KUMARAGURU college of technology
character is life

Register Number: ……..

B.TECH DEGREE EXAMINATIONS: MAY 2015

(Regulation 2009)

Sixth Semester

BIOTECHNOLOGY

BTY119:Protein Engineering

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Identify the strongest form of intermolecular bonding that could be formed involving the residue of the amino acid tyrosine.
   a) Ionic bond
   b) Hydrogen bond
   c) Van der waals interactions
   d) None of the above
2. Amino acids with hydroxyl groups are
   a) Serine and alanine
   b) Alanine and valine
   c) Serine and threonine
   d) Valine and isoleucine
3. Identify which of the following terms refers to the arrangement of different protein subunits in a multiprotein complex
   a) Primary structure
   b) Secondary structure
   c) Tertiary structure
   d) Quarterny structure
4. The first protein sequenced by Sanger is
   a) Haemoglobin
   b) Myoglobin
   c) Insulin
   d) Myosin
5. An average protein will not be denatured by
   a) a detergent like sodium dodecyl sulfate
   b) heating to $90^{o}C$
   c) Iodoacetic acid
   d) pH10

6. Chaperone proteins function by
   a) Providing a protective environment in which proteins can fold properly
   b) Degrading proteins that have folded improperly
   c) Providing template for how the proteins should fold
   d) Rescuing proteins that folded incorrectly and allowing them to refold into proper configuration
7. Nuclear receptors belong to which class of transcription factor?
   a) Receptors
   b) cell surface markers
   c) spectrins
   d) transport proteins
8. Stabilization of phage T4 lysozyme is by engineered
   a) Disulfide bonds
   b) Hydrogen bonds
   c) Ionic bonds
   d) Covalent bonds
9. Nuclear receptors belong to which class of transcription factor?
   a) Helix-loop-helix proteins
   b) Helix-turn-helix proteins
   c) Leucine zipper proteins
   d) Zinc finger proteins
10. Which of the following enzymes is responsible for processing HIV proteins during the production of new viruses?
   a) Integrase
   b) Protease
   c) Reverse Transcriptase
   d) DNA polymerase

PART B (10 x 2 = 20 Marks)

11. How does 3’ polyadenylation occur in mRNA processing?
12. Glycine is present in the disallowed region of Ramachandran plot – Substantiate the statement.
13. State importance of TIM barrel structure
14. Summarize peptide mapping
15. List out the functions of molecular chaperons in protein folding
16. Define modular design in proteins.
17. What are abzymes?
18. Name the two strategies involved in design of peptide synthesis by stabilized trypsin.

19. Example for advancement in protein engineering is development of modified insulin – substantiate the above statement.

20. Mention the significance of aspartyl protease in AIDS

PART C (5 x 14 = 70 Marks)

21. a) (i) Describe the various non-covalent interactions involved in protein – protein interactions (7)

(ii) Explain the principle and process of 2-D electrophoresis with a neat sketch. (7)

(OR)

b) (i) Write short notes on post translational modifications involving amino group (10)

(ii) Describe in detail about the Ramachandran Plot with special reference to the allowable and disallowable regions (4)

22. a) (i) Explain in detail about the process of High throughput protein screening using MALDI – TOF (7)

(ii) With the aid of a neat sketch elucidate the various super secondary structures formed by α helices (7)

(OR)

b) (i) Give a brief note on the various steps involved in Edman sequencing (7)

(ii) Describe the significance of nucleotide binding folds with special reference to Rossmann fold. (7)

23. a) (i) Explain in detail about the process of protein folding. (10)

(ii) With a neat sketch explain the working principle of NMR. (4)

(OR)

b) (i) X- Ray diffraction is used to determine the 3 D structure of the protein – substantiate the above statement. (4)

(ii) Write about the quarternary structure of proteins with special reference to Haemoglobin. (10)

24. a) (i) Describe the structural features of Zn finger proteins. (4)

(ii) Explain the general characteristics of membrane proteins quoting fluid mosaic model of membrane. (10)

(OR)

b) Explain the structural features of cro protein & lambda repressor.

25. a) Describe the methods to change primary structure of a protein.

(OR)

b) (i) How is insulin aggregation prevented? (4)

(ii) How *de novo* protein design is carried to create a novel protein molecule? (10)

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