

3. (a) What are non-allelic interactions? Explain any three modified Mendelian ratios. (10)
- (b) Explain how chromosomes carrying visible structural mutations were used to demonstrate the cytological basis of crossing over. (5)
4. (a) Give an account of various types of gene mutations. Discuss their effects with suitable examples. (10)
- (b) What is aneuploidy? Give one example each of monosomy and trisomy in humans, along with their karyotype abbreviations. (5)
5. (a) What is cytoplasmic inheritance? Classify cytoplasmic inheritance with examples. (10)
- (b) Write a note on Retrotransposons. (5)
6. Write short notes on any **three** of the following :
- (i) Dosage Compensation
 - (ii) Transposable elements in Bacteria
 - (iii) Polyploidy
 - (iv) Polygenic Inheritance (3×5=15)

(1200)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 5854

K

Unique Paper Code : 2232013503

Name of the Paper : B.Sc. (H) Zoology NEP

Name of the Course : **Fundamentals of Genetics**

Semester : V

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **FOUR** questions, including question No. 1, which is compulsory.

1. (a) Define the following terms (**any three**) :

(1×3=3)

(i) Frameshift mutation

(ii) Gynandromorphs

(iii) Penetrance

(iv) Pleiotropy

P.T.O.

(b) Give a suitable example for each (any three):

(1×3=3)

- (i) Base Analogue
- (ii) Sex-influenced trait
- (iii) Lethal gene
- (iv) An allopolyploid

(c) Differentiate between the following (any three):

(2×3=6)

- (i) Simple and Composite Transposons
- (ii) Silent mutation and Non-sense mutation
- (iii) Nuclear inheritance and extranuclear inheritance
- (iv) Monoecious and Dioecious organisms

(d) Explain the following: (3)

- (i) Distance in Linkage maps is expressed in map units, not in base pairs.
- (ii) Inversions are crossover suppressors.

2. (a) In *Drosophila*, the recessive mutant allele cinnabar (*cn*) results in bright red eyes, curved (*c*) results in curved wings, and plexus (*px*) has extra wing veins. All three genes are linked. In a cross between *cn c px* / + + + females and *cn c px* / *cn c px* males, the following progeny were counted:

(i) Deduce the order of genes.

Phenotype (Genotype)	Number
<i>cn c px</i>	296
<i>cn c</i> +	63
<i>cn</i> + +	119
<i>cn</i> + <i>px</i>	10
+ <i>c px</i>	86
+ <i>c</i> +	15
+ + +	329
+ + <i>px</i>	82
Total	1000

(ii) Determine the map distance and construct a linkage map.

(iii) Calculate the coefficient of coincidence and interference. (2+4+2=8)

(b) Discuss somatic cell hybridisation and the use of HAT medium. Explain its significance for gene mapping. (7)

P.T.O.