

B.Sc. Part-II (Semester-III) Examination
3S : MICROBIOLOGY
(Molecular Biology and Genetic Engineering)

Time : Three Hours]

[Maximum Marks : 80

Note :—(1) All questions are compulsory.

(2) Draw well labelled diagrams wherever necessary.

1. (A) Fill in the blanks :

(i) The source of EcoRI restriction enzyme is _____.

(ii) Enzyme that synthesize RNA using DNA template are called as _____.

(iii) Amplification of DNA is a function of _____.

(iv) Recombinant hepatitis vaccine is produced in _____ cells.

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(B) Choose the correct alternative :

(i) The initiation codon for protein synthesis is _____.

(a) AUG

(b) UAG

(c) UAA

(d) GUA

(ii) Lac Z gene of Lac operon codes for _____.

(a) Alpha galactosidase

(b) Beta galactosidase

(c) Transacetylase

(d) Galactoside permease

(iii) P^{BR322} plasmid contains _____ genes.

(a) Ampicillin resistance gene

(b) Origin of replication

(c) Tetracycline resistance gene

(d) All of the above three

(iv) Size of DNA fragment is analyzed by _____.

(a) Southern blotting

(b) Gel electrophoresis

(c) Paper electrophoresis

(d) Gel chromatography

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(C) Answer in **one** sentence :

- (i) Define gene library.
- (ii) What are transgenic plants ?
- (iii) Name the enzyme involved in photoreaction.
- (iv) Define mutation.

- 2. (a) Give any four characters of Genetic code. 4
- (b) Define Muton, Recon and Gene within Gene. 4
- (c) Describe in brief Meselson and Stahl experiment on DNA replication. 4

OR

- (d) Describe the outline of transcription. 4
- (e) Describe in brief Light DNA repair. 4
- (f) Describe the role of any four enzymes in DNA replication. 4
- 3. Describe in detail lac operon and its regulatory mechanism. 12

OR

Describe in detail the molecular basis of induced mutations. 12

- 4. (a) Describe the mechanism of conjugation for $F^+ \times F^-$. 4
- (b) Differentiate between Generalized and Specialized Transduction. 4
- (c) Describe Griffith experiment for discovery of Transformation. 4

OR

- (d) Explain how Hfr cells are formed ? 4
- (e) Describe the mechanism of transformation. 4
- (f) Describe Davis Utube experiment for conjugation. 4
- 5. (a) Describe DNA modifying enzymes. 4
- (b) Explain in short plasmid vector with any one example. 4
- (c) What are restriction endonucleases ? Explain any two types of cut introduced by restriction endonucleases in DNA. 4

OR

- (d) What are vectors ? Discuss their ideal characters. 4
- (e) Describe cosmids. 4
- (f) Explain DNA polymerases enzyme. 4
- 6. Explain the following in brief :
 - (a) PCR 4
 - (b) Agarose gel electrophoresis. 4
 - (c) Colony hybridization. 4

OR

- (d) Southern blotting. 4
- (e) Gene mapping. 4
- (f) DNA sequencing by microarray. 4
- 7. How is Genetic Engineering used for producing transgenic plants ? What are applications of transgenic plants. 12

OR

Describe the production of recombinant Insulin and add a note on DNA probes in disease diagnosis. 12

