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Total Number of Pages : 02

B.Tech
PBT6D001

6th Semester Regular Examination 2018-19
PROTEIN ENGINEERING AND STRUCTURE ANALYSIS
BRANCH : BIOTECH
Time : 3 Hours
Max Marks : 100
Q.CODE : F910

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part- I

Q1 Only Short Answer Type Questions (Answer All-10) (2 x 10)

- a) What do you understand by chemical denaturation? How it is different from thermal denaturation?
- b) What is DNA shuffling?
- c) Write two important applications of protein engineering.
- d) What is the fate of a protein if it is misfolded?
- e) Mention any two reagents used for denaturing the proteins and outline their mode of action.
- f) What do you mean by 'cotton effect' in circular dichroism?
- g) Write any two methods to increase enzyme stability and specificity.
- h) What do you mean by molecular chaperons? Write the importance of Hsp 70 chaperone system.
- i) State the principle of solvent perturbation technique?
- j) What is meant by rational protein design?

Part- II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- a) Distinguish between calorimetric and viscometric methods for protein estimation.
- b) What are the properties of an enzyme that can be changed in newly designed protein?
- c) Explain in detail the different types of super secondary structure found in protein with suitable examples?
- d) Write notes on engineered lysozyme for specific applications?
- e) How to apply liquid chromatography in proteomics for protein separation?
- f) Illustrate with examples the computational approaches to protein engineering.
- g) Briefly explain protein structure-function relationship.
- h) How X-ray diffraction technique used to determine protein structure? Write its limitation.
- i) Explain 2-D gel electrophoresis and its biological significance.
- j) Explain the mechanism of stabilization of proteins from psychrophiles and thermophiles.
- k) Write in detail the role of different non-covalent interaction in protein structure and function?
- l) Discuss the role of EPR in protein structure and function analysis with example.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 What is Ramachandra plot? How it is involved in protein structure validation? **(16)**

Q4 Briefly explain the principle, instrumentation and applications of spectroscopy for protein analysis. **(16)**

Q5 What do you mean by site directed mutagenesis? Briefly explain the various methods of site directed mutagenesis used for genetic engineering of novel protein. Add a note on the strategies of selection of mutants. **(16)**

Q6 Describe in detail thermodynamic laws and principles involved in protein stability and flexibility? **(16)**