Register No: ……..

B.TECH. DEGREE EXAMINATIONS: APRIL/MAY 2011

Sixth Semester

BIOTECHNOLOGY

U07BT603: Protein Engineering

Time: Three Hours **Maximum Marks: 100**

Answer ALL questions:-

PART A (10 x 1 = 10 Marks)

1. Which of the following is **not** an amino acid?
   a) glutamic acid b) aspartic acid c) glutamine d) palmitic acid
2. What type of covalent bonds link the amino acids in a protein?
   a) peptide bonds b) hydrogen bonds c) ionic bonds d) glycosidic bonds
3. Which one of the following is not required for studying protein structure
   a) X-ray crystallography b) Nuclear Magnetic Resonance c) ESR d) HPLC
4. Acids and bases denature a protein by disrupting
   a) Peptide bonds and ionic bonds b) Hydrophobic interactions and peptide bonds
   c) Ionic bonds and hydrogen bonds d) covalent bonds and alkene bonds
5. How many aminoacyl residues are involved in a β turn?
   a) One b) Zero c) Four d) Two
6. In the zinc fingers motif, the spacing of the helical segments is performed by
   a) Beta sheets b) Helical clusters c) Zinc atoms d) Alpha helix
7. A form of binding motif containing a nearly identical sequence of 60 amino acids in many eukaryotes is the
   a) Homeodomain motif b) Zinc finger motif c) Leucine zipper motif d) Universal motif
8. Which of the following is not structural motif encountered in DNA binding proteins?
   a) Helix-turn-helix b) Zn fingers c) β barrel d) Leucine Zippers
9. What is the molecular target for the vinca alkaloids used as anticancer agents?
   a) The transport protein for serotonin b) DNA c) Cell membrane d) Tubulin
10. What is meant by a binding site?
    a) The area of a macromolecular target that is occupied by a drug when it binds.
    b) The portion of the drug to which a drug target binds.
    c) The functional groups used by a drug in binding to a drug target.
    d) The bonds involved in binding a drug to its target.

PART B (10 x 2 = 20 Marks)

11. Differentiate between covalent bonds and hydrogen bonds
12. Explain the interaction of UV Rays on protein and its application.
13. Define Glycosylation.
14. Define pKa value. Give an example
15. Comment on Edmann degradation.
16. What are TIM barrel structures?
17. What are Leucine zippers?
18. Write down the sub types of Immunologlobulins.
19. Give two examples for engineered proteins.
20. List out the tools essential for studying recombinant proteins.

PART C (5 x 14 = 70 Marks)

21. a) Describe different types of protein structures.

(OR)

b) Explain in detail on the different types of bonds and energies in protein make up.

22. a) Describe the classification of amino acids? Add a note on three and single letter codes of amino acids

(OR)

b) Give an account on the peptide synthesis in prokaryotes and detail about the Post – translational modification with illustrations.

23. a) Describe the super secondary structural organizations of the Alpha helix and the Beta sheet.

(OR)

b) Write short notes on:

(i) Protein folding (4)

(ii) Domain (3)

(iii) Modular Nature (3)

(iv) Motif (4)

(v) alpha hairpin (3)

24. a) Explain in detail the structure and mechanism of action of cro protein.

(OR)

b) Give an account on the structure – function relationship of Serine protease

25. a) Explain the different strategies used for de novo protein design about the drug design using different protein database.

(OR)

b) With suitable illustrations describe the different methods of protein engineering.

****