KATHMANDU UNIVERSITY
End Semester Examination
February, 2025

Level : B.Sc.
Year : II
Time : 2 hrs. 30 mins.

11 FEB 2025

Course : BIOT 202
Semester : II
F.M. : 55

SECTION "D"
[7 Q. × 5 = 35 marks]

Attempt *ALL* questions.

1. Discuss Temperature Dependent Sex Determination in detail.

2. Explain in detail how inversion of chromosome affects fertility.

3. Several genes interact to influence mouse coat color. Wild-type AA animals have dark and yellow striped hairs. The A^Y allele of the same gene is recessive lethal, but is also dominant to the A allele--it gets rid of the dark stripe and thus produces an all yellow color. The B gene controls whether the dark color of a hair stripe is black (B) or brown (b). B is dominant to b. Black and yellow striped hairs are referred to as "agouti". Brown and yellow striped hairs are "cinnamon". If mice of genotype A^YABb are crossed to each other, what resulting phenotypic ratios do you see in the next generation among the living mice?

4. Write short note on lethal alleles with examples.

5. In Drosophila, Lyra (Ly) and Stubble (Sb) are dominant mutations located on chromosome III. A recessive mutation with bright red eyes (br) was discovered and shown also to be on chromosome III. The data in the table are generated.

S.N.	PHENOTYPE	NUMBER
1.	Ly Sb br	404
2.	+ + +	422
3.	Ly + +	18
4.	+ Sb br	16
5.	Ly + br	75
6.	+ Sb +	59
7.	Ly Sb +	4
8.	+ + br	2
	TOTAL	**1000**

a. Determine the sequence and interlocus distance between the three genes?
b. Determine the interference involved.

P.T.O.

6. Diagram how mitotic or meiotic error generates monosomy and trisomy.

7. Suppose you discover a new variant in which hamsters have long tails instead of the usual stubby tails. You notice that this trait seems only to be present in males. To investigate this pattern, you cross a long-tail male with a true-breeding stubby-tail female, and find that all of the F1 progeny of both sexes have stubby tails. You then interbreed the F1 and observe that all of the F2 females have stubby tails, but 1/4 of the F2 males have long tails. What conclusion would you draw regarding the inheritance of long allele? Explain.

SECTION "E"

8. Give **TWO** differences between ***ANY FIVE*** [5 Q × 2 = 10 marks]
   a. Endopolyploidy and Aneuploidy.
   b. Infectious heredity and Maternal effect.
   c. X-linked and Y-linked inheritance
   d. Eugenics and Euphenics.
   e. Genotype and Phenotype.
   f. Nuclear inheritance and Cytoplasmic inheritance

9. Explain **WHY/HOW** for ***ANY FIVE*** [5 Q × 2 = 10 marks]
   a. The secondary sex ratio of humans is greater than 1.
   b. Mendel did not encounter linkage in his experiments.
   c. The study of organelle heredity is not easy.
   d. Color blindness is an X-linked recessive disorder.
   e. Multiple alleles can only be studied in population. .
   f. The maximum frequency of recombination is 50%