

PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2024  
(Second Semester)

Branch - BIOTECHNOLOGY

GENETIC ENGINEERING

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 × 1 = 10)

| Mod.No. | Q.No. | Question                                                                                                                                                                                                                              | K Level | CO  |
|---------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----|
| 1       | 1     | The enzyme Bal31 purified from the bacterium <i>Alteromonas Espejiana</i> is an example of which enzyme?<br>a. Exonuclease                      b. Ligase<br>c. Endonuclease                      d. Phosphatase                      | K2      | CO1 |
|         | 2     | Host controlled restriction is a phenomenon related to<br>a. Bacteria                              b. Virus<br>c. Plasmid                              d. Gene of interest                                                            | K2      | CO1 |
| 2       | 3     | Introduction of new gene through Ti plasmid should be done in _____<br>a. Callus                              b. Flowers<br>c. Germ cells                              d. Fully grown plant                                           | K3      | CO2 |
|         | 4     | pEMBL series vector is an example of<br>a. Shuttle vector                      b. Cosmid<br>c. Phage                              d. Phagemid                                                                                         | K3      | CO2 |
| 3       | 5     | Genomic library construction is concerned with _____<br>a. Gene isolation                      b. Protein production<br>c. Regeneration                      d. Gene detection                                                        | K4      | CO3 |
|         | 6     | Technique used for quantification and detection of m-RNA<br>a. Eastern blotting                      b. Southern blotting<br>c. Western blotting                      d. Northern blotting                                            | K4      | CO3 |
| 4       | 7     | How many DNA duplexes are obtained from one DNA duplex after 4 cycles of PCR?<br>a. 32                                      b. 16<br>c. 12                                      d. 8                                                  | K5      | CO4 |
|         | 8     | The type of DNA amplification where the region of DNA amplified lies on either side of a known segment?<br>a. RT – PCR                              b. Inverse -PCR<br>c. Nested - PCR                              d. Anchored - PCR | K5      | CO4 |
| 5       | 9     | What is the first-line drug for patients with type 2 diabetes and obesity?<br>a. Insulin                              b. Acarbose<br>c. Metformin                              d. Sulphonylureas                                      | K6      | CO5 |
|         | 10    | Gigantism is caused by an over secretion of<br>a. Insulin                              b. Adrenaline<br>c. Somatostatin                              d. Thyroid                                                                       | K6      | 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.        | Write about the novel restriction enzymes from lower plants. | K2      | CO1 |
|            |              | (OR)                                                         |         |     |
|            | 11.b.        | Compare and contrast Nucleases and Ligases.                  |         |     |
| 2          | 12.a.        | Differentiate phagemids and cosmids.                         | K3      | CO2 |
|            |              | (OR)                                                         |         |     |
|            | 12.b.        | Outline the advantages of SV40 vector.                       |         |     |
| 3          | 13.a.        | Explain the construction of genomic library.                 | K4      | CO3 |
|            |              | (OR)                                                         |         |     |
|            | 13.b.        | Give a note on Jumping libraries.                            |         |     |
| 4          | 14.a.        | Explain in detail about Automated DNA sequencing.            | K5      | CO4 |
|            |              | (OR)                                                         |         |     |
|            | 14.b.        | Write a brief note on colony PCR.                            |         |     |
| 5          | 15.a         | Explain and expand TPA.                                      | K6      | CO5 |
|            |              | (OR)                                                         |         |     |
|            | 15.b.        | Comment on Gene editing.                                     |         |     |

**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           | Describe in detail about homopolymer tailing.                                      | K2      | CO1 |
| 2          | 17           | Explain how can you construct pBR322 vector?                                       | K3      | CO2 |
| 3          | 18           | Discuss about the protein-protein interactive cloning.                             | K4      | CO3 |
| 4          | 19           | Outline the steps and applications of Nested PCR.                                  | K5      | CO4 |
| 5          | 20           | Discuss in detail about principle and protocol for the CRISPR/Cas9 genome editing. | K6      | CO5 |