

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2026
(First Semester)

Branch – BIOTECHNOLOGY

STRUCTURAL BIOLOGY AND CHEMISTRY OF PROTEINS

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 × 1 = 10)

Question No.	Question	K Level	CO
1	The Ramachandran plot shows allowed regions for (i) Bond length (ii) Bond energies (iii) ϕ (phi) and ψ (psi) (iv) Amino acid side chain rotations	K1	CO1
2	In β -sheets, which feature distinguishes antiparallel from parallel sheets (i) Number of strands (ii) Orientation of peptide bonds (iii) hydrogen bond (iv) Presence of disulfide bonds	K1	CO1
3	Which of the following is common structural motif (i) Zinc finger (ii) Hemoglobin tetramer (iii) Collagen triple helix (iv) Myoglobin	K2	CO2
4	Immunoglobulin fold is an example of..... (i) motif (ii) Domain (iii) primary structure (iv) Random coil	K2	CO2
5	Which technique is most suitable for studying real-time protein-protein interactions without labeling? (i) ELISA. (ii) Surface plasmon resonance (iii) SDS-PAGE (iv) Western blot	K3	CO3
6	Principle of affinity chromatography----- (i) Size exclusion (ii) Specific ligand-protein interaction (iii) Charge-based separation (iv) Solubility difference	K3	CO3
7	Which of the following is an example of a multifunctional protein? (i) Hemoglobin (ii) Albumin (iii) DNA polymerase (iv) Actin	K4	CO4
8	The peptide bond in a polypeptide has (i) Free rotation (ii) Partial double bond character (iii) Ionic nature (iv) Single bond character	K4	CO4
9	In chimeric antibodies, the antigen-binding region is derived from: (i) Human (ii) Mouse (iii) Bacteria (iv) Virus	K5	CO5
10	A short peptide region fused to a protein of interest is known as (i) Tag (ii) Oligonucleotide (iii) Fragment (iv) Dimer	K5	CO5

Cont...

SECTION - B (35 Marks)
 Answer **ALL** questions
ALL questions carry **EQUAL** Marks

(5 × 7 = 35)

Question No.	Question	K Level	CO
11.a.	Explain Rossman motif and its structural components.	K1	CO2
(OR)			
11.b.	Discuss the L&D configuration of protein.		
12.a.	Describe the Leucine zipper and its structure and function.	K2	CO2
(OR)			
12.b.	Give a brief note on Zinc finger and its importance.		
13.a.	Explain in principle and applications 2D Gel Electrophoresis.	K3	CO3
(OR)			
13.b.	Enumerate in detail on X-ray diffraction in protein structure analysis.		
14.a.	Enumerate about biologically important peptides in detail.	K4	CO4
(OR)			
14.b.	Give an account of conjugated proteins and metallo-proteins.		
15.a.	Explain briefly on cryostable enzymes and their industrial applications.	K5	CO5
(OR)			
15.b.	Describe a brief note on antibody engineering with its applications.		

SECTION -C (30 Marks)
 Answer **ANY THREE** questions
ALL questions carry **EQUAL** Marks

(3 × 10 = 30)

Question No.	Question	K Level	CO
16	Explain in detail about the Ramachandran plot and protein conformations.	K1	CO1
17	Explain the scissors grip model and coiled-coil in leucine zippers.	K2	CO2
18	Discuss on protein identification and sequencing by MALDI-TOF.	K3	CO3
19	Discuss the Collagen triple helix and its importance.	K4	CO4
20	Enumerate engineering of therapeutic proteins with their applications.	K5	CO5

Z-Z-Z

END