

[This question paper contains 4 printed pages.]

936

Your Roll No. ....

**B.Sc. (Hons.) / II**

**C**

**BOTANY – Paper Vi**

**(Genetics and Biotechnology)**

**(Admissions of 2004 and onwards)**

*Time : 3 Hours*

*Maximum Marks : 38*

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

*Attempt Five questions in all.*

*Question No. 1 is compulsory.*

*All parts of a question must be answered together.*

1. (i) Crossing over between two gene loci does not exceed 50%. Justify.
- (ii) Name the two degenerate codons and the amino acids coded by them.
- (iii) In Muller's CIB test, what do C, I and B stand for ?
- (iv) How many Barr bodies would you expect in an individual with Turner's Syndrome ?
- (v) What are Biological Scissors ?

P.T.O.

- (vi) Name a thermostable DNA polymerase that can be used to perform PCR.
- (vii) Name two recessive and two dominant genetic traits in human beings.
- (viii) What are Ribozymes ?
- (ix) Name the genetic material present in the Retroviruses.
- (x) Prototrophs of bacteria grow on a minimal medium but auxotrophs do not. Explain. (1×10)
2. (a) Write short notes on **any three** :
- (i) Cell cycle checkpoints
  - (ii) Genomic imprinting
  - (iii) YACs
  - (iv) Petite mutants in Yeast (2×3)
- (b) A colour blind man married a normal eyed woman whose father was color blind. Give the genotypes of the couple and their offsprings. (1)
3. (i) Describe the elongation cycle of prokaryotic translation. (3)

- (ii) What do you understand by inactivation and hypoactivation of X-chromosome. Comment on Lyon's hypothesis. (4)
4. (i) Which technique can be utilized to confirm the identity of criminals? Explain the principal involved and applications of this technique. (4)
- (ii) Elaborate upon the discovery and role of self catalytic RNAs. (3)
5. (i) Explain briefly **any two** of the following :
- (a) Bioinformatics
- (b) Human Genome Project
- (c) Hybridomas and their applications (2½×2)
- (ii) Why are restriction enzymes named so? Describe their role in genetic engineering. (2)
6. Describe the gene regulation in Lac Operon. What do you understand by positive and negative control? (7)
7. (i) Explain the mechanism of splicing in the formation of eukaryotic mRNA. (4)
- (ii) Write a note on the role of gene therapy in treatment of a particular disease. (3)

8. In corn, a dominant gene *C* produces coloured kernels, its recessive allele produces colourless kernels. Another dominant gene *Sh* produces full kernels while its recessive *sh* produces shrunken kernels. A third dominant gene *Wx* produces normal endosperm and its recessive *wx* produces waxy starch. A test cross involving triply recessive and  $F_1$  triply heterozygous plants produced the following progeny :

Coloured shrunken waxy	300
Colourless full waxy	125
Colourless shrunken waxy	18
Coloured full waxy	72
Colourless shrunken non-waxy	68
Coloured full non-waxy	22
Coloured shrunken non-waxy	115
Colourless full non-waxy	280

Using the above data give

- (a) The correct gene sequence. (2½)  
 (b) The map distance between these genes. (2½)  
 (c) Calculate Co-efficient of co-incidence. (2)