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Your Roll No.

1028

B.Sc. (Hons.)/I C

MICROBIOLOGY—Paper IV

(Concepts of Genetics)

(Admissions of 2004 and onwards)

Time : 3 Hours

Maximum Marks : 60

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

Attempt any five questions.

All questions carry equal marks.

1. (a) Write the contributions of the following scientists
(any four) : 4×1=4
- (i) B. McClintock
 - (ii) H. Creighton
 - (iii) Beedle and Tatum
 - (iv) R.C. Punnett
 - (v) T. H. Morgan.

P.T.O.

- (b) *Drosophila* females heterozygous for three recessive mutations a, b, and c were crossed to males homozygous for all three mutations. The cross yielded the following results :

Phenotype	Number
+++	75
++c	348
+bc	96
a++	110
ab+	306
abc	65

Construct a linkage map showing the correct order of these genes and estimate the distance between them. 6

- (c) Explain Genomic imprinting. 2
2. (a) Define the following terms (any eight) : 8×1=8
 Hemizygous, Pseudogene, Penetrance, Test cross, G-banding, Transgressive variation, Reduction division, Hardy-Weinberg's law, Dosage compensation
- (b) Explain maternal inheritance by taking suitable example. 4

3. Write short notes on (any four) : $4 \times 3 = 12$
- (i) Nucleosomes
 - (ii) Sex-linked inheritance
 - (iii) Robertsonian translocation
 - (iv) *Arabidopsis thaliana* as genetic model
 - (v) r-RNA gene organization
4. Differentiate between the following (any four) : $4 \times 3 = 12$
- (i) Frame shift and point mutations
 - (ii) Pleiotropy and multiple alleles
 - (iii) SINE and LINE
 - (iv) Paracentric and Pericentric inversion
 - (v) Lampbrush and Polytene chromosome.
- 5 (a) Define Barr body. How many Barr bodies are present in Turner's syndrome and Klinefelter's syndrome ? 3

- (b) Explain the following (any *three*) : 3×3=9
- (i) Ames test
 - (ii) 5-bromouracil as a mutagen
 - (iii) Position effect
 - (iv) Effect of Colchicin.
6. (a) Explain Holiday Model of recombination. 4
- (b) How do autotetraploids differ from allotetraploids ?
Which of these would have greater evolutionary significance and why ? 4
- (c) What are gynandromorphs ? 2
- (d) What causes Fragile-X Syndrome ? 2