

NB.- Attempt all questions. All questions carry equal marks.

Q.1] Answer Any FOUR of the following ----- [20]

- 1) Write a short note on Viral cultivation in tissue culture.
- 2) Discuss Ames test and its application.
- 3) Explain the mechanism of nucleotide excision repair.
- 4) Explain the features of YAC.
- 5) Diagrammatically explain basic steps of PCR.
- 6) In *E. coli* the following Hfr strains donate the genes in the order given below:

| Hfr | Order of gene transfer |
|-----|------------------------|
| 1 | L M N R J K |
| 2 | O P L M N R |
| 3 | N R J K O P |
| 4 | J R N M L P |

All Hfr strains were derived from the same F⁺ strain. On the diagram indicate the origin, transfer and polarity for each strain.

Q.2 A] Answer Any TWO of the following ----- [12]

- 1) Discuss transformation in *Bacillus subtilis*
- 2) Differentiate between HFr and F-[minus] cells.
- 3) Diagrammatically explain how an IS element gets integrated in a chromosome.

B] Answer in one sentence of Any FOUR of the following ----- [04]

- 1) What is transmission genetics?
- 2) What are prototrophs?
- 3) Name the scientist that proved Conjugation.
- 4) Explain term Integrons?
- 5) What is plasmid curing?
- 6) What is Homologous recombination?

C] Give two examples of Any FOUR of the following ----- [04]

- 1) Features that make *Drosophila* a model organism.
- 2) Transposable element.
- 3) Pathogenic bacteria which undergo natural transformation.
- 4) Bacteria with R plasmids.
- 5) Composite transposons.
- 6) Methods of making cells competent.

Q.3. A] Answer Any TWO of the following ----- [12]

- 1) Explain how mutation induced by U.V. light is repaired
- 2) Justify: Meselson and Stahl proved that DNA replication is semi conservative.
- 3) Discuss the initiation step of DNA replication.

B] Answer Any FOUR of the following----- [08]

- 1) Give the effect of any two physical mutagens on DNA.
- 2) How are Okazaki fragments synthesized and joined?
- 3) Give the significance of telomerase
- 4) Explain the terms 'Transversion' and 'transition'
- 5) Define: Nonsense and missense mutation.
- 6) Name two proteins involved in mismatch repair.

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-2-

Q.4 A] Answer Any TWO of the following ----- [12]

- 1) Differentiate between plasmid and phage as cloning vector.
- 2) Explain Western blotting technique.
- 3) Discuss in brief Bioinformatics.

B] Give the full form and significance of Any FOUR the following ----- [08]

- (i) YAC (ii) NCBI (iii) VNTR (iv) RFLP (v) KEGG (vi) DDBJ

Q.5 A] Answer Any TWO of the following ----- [12]

- 1) Discuss the life cycle of HIV virus.
- 2) Diagrammatically represent the structure of T4 phage.
- 3) Discuss: Plaque assay and transformation assay.

B] Answer Any FOUR of the following ----- [08]

1. Give two examples of enveloped RNA viruses.
2. Give significance of neuraminidase.
3. Explain the term : Secondary cell culture
4. Give two differences between prion & viroids.
5. Name any two sites in an embryonated egg that can be used for inoculation of viruses
6. Name any two criteria used for classification of viruses.

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