

AP-458

B.Sc. (Part – II) Semester – III Examination

3S : MICROBIOLOGY

(Molecular Biology and Genetic Engineering)

Time—Three Hours]

[Maximum Marks—80

N.B. :— (1) All questions are compulsory.

(2) Draw neat and well labelled diagrams wherever necessary.

1. (a) Fill in the blanks :

2

(i) The unit of DNA in which recombination takes place is _____.

(ii) The product of Lac Z gene of Lac Operon is _____.

(iii) _____ is called as molecular scissors.

(iv) Mutations occurring due to mutagenic agents are called as _____ mutations.

(b) Choose the correct alternative :

2

(i) Codons are present on _____.

(a) r-RNA

(b) t-RNA

- (c) m-RNA
(d) None of the above
- (ii) PCR means :
(a) Polyacrylamide chain reaction
(b) Polymerase chain reaction
(c) Polymerase catalytic regulator
(d) Polyacrylamide catalytic regulator
- (iii) Recombinant Hepatitis B vaccine is produced in _____ cells.
(a) E coli
(b) Yeast
(c) Algae
(d) Mice
- (iv) Semiconservative mode of DNA replication was experimentally proved by _____.
(a) Lederberg and Tatum
(b) Jacob and Monod
(c) Meselson and Stahl
(d) Zinder and Lederberg

- (f) Discuss briefly the basic technique of genetic engineering. 4
6. (a) Explain with example the identification of transformed cell by antibiotic resistance marker gene. 4
(b) Briefly explain the construction of gene library. 4
(c) Describe briefly isolation of plasmid DNA. 4

OR

- (d) How colony hybridization is used for selection of desired clones ? 4
(e) What is PCR ? Give its applications. 4
(f) Explain in brief Agarose gel electrophoresis. 4
7. Describe in detail transgenic plants with examples. 12

OR

Briefly mention a few applications of Genetic Engineering in health biotechnology and explain in detail how insulin is produced using Genetic Engineering. 12

(c) Answer in one sentence : 4

(i) Name the gel material used in gel electrophoresis.

(ii) Name the enzyme involved in photoreactivation repair mechanism.

(iii) Define mutation.

(iv) Define vectors in Genetic Engineering.

2. (a) Enlist enzymes involved in DNA replication and give their role in replication. 4

(b) Give any six characters of genetic code. 4

(c) Define – Muton, Recon and gene within gene and cistron. 4

OR

(d) Explain in brief rolling circle mechanism of DNA replication. 4

(e) Briefly describe transcription. 4

(f) Describe in brief Meselson and Stahl experiment on DNA replication. 4

3. Describe in detail Lac operon and its regulatory mechanism. 12

OR

Describe in detail the molecular basis of induced mutation.

12

4. (a) Describe Griffith's experiment for discovery of transformation. 4
- (b) Describe the mechanism of conjugation between F^+ cell and F^- cell. 4
- (c) Differentiate between generalized and specialized transduction. 4

OR

- (d) Describe in brief mechanism of transformation. 4
- (e) Explain how Hfr cells are formed. 4
- (f) Describe in brief Lederberg and Tatum experiment for conjugation. 4
5. (a) What are vectors ? Briefly explain types of vectors used in genetic engineering. 4
- (b) What are restriction endonuclease ? Explain two types of cut introduced by restriction endonuclease in DNA. 4
- (c) Describe any two nucleases used for DNA manipulations. 4

OR

- (d) Briefly describe cosmids. 4
- (e) Enlist DNA modifying enzymes and explain any one enzyme in detail. 4