

(101)

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS- 2026

M.Sc.-II Semester (BT)

COURSE CODE (CREDITS): 20MS1WBT233 (2)

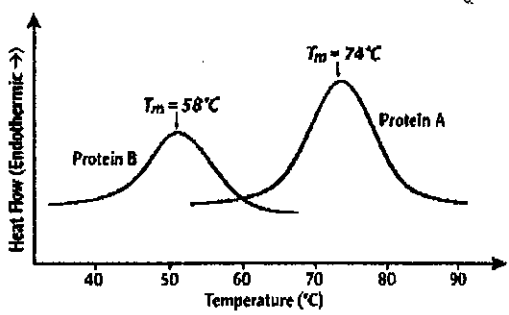
MAX MARKS: 25

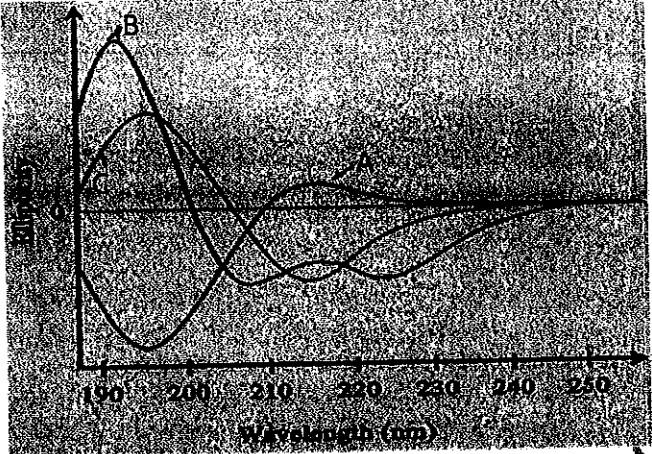
COURSE NAME: Protein Engineering

COURSE INSTRUCTOR: Dr. Saurabh Bansal

MAX. TIME: 1 Hour 30 Min

Note: (a) All questions are compulsory.

Q. No.	Question	Marks
Q1 a)	Why is protein stability considered a critical parameter in biotechnology and pharmaceutical industries? Illustrate with examples.	2
Q1 b)	Based on the DSC curves, which protein is more stable? Justify your answer in terms of thermal transition midpoint and enthalpy of denaturation. 	2
Q2	What are the different methods for analyzing the protein stability? Explain one methods of determining protein stability along with their principle, advantages and limitations.	3
Q3 a)	Differentiate between bathochromic shift and hypsochromic shift with suitable examples from protein spectroscopy.	2
Q3 b)	How can UV-Vis spectroscopy be applied to determine the melting temperature of DNA? What does hyperchromicity signify?	2
Q4 a)	Differentiate between CD and ORD.	2
Q4 b)	A protein sample shows a strong negative band at 222 nm in CD spectroscopy. What does this indicate about its structure?	1
Q4 c)	What structural information does provide about proteins by Near UV CD spectroscopy?	1

Q5 a)	 Identify the secondary structure represented by each curve (A, B and C). Justify your answer based on the characteristic peaks and troughs in the far-UV region.	
Q5 b)	If a protein undergoes thermal denaturation, which of the three curves would you expect its CD spectrum to resemble at high temperature? Why?	2
Q6	How does FRET act as a molecular ruler? Discuss its applications in studying protein conformational changes.	2
Q7	A protein shows a blue shift in tryptophan fluorescence upon folding. What does this indicate about the environment of Trp residues?	1
Q8	Evaluate the statement: "Directed evolution produces superior results compared to rational design because it does not rely on prior structural knowledge." Do you agree? Justify with examples.	3