

**PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)**

**BSc DEGREE EXAMINATION MAY 2026
(Second Semester)**

Branch – **MICROBIOLOGY**

FUNDAMENTALS OF BIOCHEMISTRY

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 property of water is mainly responsible for its high boiling point? (i) Ionic bonding (ii) Covalent bonding (iii) Hydrogen bonding (iv) Metallic bonding	K1	CO1
	2	The main buffer system that maintains the pH of human blood is the: (i) Phosphate buffer system (ii) Protein buffer system (iii) Ammonia buffersystem (iv) Carbonic acid–bicarbonate buffer system	K2	CO1
2	3	Which of the following is known as an inverted sugar? (i) Sucrose (ii) Fructose (iii) Lactose (iv) Glucose	K1	CO2
	4	The structural carbohydrate found in the cell walls of plants is called (i) Starch (ii) Lactose (iii) Glycogen (iv) Cellulose	K2	CO2
3	5	Which of the following form of lipids are referred to as neutral lipids? (i) Triacyl glycerol (ii) Steroid (iii) Phospholipids (iv) Wax	K1	CO3
	6	Phospholipids are major components of (i) Adipose Tissue (ii) Cell membrane (iii) Bone matrix (iv) Blood plasma	K2	CO3
4	7	Sulphur-containing amino acids are (i) Methionine and Threonine (ii) Cysteine and Threonine (iii) Cysteine and Methionine (iv) Cysteine and Serine	K1	CO4
	8	The regular folding of a polypeptide chain into structures like alpha-helix and beta-pleated sheet is known as the: (i) Primary structure (ii) Tertiary Structure (iii) Secondary structure (iv) Quaternary structure	K2	CO4
5	9	The protein part of an enzyme without its cofactor is called (i) Holoenzyme (ii) Apoenzyme (iii) coenzyme (iv) Abzymes	K1	CO5
	10	In competitive inhibition, the effect of the inhibitor can be overcome by (i) Decreasing enzyme concentration (ii) Increasing substrate concentration (iii) Decreasing temperature (iv) Adding more inhibitor	K2	CO5

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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 how the Phosphate buffer system maintains pH in biological fluids.	K2	CO1
		(OR)		
	11.b.	Discuss the role of hydrogen bonding in determining the physical properties of water.		
2	12.a.	Explain the phenomena of mutarotation and inversion in carbohydrates.	K2	CO2
		(OR)		
	12.b.	Describe homopolysaccharides and explain their structure and biological functions with examples such as Starch.		
3	13.a.	Classify fatty acids based on chain length, degree of saturation, and nutritional importance with suitable examples.	K3	CO3
		(OR)		
	13.b.	Describe the structure of Cholesterol and explain its major biological functions.		
4	14.a.	Discuss the types of DNA, highlighting their differences in helix structure and role in living cells.	K3	CO4
		(OR)		
	14.b.	Discuss the physical properties of amino acids in detail.		
5	15.a.	Analyze the classification of enzymes according to the system proposed by the IUBMB with a suitable example.	K4	CO5
		(OR)		
	15.b.	Critically analyze the mechanism of action of enzyme inhibitors by classifying them into competitive, non-competitive, uncompetitive inhibitors.		

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	Derive the Henderson–Hasselbalch equation starting from the dissociation of a weak acid and discuss its biological significance.	K2	CO1
2	17	Classify monosaccharides based on (i) functional group and (ii) number of carbon atoms. Explain each category with suitable examples.	K2	CO2
3	18	Describe the dietary sources and biological functions of fat-soluble vitamins.	K3	CO3
4	19	Critically analyze the secondary structure of proteins and discuss their structural features and significance in determining overall protein conformation.	K4	CO4
5	20	Derive the Michaelis–Menten equation for an enzyme-catalyzed reaction and obtain the mathematical expression for reaction velocity, V_{max} , and the Michaelis constant (K_m), and explain their biochemical significance in enzyme kinetics.	K5	CO5