

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

**BSc DEGREE EXAMINATION DECEMBER 2025**  
(Third Semester)

Branch - **BIOCHEMISTRY**

**MOLECULAR BIOLOGY**

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            | Choose the organism in which transformation is observed in Griffith's experiment.<br>a) <i>S. pneumoniae</i> b) <i>E. coli</i><br>c) <i>S. typhi</i> d) <i>B. subtilis</i> | K1      | CO1 |
|            | 2            | Relate the responsibility of F-factor in bacteria.<br>a) Replication      b) Conjugation<br>c) Transcription      d) Protein synthesis                                     | K2      | CO1 |
| 2          | 3            | Select the location of TATA box in eukaryotic promoter<br>a) -10 region      b) -35 region<br>c) -25 region      d) +1 region  | K1      | CO2 |
|            | 4            | Select the following which is involved in the removal of introns.<br>a) Spliceosome complex      b) Rho factor<br>c) Polymerase      d) Helicase                           | K2      | CO2 |
| 3          | 5            | Which of the following is start codon in mRNA?<br>a) UAG      b) AUG      c) UAA      d) UGA   | K1      | CO3 |
|            | 6            | Name the phenomenon in which multiple codons code for the same amino acid in genetic code<br>a) Degeneracy      b) Ambiguity<br>c) Overlapping      d) Non-overlapping     | K2      | CO3 |
| 4          | 7            | Pick out the base formed when cytosine in DNA undergoes deamination.<br>a) Adenine      b) Guanine      c) Thymine      d) Uracil  | K1      | CO4 |
|            | 8            | Pick out the process by which nitrous acid cause mutation.<br>a) Deaminating bases      b) Dimer formation<br>c) Removal of bonds      d) Inserting bonds                  | K2      | CO4 |
| 5          | 9            | Find the mutation that changes a codon to stop codon.<br>a) Point      b) Missense<br>c) Nonsense      d) Silent   | K1      | CO5 |
|            | 10           | Identify the process that is related to holiday model.<br>a) Replication      b) Translation<br>c) Transcription      d) Homologous recombination                          | K2      | CO5 |

Cont...

SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks  $(5 \times 7 = 35)$ 

| Module No. | Question No. | Question   | K Level | CO  |
|------------|--------------|--|---------|-----|
| 1          | 11.a.        | Demonstrate the importance of Hershey-Chase bacteriophage experiment.<br>(OR)  | K2      | CO1 |
|            | 11.b.        | Illustrate the mechanism of replication fork and label the leading and lagging strands.  |         |     |
| 2          | 12.a.        | Select the role of sigma factor in the initiation of prokaryotic transcription.<br>(OR)  | K3      | CO2 |
|            | 12.b.        | Identify the role of enhancers in eukaryotic transcription.  |         |     |
| 3          | 13.a.        | Construct a diagram of ribosome with A, P and E site and explain the role of each site during elongation phase in translation.<br>(OR) | K3      | CO3 |
|            | 13.b.        | Compare the difference between prokaryotic and eukaryotic translation.   |         |     |
| 4          | 14.a.        | Examine the mechanism of SOS response.<br>(OR)   | K4      | CO4 |
|            | 14.b.        | Analyze the concept of Trp operon regulation.  |         |     |
| 5          | 15.a.        | Summarize the holliday model of homologous recombination.<br>(OR)  | K4      | CO5 |
|            | 15.b.        | Evaluate the role of insertion sequence elements in prokaryotes.   |         |     |

SECTION - C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks  $(3 \times 10 = 30)$ 

| Module No. | Question No. | Question  | K Level | CO  |
|------------|--------------|---|---------|-----|
| 1          | 16           | Analyze the significance of Griffith's transformation experiment in establishing DNA as genetic material.             | K4      | CO1 |
| 2          | 17           | Compare the mechanism of transcription in rho dependent and rho independent transcription termination in prokaryotes. | K4      | CO2 |
| 3          | 18           | Examine the post translational modification of proteins.  | K4      | CO3 |
| 4          | 19           | Paraphrase the mechanism of different types of DNA damage.  | K4      | CO4 |
| 5          | 20           | Differentiate between composite and non-composite transposons.  | K4      | CO5 |