

PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)  
MSc DEGREE EXAMINATION MAY 2024  
(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)

| Question No. | Question  | K Level | CO  |
|--------------|---|---------|-----|
| 1            | What is cellulose?<br>a) Heteroglycan                      b) Disaccharide<br>c) Homoglycan hexosan              d) none of them  | K1      | CO1 |
| 2            | Keratan sulfate contains N-acetyl glucosamine with sulfate on<br>a) C6              b) C5              c) C4              d) C1   | K2      | CO1 |
| 3            | In Ramachandran plot, right-handed alpha-helix appears in<br>a) Quadrant 1 b) Quadrant 2 c) Quadrant 3 d) Quadrant 4  | K1      | CO1 |
| 4            | Carnosine is synthesized in the body from alanine and<br>a) Phenyl alanine    b) glycine              c) tyrosine              d) histidine   | K2      | CO1 |
| 5            | Which of the following is not a derivative of cholesterol?<br>a) Steroid              b) Vitamin D              c) Bile salts              d) Vitamin B                               | K1      | CO1 |
| 6            | What are prostaglandins?<br>a) Proteins              b) Lipids              c) Saccharides              d) fatty acid   | K2      | CO1 |
| 7            | Which of the following will cause DNA damage?<br>a) UV radiation                      b) alkylating agent<br>c) cross linking agent              d) all of them                       | K1      | CO1 |
| 8            | DNA bending proteins are not involved in which of the following?<br>a) Transcription                      b) Replication<br>c) mutation                              d) Recombination | K2      | CO1 |
| 9            | How many hydrogen bonds are formed between Hoogsteen base pairing?<br>a) 1                      b) 2                      c) 3                      c) 4                              | K1      | CO1 |
| 10           | Helix-loop-helix consists of 2 alpha helices that are...<br>a) Both Long                              b) both short<br>c) one short one long                      d) none of them     | K2      | CO1 |

**SECTION - B (35 Marks)**  
Answer ALL questions  
ALL questions carry EQUAL Marks (5 × 7 = 35)

| Question No. | Question   | K Level | CO  |
|--------------|--|---------|-----|
| 11.a.        | Classify polysaccharides based on structure with an example for each.                  | K4      | CO3 |
|              | (OR)   |         |     |
| 11.b.        | Describe biological functions of mannans and galactans.                                |         |     |
| 12.a.        | Outline the most common types of interactions that determine protein structure.        | K5      | CO4 |
|              | (OR)   |         |     |
| 12.b.        | Outline the conformational properties of myoglobin and collagen triple helix proteins. |         |     |

Cont...

|       |   |    |     |
|-------|---|----|-----|
| 13.a. | Explain the role and importance of lipid soluble vitamins.  | K5 | CO4 |
| (OR)  |   |    |     |
| 13.b. | Evaluate the role of isoprenoids and its derivatives as nutraceuticals.                           |    |     |
| 14.a. | Compare between the Wedge model and Junction model for DNA bending and highlight the differences. | K4 | CO3 |
| (OR)  |   |    |     |
| 14.b. | Explain protein induced DNA bending.  |    |     |
| 15.a. | Elaborate any two specific examples of DNA-protein interactions.                                  | K6 | CO3 |
| (OR)  |   |    |     |
| 15.b. | Discuss the structure and stability of triplex DNA.   |    |     |

**SECTION -C (30 Marks)**

Answer ANY THREE questions

ALL questions carry EQUAL Marks

(3 × 10 = 30)

| Question No. | Question  | K Level | CO  |
|--------------|---|---------|-----|
| 16           | Compare available isolation and purification techniques for glycosaminoglycans.                       | K4      | CO3 |
| 17           | Discuss in detail the structural attributes of secondary, tertiary and quaternary protein structures. | K6      | CO5 |
| 18           | Justify the need and role of amphipathic lipids in biological systems.                                | K5      | CO4 |
| 19           | Discuss how DNA bending is different from DNA supercoiling.   | K5      | CO4 |
| 20           | Discuss in detail with atleast two examples of DNA mutation based genetic diseases.                   | K4      | CO3 |

Z-Z-Z

END