

KATHMANDU UNIVERSITY  
End Semester Examination [C]  
April/May, 2023

03. May - 023  
Course : BIOT 202  
Semester : I  
F.M. : 55

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

SECTION "D"  
[7Q. × 5 = 35 marks]

Attempt *ALL* questions.

1. Discuss the significance of test cross with a suitable example(s).
2. Discuss the influence of extranuclear genes in shell coiling pattern of snail.
3. Write short note on Temperature-Dependent Sex Determination in Reptiles.
4. Discuss the role of gene duplication in evolution.
5. Determine the possible phenotypes of the offspring born from the parents both of whom are blood type AB and heterozygous for "h mutation".
6. Explain the inheritance pattern of eye color mutation in *Drosophila*.
7. In *Drosophila*, Lyra (Ly) and Stubble (Sb) are dominant mutations located at loci 40 and 58, respectively, on chromosome III. A recessive mutation with bright red eyes was discovered and shown also to be on chromosome III. A map is obtained by crossing a female who is heterozygous for all three mutations to a male homozygous for the bright red mutation (which we refer to here as br). The data in the table are generated. [2+2+1]
  - a. Determine the location of the br mutation on chromosome III.
  - b. Calculate the interference involved.
  - c. Is it a positive or negative interference? Explain.

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
	<b>TOTAL</b>	<b>1000</b>

SECTION "C"

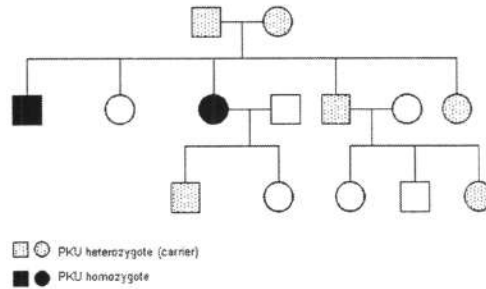
8. Give *TWO* differences between (*ANY FIVE*):
  - a. Penetrance and Expressivity
  - b. Eugenics and Euphenics
  - c. Parental and Recombinant gametes
  - d. Autopolyploid and Allopolyploid
  - e. Paracentric and Pericentric inversion
  - f. Back cross and Reciprocal cross

[5Q. × 2 = 10 marks]

9. Explain WHY/HOW for (*ANY FIVE*): [5Q. × 2 = 10 marks]
- a. ABO alleles show both co-dominant and dominant/recessive type of inheritance.
  - b. Trisomy 21 is not an inherited disorder.
  - c. Baldness in humans is a sex-influenced autosomal trait.
  - d. Mendel did not encounter linkage in his classic pea-experiments.
  - e. Autosomal dominant traits do not skip generation.
  - f. The number of recombinants recovered depends upon the distance between the genes.



8. Which of the following is statements regarding aneuploidy is **INCORRECT**?
- Arises due to the non-disjunction of homologous pair of chromosomes
  - Arises due to the non-disjunction of non-homologous chromosomes
  - One gamete comes to have an extra chromosome
  - Another gamete becomes deficient in one chromosome
9. Cytoplasmic inheritance differs from nuclear inheritance in the absence of
- similarity of reciprocal Crosses
  - effect on back crossing
  - biparental contribution
  - all the above
10. Identify the mode of inheritance
- autosomal dominant
  - autosomal recessive
  - X-linked dominant
  - X-linked recessive



SECTION "B"  
 [5Q. × 1 = 5 marks]

11. The phenomenon where a gene pair masks the effect of another is called \_\_\_\_\_.
12. \_\_\_\_\_ is the basic unit of inheritance.
13. The number of Barr bodies in males with Klinefelter's syndrome is \_\_\_\_\_.
14. Consider this sequence A—O—B —C—D—E—F, be a DNA sequence where O is the centromere. The sequence after pericentric inversion will be \_\_\_\_\_.
15. \_\_\_\_\_ is an alternate form of a gene.

SECTION "C"  
 [5Q. × 1 = 5 marks]

**Define the following.**

16. Single cross over:
17. Trisomy 13:
18. Intercalary deletion:
19. Partial dominance:
20. Recessive lethal allele: