[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 8516 **HC**

Unique Paper Code : 32537503

Name of the Paper : Inheritance Biology

Name of the Course : **Microbiology : DSE for Honours**

Semester : V

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Question No. **1** is compulsory.
3. Attempt **five** questions in all.

1. (a) Define the following (attempt any **12**) : (12×1=12)

(i) Acrocentric chromosome

(ii) Repetitive DNA

(iii) C-banding

(iv) Inversion

(v) Position effect

(vi) Multiple allele

(vii) Pleiotropy

(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 : (3×5=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)

4. (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)

5. (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 :

S.No	Phenotypic class	Number
1	yellow, cut, miniature	30
2	wild-type	33
3	yellow	10
4	cut, miniature	12
5	miniature	8
6	yellow, cut	5
7	yellow, miniature	1
8	cut	1
	Total	100

BSc(H) Microbiology

Sem - I - II - V

2 Set

(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. (6)

(b) What phenotypes and their ratios would you expect from the following matings : (4)

(i) $I^A I^A \times I^B I^B$

(ii) $I^A I^B \times 1^o 1^o$

(iii) $I^A 1^o \times I^B 1^o$

(iv) $I^A 1^o \times 1^o 1^o$

2

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