

M.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2023.

Second Semester

Zoology — Core

GENETICS

(For those who joined in July 2021 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Dihybrid cross between two heterozygous individuals, what is the phenotypic ratio of the off spring?
(a) 1 : 1 (b) 3 : 1
(c) 1 : 2 : 1 (d) 9 : 3 : 3 : 1
2. Pleiotropy means
(a) A phenomenon where multiple genes influence a single trait
(b) A phenomenon where a single gene influences multiple traits
(c) A phenomenon where genes are linked on the same chromosome
(d) A phenomenon where genes are unlinked on different chromosomes

3. Purpose of a two-point test cross is
(a) to determine the genotype of an individual
(b) to determine the linkage between two genes on the same chromosome
(c) to determine the location of genes on different chromosomes
(d) to determine the number of genes in a population
4. Which chromosome is responsible for X-linked inheritance?
(a) Chromosome 1 (b) Chromosome 20
(c) X chromosome (d) Y chromosome
5. Which of the following promotes gene expression in euchromatin?
(a) Histone acetylation
(b) DNA methylation
(c) Histone methylation
(d) Histone deacetylation

6. What is the effect of a deletion mutation on a gene?
(a) It usually has no effect
(b) It may cause the gene to produce a non-functional protein
(c) It may cause the gene to produce a protein with altered function
(d) It may cause the gene to produce a more efficient protein
7. Which of the following is not a factor that can affect genotype frequencies in a population?
(a) Mutation (b) Migration
(c) Genetic drift (d) Natural selection
8. Migration in population genetics is
(a) The movement of individuals into or out of a population
(b) The frequency of a particular allele in a population
(c) The evolution of new species from existing ones
(d) The process of natural selection

9. Sickle cell anemia is caused by a mutation in _____
(a) Hemoglobin A gene
(b) Hemoglobin B gene
(c) Hemoglobin C gene
(d) Hemoglobin S gene
10. Alkaptonuria is caused by a deficiency of
(a) Homogentisate oxidase
(b) Tyrosine hydroxylase
(c) Phenylalanine hydroxylase
(d) Histidine decarboxylase

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Define law of independent assortment.
Or
(b) Describe polygenetic inheritance.
12. (a) Explain about two point test cross.
Or
(b) Describe Y linkage with hair pinna in males.

13. (a) Articulate about Euploidy and Aneuploidy.

Or

(b) Explain genetic aberrations with deletion.

14. (a) Conclude – Fisher's theorem.

Or

(b) Explain about migration.

15. (a) Evaluate about Sickle cell anaemia.

Or

(b) Justify – reverse mutation.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Enumerate dihybrid cross with law of independent assortment.

Or

(b) Define multiple allelic inheritance.

17. (a) Illustrate three point test cross in drosophila.

Or

(b) Discuss X linked inheritance with hemophilia.

18. (a) Explain about non disjunction failure in during cell division.

Or

(b) Articulate about karyo type concepts of Eugeneics and Euthenics.

19. (a) Explain about Inbreeding depression in a gene population.

Or

(b) Define – Inbreeding depression.

20. (a) Summarize about frameshift mutation.

Or

(b) Evaluate the inborn errors of metabolism that cause albinism.