JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

M.Sc.- II Semester (Biotechnology)

COURSE CODE (CREDITS): 20MS1WBT233 (02) MAX. MARKS: 25

COURSE NAME: Protein Engineering

COURSE INSTRUCTORS: Dr. Saurabh Bansal MAX. TIME: 1 Hour 30 Min

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	How does temperature impact the stability of proteins, and what is the significance of the melting temperature (Tm) in this context?	3
Q2 a.	How can CD spectroscopy be used to differentiate between alpha-helical and beta-sheet structures in proteins?	2
Q2 b.	Why is ORD less commonly used in protein analysis compared to CD?	2
Q3	Differentiate between the following:	
Q3 a.	ORD and CD	2
Q3 b.	Directed evolution and Rational Design of protein engineering	2
Q4 a.	What are the key differences between fluorescence and phosphorescence in terms of their lifetimes and mechanisms?	2
Q4 b.	How do factors like quenching and energy transfer affect fluorescence intensity?	2
Q5 a.	What do you understand by directed evolution? How is it different from natural evolution?	3
Q5 b.	Draw a diagram representing the different steps of directed evolution.	2
Q6.	How does altering the conditions of PCR, such as magnesium ion concentration or biased dNTP concentrations, influence the mutation rate in epPCR?	2
Q7.	A research team aims to explore all possible substitutions at a key active site. Which approach of directed evolution will you use for the same? Draw a flow chart of carrying out this approach experimentally for the completion of your objective.	3