[This question paper contains 4 printed pages.] ibe Your Roll No..... HC Sr. No. of Question Paper: 8516 Unique Paper Code : 32537503 : Inheritance Biology Name of the Paper : Microbiology: DSE for Honours Name of the Course Semester Maximum Marks: 75 Duration: 3 Hours Instructions for Candidates Write your Roll No. on the top immediately on receipt of 1. this question paper. Ž, Question No. 1 is compulsory. 3. Attempt five questions in all. $(12 \times 1 = 12)$ l. (a) Define the following (attempt any 12):

(i) Acrocentric chromosome

(ii) Repetitive DNA

(iii) C-banding (iv) Inversion

(v) Position effect

(vi) Multiple allele

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(vii) Pleiotropy P.T.O. 8516

- (viii) Crossing over
- (ix) Poky mutant
- (x) Identical twins
- (xi) Linker DNA
- (xii) Dicentric chromatid
- (xiii) Maternal Inheritance
- (b) Write the contributions of the following Scientists: (3×1^{-3})
 - (i) Bateson
 - (ii) T H Morgan
 - (iii) Alfred H Sturtevant
- 2. Differentiate between the following pairs:

 $(3\times 5^{=15})$

- (i) Monohybrid and Dihybrid cross
- (ii) Euchromatin and Heterochromatin
- (iii) Turner syndrome and Klinefelter syndrome
- (iv) Phenotype and Karyotype
- (v) Dominant epistasis and Recessive epistasis
- 3. (a) Explain the mechanism of inheritance of kappa particles in Paramecium.
 - (b) What are giant chromosomes? Explain by giving example of polytene chromosomes.

- (c) Describe key features of Arabidopsis thaliana as a model organism in genetic analysis. (5×3=15)
- (a) Write short notes on the following: (4×3=12)
 - (i) QTL mapping
 - (ii) Lod Score for Linkage testing
 - (iii) Barr Body
- (b) Elaborate the Mendel's laws of inheritance. (3)
- (a) Drosophila females heterozygous for three recessive X-linked markers, y (yellow body), ct (cut wings), and m (miniature wings), and their wild-type alleles were crossed to y ct m males. The following progeny were obtained:

Phenotypic class	Number
	30
	33
	10
	12
	8
	5
	1
	1
	100
	yellow, cut, miniature wild-type yellow cut, miniature miniature yellow, cut yellow, miniature cut Total

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(i) Which classes are parental types? (ii) Which classes represent double crossovers? (iii) Which gene is in the middle of the other two? (iv) calculate the map distances between the genes. (v) calculate interference. (5)

(b) Discuss genetic basis of Down syndrome and mention any four symptoms. (6)

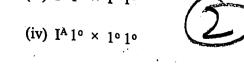
(c) What are telomeric DNA sequences? Give their significance. (4)

6. (a) Describe the experimental evidence for cytological basis of crossing over.

(b) What phenotypes and their ratios would you expect from the following matings:

(4)

- (i) $I_V I_V \times I_B I_B$
- (ii) $I^A I^B \times 1 \circ 1 \circ$
- (iii) $I^A 1^o \times I^B 1^o$



(c) Define gene duplication by giving example of Bar eyes mutation in Drosophila. (5)