[Time: 2:30Hours] **[Marks:75]**

Please check whether you have got the right question paper.

N.B:
1. Attempt all questions.
2. All questions carry equal marks.
3. Draw neat labeled diagrams wherever necessary.

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

i) Minimal medium
ii) Competent cell
iii) Helper phage
iv) Homoallelic mutation
v) Non-permissive host
vi) Transducing phage

Q.1 b. Attempt the following **(any two):** (12)

i) Diagrammatically describe specialised transduction.
ii) Conjugation and interrupted mating allow mapping of large chromosome fragments. Justify.
iii) Describe 'Cis-trans test'
iv) What is an F' *(lac)?* How is it formed?

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

i) _____is a 162 base pair region found between the promoter-operator region and trpE.
ii) Explain the term allosteric shift.
iii) Give the role of Rec A protein in induction of lytic pathway in phage λ.
iv) State the significance of *$lacI^{Q}$ and $lacI^{SQ}$ mutants*.
v) What are non-autonomous elements?
vi) Give an example of a composite transposon.

Q.2 b. Discuss the following: **(Any two):** (12)

i) Regulation of lac operon through catabolite repression.
ii) Early transcription events in phage λ.
iii) Cis -dominant mutations.
iv) Integration of an IS element into chromosomal DNA.

Q.3 a. Do as instructed **(Any three):** (03)

i) State the significance of YAC vectors.
ii) What are expression vectors?
iii) State the importance of phagemid vectors.
iv) Name the enzyme which uses RNA as template to synthesize DNA.
v) What is Homopolymer tailing?
vi) State an application of alkaline phosphatase.

Q.3 b. Give an account of **(any two):** (12)

i) 'Blue white selection' in recombinant DNA technology.
ii) Applications of type II restriction enzymes in cloning.
iii) Advantages and drawbacks of pBR322 vector.
iv) Mode of action and sources of DNA ligase.

Q.4 a. Explain the following: **(Any three):** (03)

i) Genomic library
ii) Autoradiography
iii) Heterologous probe
iv) Plaque lift
v) Partial Digestion of DNA
vi) cDNA

Q.4 b. Answer the following **(any two):** (12)

i) Explain the screening of lambda genomic library
ii) Give an account of Nick translation method.
iii) Diagrammatically explain cDNA synthesis.
iv) How would you create a rDNA molecule?

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

i) Restriction mapping
ii) Use of linker in construction of library
iii) Life cycle of a lambda phage
iv) Cointegration model for transposition of a transposable element.
v) Molecular model for attenuation
vi) Reverse transcriptase

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