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**GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022**

**B. Tech Degree Examinations, May – 2021**

**(Eighth Semester)**

**BBTPE8021– PROTEIN ENGINEERING**

**(Biotechnology)**

Time: 2 hrs

Maximum: 50 Marks

**Answer ALL Questions**

**The figures in the right hand margin indicate marks.**

**PART – A: (Multiple Choice Questions)**

**(1 x 10 = 10 Marks)**

**Q.1. Answer ALL questions**

[CO#] [PO#]

- |   |     |     |
|---|-----|-----|
| a. Which structure of a protein is the arrangement of protein subunits in a multi-subunit complex?              | CO1 | PO1 |
| (i) quaternary  |     |     |
| (ii) primary  |     |     |
| (iii) secondary   |     |     |
| (iv) tertiary   |     |     |
| b. Beta-sheets allowed region is present in which of the following quadrants of Ramachandran plot?              | CO1 | PO1 |
| (i) First quadrant  |     |     |
| (ii) Second quadrant  |     |     |
| (iii) Third quadrant  |     |     |
| (iv) Fourth quadrant  |     |     |
| c. Pure water is known to be which of the following?  | CO2 | PO1 |
| (i) Weak electrolyte  |     |     |
| (ii) Strong electrolyte   |     |     |
| (iii) Neither weak nor strong   |     |     |
| (iv) Not an electrolyte   |     |     |
| d. Which of the following forces is favorable for protein folding?  | CO2 | PO1 |
| (i) Hydrophobic interactions  |     |     |
| (ii) Hydrogen bonding   |     |     |
| (iii) Vander Waals forces   |     |     |
| (iv) Ionic bonding  |     |     |
| e. The temperature that allows for most rapid growth during a short period of time is known as _____            | CO3 | PO1 |
| (i) Minimum Temperature   |     |     |
| (ii) Maximum Temperature  |     |     |
| (iii) Optimum Temperature   |     |     |
| (iv) Growth Temperature   |     |     |
| f. Which of the following is done for the directed evolution of the proteins with an unknown structure?         | CO3 | PO1 |
| (i) Site-directed mutagenesis   |     |     |
| (ii) Specific mutations   |     |     |
| (iii) Non-random mutations  |     |     |
| (iv) Random changes (mutations)   |     |     |
| g. Which of these are not the hydrolytic enzymes of lysosome?   | CO3 | PO1 |
| (i) Lipases   |     |     |
| (ii) Sulfatases   |     |     |
| (iii) Phosphatases  |     |     |
| (iv) Aldolase   |     |     |
| h. X-ray crystallography uses which characteristic of light?  | CO4 | PO1 |
| (i) Polarization  |     |     |
| (ii) Interference   |     |     |
| (iii) Diffraction   |     |     |
| (iv) Coherency  |     |     |
| i. What is the wavelength range for UV spectrum of light?   | CO4 | PO1 |
| (i) 400 nm – 700 nm   |     |     |
| (ii) 700 nm to 1 mm   |     |     |
| (iii) 0.01 nm to 10 nm  |     |     |
| (iv) 10 nm to 400 nm  |     |     |
| j. Which of the following is a technique for the determination of the three-dimensional structure of a protein? | CO4 | PO1 |
| (i) Gas chromatography  |     |     |
| (ii) Mass spectroscopy  |     |     |
| (iii) Radiotherapy  |     |     |
| (iv) NMR spectroscopy   |     |     |

**PART – B: (Short Answer Questions)****(2 x 5 = 10 Marks)**Q.2. Answer ALL questions

[CO#] [PO#]

- |   |     |     |
|---|-----|-----|
| a. What are the methods involved in Protein-protein interactions? | CO1 | PO1 |
| b. What are forces involved in DNA-protein interactions?          | CO1 | PO1 |
| c. Define Protein denaturation                                    | CO2 | PO1 |
| d. What is lysozyme?  | CO3 | PO1 |
| e. Write a note on principle of Circular Dichorism?               | CO4 | PO1 |

**PART – C: (Long Answer Questions)****(6 x 5 = 30 Marks)**Answer ANY FIVE questions

Marks [CO#] [PO#]

- |   |       |     |           |
|---|-------|-----|-----------|
| 3. What is protein engineering and its applications?  | 6     | CO1 | PO1, PO12 |
| 4. What is Protein-DNA Interaction? What are the methods used to study protein-DNA interaction? | 2 + 4 | CO1 | PO1, PO12 |
| 5. Write a note on protein stability and how it is measured?                                    | 6     | CO2 | PO1, PO12 |
| 6. Write a note on solvent perturbation?  | 6     | CO2 | PO1, PO12 |
| 7. What are the approaches to protein engineering?  | 6     | CO3 | PO1, PO12 |
| 8. Write a note on applications of Industrial important engineered enzymes?                     | 6     | CO3 | PO1, PO12 |
| 9. Explain Electrophoresis and its types.   | 6     | CO4 | PO1, PO12 |
| 10. Explain XRD and its role in protein structure prediction?                                   | 6     | CO4 | PO1, PO12 |

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