

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -I EXAMINATION- 2025

M.Sc.- II Semester (Biotechnology)

COURSE CODE (CREDITS): 20MS1WBT233 (02)

MAX. MARKS: 15

COURSE NAME: Protein Engineering

COURSE INSTRUCTORS: Dr. Saurabh Bansal

MAX. TIME: 1 Hour

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems.

Q. No.	Question	Marks
Q1	What is protein engineering, and what are its main goals?	1
Q2	What are the key steps involved in protein engineering of an enzyme? Draw a self-explanatory flow chart.	1
Q3	What are the different approaches to protein engineering? Explain one approach in detail.	2
Q4	What are unnatural amino acids (UAAs)? What advantages do UAAs offer over natural amino acids in protein engineering?	3
Q5	What are the challenges associated with incorporating UAAs into proteins and describe one method used to successfully integrate UAAs into proteins?	3
Q6 a)	A protein undergoes a conformational change with an enthalpy change (ΔH) of -60 kJ/mol and an entropy change (ΔS) of -0.2 kJ/(mol·K) at 298 K. Calculate the Gibbs free energy change (ΔG) for the conformational change.	2
Q6 b)	Determine if the conformational change is spontaneous at 298 K.	1
Q7	Explain the impact of pH and ionic strength on protein stability and interactions.	2