25BTU103

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Branch - **BIOTECHNOLOGY**

CHEMISTRY OF BIOMOLECULES

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	What is called as the measure of hydrogen ion concentration in a solution. a) Buffer b) pKa c) pH d) Ionic strength	K1	CO1
	2	Why does the Hydrophobic interactions in proteins occur. a) Water molecules push nonpolar groups together b) Covalent bonds form between nonpolar groups c) Polar amino acids repel each other d) Proteins dissolve only in lipids	K2	CO2
2	3	How are Glucose and fructose classified? a) Disaccharides b) Hexoses c) Pentoses d) Polysaccharides	K1	CO1
	4	Show haw Cellulose is different from starch. a) It is made of glucose monomers b) It is digestible by humans c) It contains β-1,4 glycosidic bond d) It is soluble in water	K2	CO2
3	5	Cholesterol belongs to which class of lipids? a) Phospholipids b) Triglycerides c) Glycolipids d) Sterols	K1	CO1
	6	Infer how Phospholipids differ from triglycerides. a) Phospholipids have three fatty acids b) Phospholipids have a phosphate group replacing one fatty acid c) Triglycerides have a phosphate group d) Phospholipids are always solid at room temperature	K2	CO2
4	7	Where does the peptide bond is formed? a) between Amino group of one amino acid and carboxyl group of another b) between Two amino groups c) between Two carboxyl groups d) between Side chains of amino acids	K1	CO1
	8	Which of the following correctly classifies amino acids based on side chains? a) Essential vs Non-essential b) Polar vs Non-polar c) Acidic vs Basic d) All of the above	K2	CO2
5	9	Recall that Vitamin C is: a) Fat-soluble b) Water-soluble c) Steroid hormone d) Biogenic amine	K1	CO1
	10	Show the Deficiency of Vitamin B12. a) Megaloblastic anemia b) Rickets c) Scurvy d) Xerophthalmia	K2	CO2

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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.	Explain the significance of hydrophobic interactions in the folding of proteins.	K2	CO1/CO2
		(OR)		
	11.b.	Explain why salts like NaCl dissolve easily in water, while lipids are insoluble, using the concept of polarity.	K3	
2	12.a.	Explain the classification of monosaccharides with examples.	K2	CO2
		(OR)		
	12.b.	Explain the structure and significance of hyaluronic acid as a heteropolysaccharide.		
3	13.a.	Discuss the structure and biological functions of cholesterol.	K2	CO3
		(OR)		
	13.b.	Compare the structures of DNA and RNA and explain how their structural differences determine their distinct biological functions.		
4	14.a.	Explain the classification of amino acids based on their side chains and give examples.	K2	CO2
		(OR)		
	14.b.	Explain the structure and biological function of collagen as a secondary structure protein.		
5	15.a.	Describe the chemistry and functions of insulin.	*K2*	CO2
		(OR)		
	15.b.	Classify vitamins into water-soluble and fat-soluble types with examples.		

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	Analyze the different types of chemical bonds in biomolecules and their roles in stabilizing proteins and nucleic acids.	K4	CO4
2	17	Discuss the structural features of maltose, lactose, and sucrose and evaluate their biochemical significance in nutrition.	K4	CO3
3	18	Explain how the amphipathic nature of phospholipids contributes to the structure and function of biological membranes.	K3	CO4
4	19	Explain how the primary, secondary, tertiary, and quaternary structures of proteins determine their function with 3 examples.	K3	CO3
5	20	Analyze the biological functions and deficiency manifestations of fat-soluble vitamins (A, D, E, K).	K4	CO4

Z-Z-Z END