



B.Sc./3rd Sem/ZOO/25(NEP)

2025

3rd Semester Examination (CCFUP : NEP)

ZOOLOGY

Paper : MJ 3-T (Single Core Major)

(Genetics)

Full Marks : 40

Time : Two Hours

The figures in the margin indicate full marks.

*Candidates are required to give their answers
in their own words as far as practicable.*

Group - A

Answer any *five* questions : $2 \times 5 = 10$

1. What is XX/XO type of sex determination? Cite one example. 1+1
2. Mention the function of Tfm gene in human sex determination.
3. What are the major differences between LINES and SINES?
4. What is pseudoallele? Cite one example. 1+1
5. Compare sex limited and sex influenced inheritance.

P.T.O.

(2)

6. What is XIST?
7. What is thymine dimer? How is it formed?
8. What is Pleiotropy?

1+1

Group - B

Answer any **four** questions :

5×4=20

9. What is maternal inheritance? Explain this phenomenon taking shell coiling in snail as an example.
10. Establish the relationship between cistron, recon and muton. State two limitations of 'one gene one polypeptide hypothesis'.
11. How does the concept of penetrance differ from expressivity? State the importance of performing a complementation test in genetic study.
12. What do you mean by euploidy and aneuploidy? Why frameshift mutation is more deleterious than point mutation?
13. Map location of genes a, b and c are respectively 3, 13 and 25 m.u. Assuming 10 map unit is equal to 10% recombination approximately. Calculate the frequency of observed D.C.O., when coefficient of coincidence is 28%.
14. What is hybrid dysgenesis? Compare between transposon and retrotransposon with suitable examples.

2+3

(3)

Group - C

Answer any *one* question : $10 \times 1 = 10$

15. (a) Define epistasis. Describe how CIB technique used to detect X-linked lethal mutations in *Drosophila*.

1+4

- (b) What is Xeroderma Pigmentosum (XP) in human? What is nonsense mutation? Give example. How do you explain 2N-2 condition? $2+2+1$

16. Three of the many recessive mutations in *Drosophila* that affect body colour, wing shape or bristle morphology are black (*b*) body versus grey in wild type, dumpy (*dp*) wing versus long wing in the wild type and hooked (*hk*) bristles at the tip versus not hooked in the wild type. From a cross of a dumpy female with a black bodied and hooked male, all the F1 progenies are wild type for all three characters. The test cross of an F1 female with a dumpy, black, hooked male gave the following results :

Phenotypes	Number
1 Wild type	169
2 black	19
3 black, hooked	301
4 dumpy hooked	21
5 hooked	8
6 hooked, dumpy, black	172
7 dumpy, black	6
8 dumpy	304

P.T.O.

(4)

Write down the genotype of the parents. Construct linkage map of the linkage group (or groups) these genes occupy and calculate the map distance between the genes.

Also determine the coefficient of coincidence for the portion of chromosome involved in this cross. How much interference is there?

2+1+3+2+2
