

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur (GIET University)



B. Tech (Eighth Semester - Regular) Examinations, April - 2026

22BBTOE48011 - Protein Engineering

(Biotechnology)

Time: 3 hrs

Maximum: 70 Marks

(The figures in the right hand margin indicate marks)

PART – A

(2 x 5 = 10 Marks)

Q.1. Answer **ALL** questions

	CO #	Blooms Level
a. Predict the effect of temperature change on protein stability.	CO1	K3
b. Why are hydrophobic interactions weakened by chemical denaturants?	CO2	K4
c. Name one industrial application of engineered protease.	CO3	K2
d. How UV–Vis spectroscopy is used to estimate protein concentration?	CO4	K3
e. Explain how electrophoresis separates proteins.	CO4	K2

PART – B

(15 x 4 = 60 Marks)

Answer **ALL** the questions

	Marks	CO #	Blooms Level
2. a. Describe the hierarchical levels of protein structure.	8	CO1	K1
b. Analyze the different techniques to determine the Protein-DNA interaction with diagram.	7	CO1	K4
(OR)			
c. Evaluate the relative importance of different intermolecular forces in determining protein stability.	8	CO1	K5
d. Explain, how Ramachandran plot determines the protein secondary structure with suitable diagram.	7	CO1	K2
3.a. Mention the process for reversible folding and unfolding of proteins.	8	CO2	K1
b. Illustrate the techniques of Chemical modification of Protein.	7	CO2	K1
(OR)			
c. How protein structure is affected by different factors? Explain.	8	CO2	K3
d. Discuss the methods of stabilization of engineered protein.	7	CO2	K2
4.a. Design a rational protein engineering approach to improve enzyme thermostability	8	CO3	K6
b. Evaluate the effectiveness of site-directed mutagenesis in improving protein stability and function.	7	CO3	K5
(OR)			
c. Evaluate the advantages of module shuffling compared to site directed mutagenesis.	8	CO3	K5
d. Explain the role of computational methods in predicting protein structure and designing improved proteins.	7	CO3	K3
5.a. Explain the principle of X-ray crystallography and analyze its importance in determining three-dimensional protein structures.	8	CO4	K4
b. Explain the principle of UV–Visible spectroscopy and give its applications in protein quantification and structure analysis.	7	CO4	K3
(OR)			
c. Evaluate the importance of SDS-PAGE in determining protein molecular weight and purity.	8	CO4	K5
d. Explain the principle of infrared spectroscopy and its applications in studying protein functional groups.	7	CO4	K2

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