

**MSc DEGREE EXAMINATION MAY 2026**  
(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            | What is the main function of Starch in plants?<br>a) Structural support      b) Energy storage<br>c) Genetic information      d) Defense mechanism                                                                 | K1      | CO1 |
|            | 2            | Give an example of a Heteroglycan.<br>a) Cellulose      b) Heparin<br>c) Starch      d) Glycogen                                                                                                                   | K2      | CO1 |
| 2          | 3            | Label the type of bond that links amino acids together in a protein.<br>a) Hydrogen bond      b) Ionic bond<br>c) Peptide bond      d) Disulfide bond                                                              | K1      | CO2 |
|            | 4            | Express the type of protein interaction responsible for the binding of oxygen to Hemoglobin.<br>a) Cooperative binding      b) Hydrophobic interaction<br>c) Hydrogen bonding      d) Ionic interaction            | K2      | CO2 |
| 3          | 5            | State the primary function of steroids in the body.<br>a) To provide energy      b) To regulate gene expression<br>c) To synthesize proteins      d) To degrade proteins                                           | K1      | CO3 |
|            | 6            | Observe the Phospholipid which plays a crucial role as lung surfactant.<br>a) Lecithin      b) Cephalin<br>c) Phosphatidylinositol      d) Phosphatidylserine                                                      | K2      | CO3 |
| 4          | 7            | Name the type of RNA that makes up a large part of the ribosome.<br>a) mRNA      b) rRNA      c) tRNA      d) miRNA                                                                                                | K1      | CO4 |
|            | 8            | How does DNA bending affect DNA topology?<br>a) It changes DNA twist<br>b) It doesn't changes DNA twist<br>c) It increases DNA supercoiling<br>d) It decreases DNA supercoiling                                    | K2      | CO4 |
| 5          | 9            | Which of the following is a consequence of slipped DNA?<br>a) Increased gene expression<br>b) Decreased gene expression<br>c) Genetic instability<br>d) No effect on gene expression                               | K1      | CO5 |
|            | 10           | Interpret the nucleotide sequence which is involved in the formation of G-quadruplex DNA.<br>a) Guanine-rich sequences      b) Adenine-rich sequences<br>c) Cytosine-rich sequences      d) Thymine-rich sequences | 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.        | Enumerate the structure and functions of Chitin.                                                             | K1      | CO1 |
|            |              | (OR)                                                                                                         |         |     |
|            | 11.b.        | Outline the structure and biological functions of Sialic acids.                                              |         |     |
| 2          | 12.a.        | Draw Ramachandran plot and explain its salient features.                                                     | K3      | CO2 |
|            |              | (OR)                                                                                                         |         |     |
|            | 12.b.        | Illustrate the structure and role of Glycoproteins.                                                          |         |     |
| 3          | 13.a.        | Analyze the structure and biological actions of Prostaglandins.                                              | K4      | CO3 |
|            |              | (OR)                                                                                                         |         |     |
|            | 13.b.        | How are liposomes characterized, and what techniques are used to determine their size, shape, and stability? |         |     |
| 4          | 14.a.        | Summarize the different types of RNA, and how do they differ from one another?                               | K6      | CO4 |
|            |              | (OR)                                                                                                         |         |     |
|            | 14.b.        | Dictate the physical properties of double stranded DNA.                                                      |         |     |
| 5          | 15.a.        | Explain the structure and formation of triplex DNA, including the types of base pairing involved.            | K5      | CO5 |
|            |              | (OR)                                                                                                         |         |     |
|            | 15.b.        | Evaluate the characteristics of anisomorphic DNA, and how does it differ from other forms of 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           | Compare and contrast the structure and functions of Starch and Glycogen.                                   | K2      | CO1 |
| 2          | 17           | Point out the Physical interactions that determine the properties of Proteins.                             | K4      | CO2 |
| 3          | 18           | Explain the structure and functions of Phospholipids.                                                      | K4      | CO3 |
| 4          | 19           | Compile the methods used to study DNA bending and their applications in molecular biology.                 | K6      | CO4 |
| 5          | 20           | Categorize the different types of DNA-binding motifs found in proteins, and how do they interact with DNA? | K6      | CO5 |

Z-Z-Z END