2 ½ Hours

Total Marks: 75

1. **All** questions are **compulsory.**
2. **All questions** carry **equal** marks.
3. Draw **neat, labelled diagrams** wherever necessary.

Q.1 a. Explain the terms (any three) **03**

1 Prophage
2 Permissive host
3 Heteroallelic mutations
4 Phage lysate
5 Cotransformation
6 F-duction

b. Explain the following (Any two) **12**

1. Types of phage mutants
2. Genetic mapping using transformation
3. Recombinational analysis of rII mutants
4. Mapping of genes by Interrupted mating

Q. 2 a. Do as directed (Any three) **03**

1 What is an Inducer?
2 Give an example of composite transposon.
3 Name the enzyme synthesized by *lac Z* gene.
4 Fill in the blank:- IS elements were first identified in _____ organism
5 Name the product of *trpR* gene.
6 State true or false: - The leader region is the short region between the promoter–operator region and *trpE*.

b. Discuss the following (Any two) **12**

1. Positive control of the *lac* operon.
2. Induction of lytic pathway in λ phage.
3. Regulatory mutations in *lacI* gene
4. *trp* operon- Attenuation model

Q. 3 a. Answer the following (Any three) **03**

1 State the significance of BAC vectors.
2 What are shuttle vectors?
3 State the importance of phagemid vectors.
4 Name the enzyme which uses DNA as template to synthesize DNA.
5 Give significance of enzyme DNA ligase.
6 State an application of alkaline phosphatase.

b. Attempt the following (Any two) **03**

1. Justify: Using pBR322 vector has some advantages as well as drawbacks.
2. Explain the use of 'multiple cloning site' and 'blue white selection' in recombinant DNA technology.
3. Elaborate on the use of Polynucleotide kinase.
4. Give a detailed account of 'reverse transcriptase' with respect to its sources and applications.

Q. 4 a. State the significance of the following. (Any three) **03**

1 Autoradiography
2 Heterologous probes
3 Oligo d T column
4 Restriction map
5 Reverse transcriptase
6 URA 3 marker

b. Give an account of the following. (Any two) **12**

1. Analysis of cloned DNA.
2. Construction of genomic DNA Library.
3. Nick Translation in Probe synthesis.
4. Synthesis of cDNA.

Q. 5 Write short notes on (Any three) **15**

a. Complementation test.
b. Specialized transduction.
c. Random priming-method.
d. Organization of Ti plasmid.
e. Types of restriction enzymes.
f. IS elements- Discovery and Properties.

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