T.Y.B.Sc
Sem V

Subject: Biotechnology Paper III
Genetics and Molecular Biology (Rev)(R-2015)-17

QP Code : 77115

(2½ Hours) **[Total Marks : 75**

N.B. : (1) Attempt **all** questions
(2) Draw **diagrams** wherever **necessary**
(3) **Figures** to the **right** indicate **marks**

1. (a) Explain the following terms **(Any three)** 3
(i) Minimal media
(ii) F' factor
(iii) Co-transduction
(iv) Point mutants
(v) Hfr strain
(vi) HFT lysate

(b) Attempt the following **(Any two)** 12
(i) Genetic mapping can be carried out using transformation. Justify.
(ii) Diagrammatically explain generalised transduction.
(iii) Elaborate on types of phage mutants.
(iv) Comment on the circularity of the *E.coli* map.

2. (a) State the significance of **(Any three)** 3
(i) Transposase
(ii) *Ac* element
(iii) Antitermination signal
(iv) Operator
(v) *Lac* I^s mutation
(vi) P_{RM}

(b) Describe the following **(Any two)** 12
(i) Repressible operons with an example.
(ii) Cis dominant mutations with suitable examples.
(iii) Early transcription events in phage λ
(iv) Integration of IS element into chromosomal DNA.

3. (a) Do as directed **(Any three)** 3
(i) What is a cosmid ?
(ii) Define Shuttle vectors

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(iii) Fill in the blank
When restriction endonucleases make cuts across both strands of DNA at the same position, they result in _____ _____.

(iv) State the significance of *Leu2* gene in yeast episomal plasmids.

(v) Give one factor that result in star activity in restriction enzymes.

(vi) State one function of RNase H.

(b) Give an account of the following (**Any two**)
(i) Yeast Artificial Chromosomes.
(ii) M13 bacteriophage vector
(iii) DNA polymerases and its types
(iv) DNA Ligases and their applications.

4. (a) Define the following (**Any three**)
(i) Chromosomal libraries
(ii) Probes
(iii) Restriction map
(iv) Digoxigenin
(v) Restriction site linker
(vi) Autoradiogram

(b) Answer the following (**Any two**)
(i) How would you construct a DNA library ?
(ii) State how genes can be identified in libraries by complementation of mutations ?
(iii) Describe Random - primer labeling.
(iv) Explain restriction mapping.

5. Write short notes on the following (**Any three**)
(i) Polynucleotide kinase and its activity
(ii) Expression vectors
(iii) Screening of genomic library
(iv) Positive control of the lac operon
(v) Complementary genes in bacteriophages
(vi) Distinguishing features of composite and non-composite transposons.

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