PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Branch - **BIOCHEMISTRY**

CHEMISTRY OF BIOPOLYMERS

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Which homoglycan composed of β(1→4) linked glucose units? a) Cellulose b) Starch c) Glycogen d) Dextran	K1	CO1
	2	Predict the primary function of Sialic acids in biological systems. a) Cell signaling b) Terminal sugars on glycoconjugates, influencing cell-cell interactions c) Cell adhesion d) Energy storage	K2	CO1
2	3	Select the type of secondary structure which is characterized by extended strands of polypeptide chain. a) α-helix b) β-sheet c) Random coil d) β-turn	K1	CO2
	4	Interpret the Proteoglycan that plays a crucial role in Cartilage structure and function. a) Aggrecan b) Versican c) Perlecan d) Syndecan	K2	CO2
3	5	Identify the basic building block of terpenes. a) Isoprene b) Cholesterol c) Fatty acid d)Amino acid	K1	CO3
	6	Give an example of an amphipathic lipid that forms the structural basis of cell membranes. a) Triglyceride b) Cholesterol c) Phospholipid d) Sphingolipid	K2	CO3
4	7	Label the sugar molecule which is found in DNA. a) Ribose b) Deoxyribose c) Glucose d) Fructose	K1	CO4
	8	Infer the enzyme which relieves positive supercoils generated ahead of the replication fork in prokaryotes. a) Helicase b) DNA ligase c) DNA gyrase d) Primase	K2	CO4
5	9	Name the enzyme which is responsible for correcting mispaired DNA. a) DNA polymerase b) DNA ligase c) Mismatch repair enzyme d) Restriction endonuclease	K1	CO5
	10	Clarify the function of the Zinc finger motif in DNA-binding proteins. a) To recognize specific DNA sequences b) To bind to the DNA backbone c) To unwind DNA double helix d) To catalyze DNA replication	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Discuss the structure, properties and applications of Alginates.	K2	CO1
		(OR)		
	11.b.	Review the Polysaccharides with Xylose backbone.		
2	12.a.	Differentiate between α-helices and β-sheets in protein secondary structure.	K4	CO2
		(OR)		
	12.b.	Diagnose the applications of Protein based biopolymeric materials in Food industry and Medical field.		
3	13.a.	Illustrate the structure and functions of Cholesterol.	K4	CO3
		(OR)		
	13.b.	Compare Leucotrienes and Lipoxins.		
4	14.a.	Depict and explain the Cloverleaf structure of tRNA.	K6	CO4
		(OR)		
	14.b.	Relate the concept of DNA supercoiling with neat diagrams.		
5	15.a.	Dictate the characteristics and potential significance of Four stranded DNA structures in Gene regulation and Genome stability.	K6	CO5
		(OR)		
	15.b.	Outline an introduction about DNA-Protein Interactions. What are the general features of Protein binding to DNA?		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Elaborate on Glycosaminoglycans.	K2	CO1
2	17	Explore the quaternary structure of a protein with suitable example.	K4	CO2
3	18	Layout the process of producing Bioplastics from lipids. List out the lipid sources used for Bioplastic production.	K4	CO3
4	19	Summarize the Watson and Crick double helix model of DNA with neat diagram.	K6	CO4
5	20	Explain the phenomenon of triplet repeat expansion and its association with human genetic diseases.	K6	CO5

Z-Z-Z END