

[This question paper contains 4 printed pages.]

Your Roll No. ....

5152

B

**B.Sc. Programme/III**

BIO - 302

GENETICS, BIOTECHNOLOGY AND IMMUNOLOGY

Time : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

**Section A**

Attempt All questions.

1. (a) Explain the following : 4
- (i) Plasmid
  - (ii) Polyploidy
  - (iii) Linkage
  - (iv) Klinefelter's syndrome.
- (b) Differentiate between : 4
- (i) Reciprocal Cross and Back Cross...
  - (ii) Euploidy and Aneuploidy
- (c) Define (any 8) : 8
- (i) Genotype
  - (ii) PCR
  - (iii) GM Crops

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- (iv) Restriction Endonucleases
  - (v) Cytoplasmic inheritance
  - (vi) Mendel's Law of Segregation
  - (vii) Homozygous and Heterozygous alleles
  - (viii) Repetitive DNA
  - (ix) Ligase
  - (x) Monosomy.
- (d) Give contributions of the following (any five) : 5
- (i) Carl Correns
  - (ii) G. Mendel
  - (iii) Jacob and Monod
  - (iv) T. Morgan
  - (v) E. M. Southern
  - (vi) K. Mullis
  - (vii) Karl Steiner.

2. Write short notes (any four) : 2½×4=10

- (i) Test cross
- (ii) Polygenic inheritance
- (iii) Nucleosome
- (iv) Allopolyploids
- (v) IPR
- (vi) Transduction.

3. How can a classic Mendelian 9 : 3 : 3 : 1 ratio be converted into (a) 9 : 7 or (b) 15 : 1 ratio. Discuss the genetic interaction of any one. 8
4. Outline the experiment conducted by Frederick Griffith to demonstrate transformation. 8

*Or*

A couple have a colorblind daughter and a son with normal vision. What could be the genotypes of their parents? 8

5. Which blood group type of the ABO system is known as universal donor and the universal recipient ? Explain your answer. 8

*Or*

Discuss in brief the ethical concerns associated with G. M. Crops. 8

### Section B (Zoology)

Attempt any *two* questions in all, including

Q. No. 1 which is compulsory.

1. (a) Expand the following : 2
- (i) ADCC
- (ii) CD

- (iii) MHC
- (iv) IL.
- (b) Distinguish between the following : 4
  - (i) Immunogen and Hapten
  - (ii) Innate immunity and Acquired immunity
  - (iii) Primary immune and Secondary immune response
  - (iv) B-cell Epitopes and T-cell Epitopes.
- (c) Give the function/significance of : 2
  - (i) Antigen Presenting Cells
  - (ii) Complementarity Determining Region (CDR).
- (d) Draw labelled structure of an immunoglobulin molecule. 2
- 2. Explain the mechanism of action B-cells and T-cells against antigens. 10
- 3. Write short notes on any *two* of the following : 5+5
  - (i) Antigen-antibody interactions
  - (ii) Clonal Selection
  - (iii) Primary and secondary lymphoid organs.