

**Q.P. Code : 77116**

(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) Auxotroph  
(ii) Sexduction  
(iii) Transformant  
(iv) Cistron  
(v) Double lysogen  
(vi) Episome
- (b) Attempt the following (**Any two**) 12  
(i) Genetic mapping can be carried out using conjugation. Justify.  
(ii) Diagrammatically describe specialized transduction.  
(iii) Elaborate on deletion mapping of rII mutants  
(iv) Describe the production of F' factor
2. (a) State the significance of (**Any three**) 3  
(i) *bla* gene  
(ii) Autonomous elements  
(iii) *lac Y* gene  
(iv) Promoter  
(v) *lacI<sup>d</sup>* mutants  
(vi) RecA protein
- (b) Describe the following (**Any two**) 12  
(i) Positive and negative regulatory roles of  $\lambda$  repressor  
(ii) Types and features of prokaryotic transposons.  
(iii) Trans dominant mutations with suitable examples.  
(iv) Positive control of lac operon
3. (a) Do as directed (**Any three**) 3  
(i) What is star activity ?  
(ii) Define isoschizomers.

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**KS-Con. 1055-17.**

- (iii) Fill in the blank  
Taq DNA polymerase is isolated from the bacterium \_\_\_\_\_ .
- (iv) State the significance of 2  $\mu$ m plasmid in construction of yeast episomal plasmids.
- (v) Differentiate between relaxed plasmids and stringent plasmids.
- (vi) State one application of YAC.
- (b) Give an account of the following (Any two) 12
- (i) Advantages and disadvantages of pBR322 as a vector.
  - (ii) Features of pUC19 vector.
  - (iii) Ligases and their activity.
  - (iv) Polymerases and their applications.
4. (a) Define the following (Any three) 3
- (i) cDNA
  - (ii) Linker
  - (iii) Replica plating
  - (iv) Genomic library
  - (v) Autoradiographic technique
  - (vi) DNA probes
- (b) Answer the following (Any two) 12
- (i) Explain the construction of a genomic library ?
  - (ii) Give the steps used for labeling a DNA non-radioactively.
  - (iii) Describe radioactive labeling of a probe.
  - (iv) How will you screen a cDNA library ?
5. Write short notes on the following (Any three) 15
- (i) Polynucleotide kinase
  - (ii)  $\lambda$  phage as a vector
  - (iii) Identifying genes in libraries by complementation of mutations.
  - (iv) Complementation test using rII mutants.
  - (v) Repressible operons with an example.
  - (vi) Transposable phages.

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