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 Helper phage
2 Homoallelic mutations
3 Plaque
4 Deletion mutants
5 Curing
6 F-pili

b. **Explain the following (Any two)** 12
1. Types of bacterial transformation giving suitable examples
2. Genetic mapping during conjugation in *E. coli*
3. Production of F' factor
4. Test for determining the units of function in rII region

Q. 2 a. **Do as directed (Any three)** 03
1 What is an operon?
2 Give an example of non-composite transposon.
3 Name the enzyme synthesized by *lac Y* gene.
4 Give an example of an IS element in *E.coli.*
5 What is an aporepressor?
6 State true or false: - The promoter and operator regions are upstream
   from the trpE gene.

b. **Discuss the following (Any two)** 12
1. Catabolite repression.
2. Lysogenic development in λ phage.
3. Trp operon as an repressible operon.
4. Composite and non-composite transposons in prokaryotes

Q. 3 a. **Answer the following (Any three)** 03
1 What is an 'expression vector'?
2 State the significance of 'sequenase'.
3 What are 'YACs'?
4 Give significance of opine.
5 What is 'multiple cloning site'?
6 State one application of DNA kinase.

b. **Attempt the following (Any two)** 12
1. Discuss pBR322 vector.
2. What are restriction enzymes? Explain its types.
3. Explain the use of 'binary vector system' using a neat labelled diagram.
4. Give a detailed account of 'DNA ligases'.

Q. 4 a. **Define the following (Any three)** 03
1 Autoradiogram
2 Chromosomal libraries
3 Digoxigenin
4 Probes
5 Restriction map
6 Restriction site linker

b. **Give an account of the following. (Any two)** 12
1. Describe Random - primer labeling.
2. Explain restriction mapping.
3. How would you construct a cDNA library?
4. State how genes can be identified in libraries by complementation of mutations?

Q. 5 **Write short notes on (Any three)** 15
a. Deletion mapping.
b. Generalized transduction.
c. Screening of genomic library.
d. Cosmids.
e. Terminal transferase.
f. *lac O^c* mutations.

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