Seat No. : _____

MB-222

May-2025

M.Sc., Sem.-II

408 : Microbiology

(Gene Regulation and Recombinant DNA Technology)

Time : 2:30 Hours] **[Max. Marks : 70**

1. Based on the operon models, explain how negative and positive control mechanisms function in the regulation of inducible and repressible operons. **14**

OR

1. (A) Give the structure and function of lambda (λ) genome, lambda (λ) represser, Cro protein, CII and CIII proteins. **7**

   (B) Explain the role of CAP and cAMP in the positive control of the lac operon and catabolite repression. **7**

2. Write an exhaustive note on restriction endonucleases. **14**

OR

2. (A) What is restriction endonuclease ? Write on nomenclature of restriction endonucleases. **7**

   (B) Discuss the method of isolation of DNA. **7**

3. Define vectors and explain plasmid vectors in detail. **14**

OR

3. (A) Define vector and explain pBR322 in detail. **7**

   (B) What is oligonucleotide probe ? Describe labelling of probes. **7**

4. Write an exhaustive note on hybridization techniques. **14**

OR

4. (A) Discuss applications of DNA fingerprinting **7**

   (B) Explain western hybridization. **7**

5. Write any **seven** of the followings in brief. **14**

(1) List out two significant Anti-terminator proteins encoded in lambda (λ) genome ?

(2) What is the role of regulatory elements in operon ?

(3) Explain the role of allosteric proteins in operon circuits.

(4) How will you check the purity of isolated RNA ?

(5) Write the source of organism and recognition sequences of *Alu*I and *Bam*HI.

(6) A brief highlights of BAC vector.

(7) What is biolistic transformation ?

(8) Use of Avidin chemical in non-radio labelled probe.

(9) What are the advantages of microarrays ?

(10) Write any two differences between Southern and Northern hybridization.