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MBC–006

M. SC. (BIOCHEMISTRY)

(MSCBCH)

Term-End Examination

June, 2025

MBC-006 : RECOMBINANT DNA TECHNOLOGY AND ITS APPLICATIONS

Time : 3 Hours *Maximum Marks : 100*

Note : *Answer any* ***five*** *questions. All questions carry equal marks. Draw diagrams/ flowchart wherever required.*

1. (a) Explain the characteristics of plasmids as cloning vectors and their unique features that make them suitable for cloning. 10

   (b) What are the applications of reverse transcriptase and S1 nuclease in rDNA technology ? 10

2. (a) Describe the structure and applications of cosmids in rDNA technology. 10

   (b) Write a detailed note on Tobacco Mosaic Virus (TMV). 10

3. (a) Discuss the chemical methods of transfection. 10

   (b) What are the key steps and considerations while designing PCR primers ? 10

4. (a) State any *five* applications of PCR amplified fragments in cloning. 10

   (b) Explain fusion tags and their roles in purification of recombinant proteins. 10

5. (a) Describe colony and plaque hybridisation methods. 10

   (b) Discuss Sanger's method of DNA sequencing. 10

6. (a) Describe different methods for the purification of synthetic oligo-nucleotides. 10

(b) Enlist and explain the applications of oligonucleotide probes. 10

7. (a) Define site-directed mutagenesis. Explain the PCR-based method of site-directed mutagenesis. 10

(b) (i) What is gene therapy ? 4

(ii) Name *two* genetic diseases. Write their causes and symptoms. 6

8. Write notes on the following : 10+10

(a) Biosafety levels (I and II)

(b) Applications of plant genetic engineering in agriculture

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