic acid

6. Which of the following technique helps to predict the 3D structures of proteins in liquid state?

A. NMR B. X-ray C. MALDI ToF D. MS-MS

7. Total number of polypeptides in photosynthetic reaction center are

A.2 B.3 C. 4 D. 6

8. ……is found in bacteriorhodopsin

A. Retinol B. Pheophytin C. Chlorophyll D. Carotene

9. To increase thermal stability of enzymes which of the following covalent bonds have to be introduced?

A. S-S bonds B. Van Der Waals Bonds C. Hydrogen bonds D. Ionic bonds

10. Insulin aggregation is prevented by changing _____ amino acid of the native insulin?

A. Proline B. Serine C. Glycine D. Alanine

PART B (10 x 2 = 20 Marks)

11. Write the structure of a tripeptide in which glycine is one of the amino acid.
12. Define isoelectric point of a protein.
13. Differentiate primary from secondary structure of proteins.
14. What are the contributions of Fred Sanger in protein chemistry?
15. Write a note on structural features of the peptide bond
16. Comment on "Loop regions appears always at the surface of a protein".
17. What are the functions of Cro protein and repressor proteins in gene expression?
18. Classify proteases based on their amino acids at their active site
19. List out the methods by which a protein can be engineered to enhance its properties.
20. Name any two proteins used for diagnostics and therapeutics.

PART C (5 x 14 = 70 Marks)

21. a) (i) Write the steps involved in 2D gel electrophoresis techniques to characterize a protein in terms of its isoelectric point and molecular weight. (7)

(ii) Write a Ramachandran plot of a protein. (7)

(OR)

b) (i) How would disulfide bonds contribute to the protein's stability? (4)

(ii) Discuss in detail on the role of different non-covalent interactions in protein structure and function. (10)

22. a) (i) Write in detail on high through-put protein sequencing using MALDI-ToF MS.

(OR)

b) (i) Write a brief note on nucleotide binding proteins. (7)

(ii) How glycine and proline have an opposite effects on protein stability. (7)

23. a) (i) Discuss in detail on protein folding with suitable examples. (10)

(ii) What is the fate of protein if it is misfolded? (4)

(OR)

b) How is X-ray diffraction techniques used to determine the 3D structure of proteins and a note on its limitations.

24. a) (i) Write a note on the formation of antigen-binding site in immunoglobulins. (7)

(ii) Elaborate on the role of eukaryotic transcription factors in gene expression. (7)

(OR)

b) (i) What are the structural features required for the catalytic action of proteases? (7)

(ii) Write a note on formation of tetrahedral intermediates during protease active proteins. (7)

25. a) (i) Discuss any TWO methods of protein engineering with underlying principle. (7)

(ii) Write a note on engineered lysozymes for specific applications (7)

(OR)

b) Write a note on the following

(i) Abzymes

(ii) HIV proteases

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