

M.Sc. ZOOLOGY
Third Semester
Genetics and Evolution
(MSZ-11)

Duration: 3Hrs.

Full Marks: 70

**Part-A (Objective) =20
Part-B (Descriptive)=50**

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins.

Marks: 50

1. Answer the following questions (any five)

2×5=10

- a) What happens when snap dragon plant with red colour flower (RR) crossed with a heterozygous (Rr) for flower colour snap dragon plant. Worked out all the genotypes and phenotypes.
- b) A Women with blood group O married a man with AB group. Show the possible blood groups of the progeny.
- c) Differentiate between back cross and test cross.
- d) How incomplete dominance does is differ from complete dominance?
- e) A haemophilic son was born to normal parents. Give the genotype of the parents.
- f) What is sex chromatin? Explain its significance.
- g) Define allele and dihybrid cross.

2. Answer the following questions (any five)

3×5=15

- a) Write a brief note on the structure of DNA.
- b) What is the genotype of an individual with Turner's syndrome? Give 6 important phenotypic characters of such an individual.
- c) What do you understand by map distance? How is it determined?
- d) State the important features of chromosomal theory of inheritance.
- e) What is Phenotypic Plasticity? Explain with examples.
- f) Breeding within a small population can lead to decreased fitness of the offsprings. Mention the term use to describe and define it.
- g) Define the following terms: 1. Heterosis 2. Hardy-weinberg equilibrium.

3. Answer the following questions (any five)

5×5=25

- a) Demonstrate and explain the phenomenon of incomplete linkage in female drosophila with suitable crosses.
- b) Describe the human Y chromosome with a suitable diagram.
- c) Describe the genetic event that can produce an XYY man with a suitable diagrammatic representation.
- d) What is Rh incompatibility? Explain why blood group O can be an universal donor.
- e) What is somatic cell hybridization? Discuss the somatic fusion in case of Animal cell.
- f) Define 'genetic structure of a population'. In a flower garden 200 tulip flowers are White (rr), 500 are Pink (Rr) and 300 are Red (RR). Find out the genotype frequencies.
- g) A homozygous tall pea plant with green seeds (TTYy) is crossed with dwarf pea plant with yellow seeds (ttyy).
 - i. What would be the phenotype and genotype of F_1 ?
 - ii. Workout the phenotypic ratio of F_2 generation with the help of a Punnett square.

M.Sc. ZOOLOGY
Third Semester
Genetics and Evolution

(MSZ-11)

(The figures in the margin indicate full marks for the questions)

Duration: 20 minutes

Marks – 20

PART A- Objective Type

A. Choose the correct answer from the following. 1×20=20

1. What type of allele produces its effects only in homozygous individuals.
 - a. Dominant
 - b. Recessive
 - c. Incomplete dominance
 - d. Overdominance
2. Colour blindness is a
 - a. Sexlinked recessive disorder
 - b. Sex-linked dominant disorder
 - c. Autosome linked recessive disease
 - d. None of these
3. Which of the following is not a destabilizing force in Hardy-Weinberg law
 - a. Migration
 - b. B. mutation
 - c. Mitosis
 - d. Genetic drift
4. An unrooted evolutionary tree reflects
 - a. The relationship among species but not the evolutionary path
 - b. The evolutionary path and ancestral origin
 - c. All of the above
 - d. None of these
5. A heterozygous condition which yields some resistance to malaria due to
 - a. Codominance
 - b. Overdominance
 - c. Phenotypic plasticity
 - d. None of these

6. A Rh- negative mother may problem like hemolytic anemia during the birth of her second child.
 - a. Rh incompatibility
 - b. Rh-compatibility
 - c. ABO incompatibility
 - d. All of above

7. Sendai virus is used in
 - a. Somatic fusion
 - b. Transduction
 - c. Conjugation
 - d. None of these

8. In which of the following inheritance genotype and phenotypic ratios are same
 - a. Incomplete dominance
 - b. Co-dominance
 - c. Overdominance
 - d. None of these

9. Test cross is done
 - a. To determine the genotype
 - b. To determine the phenotype
 - c. Recessiveness
 - d. None of these

10. ABO blood grouping system is an example of
 - a. Codominance
 - b. Incomplete dominance
 - c. Recessiveness
 - d. None of these

11. The homologous pairing between X and Y chromosome is possible due to
 - a. Xist gene
 - b. SRY gene
 - c. Pseudoautosomal region
 - e. None of the choices

12. In XXXXX karyotype female, there is
 - a. 4 barr body
 - b. 5 barr body
 - c. 3 barr body
 - d. 2 barr body

13. Satellite DNA are
 - a. transcriptionally active DNA
 - b. highly repetitive DNA
 - c. loosely packed DNA
 - d. all the above

14. In linkage mapping of the chromosomes of a species
- one has to know the total number of genes present in the species
 - one has to know the exact number of chromosomes of that species
 - one has to conduct hybridization experiments
 - all the above
15. Haplo-diploidy system of sex determination is found in
- birds
 - bee
 - grass-hopper
 - humans
16. Monosomic and Nullisomic are representation of
- euploidy
 - polyploidy
 - hypoploidy
 - all of the above
17. The form of DNA which is present in cells and are right handed helix is
- C DNA
 - Z DNA
 - B DNA
 - E DNA
18. The process of recombination doesnot occur in
- male drosophila
 - female drosophila
 - male silkworms
 - none
19. Females possess the syndrome known as
- Klinefelter's syndrome
 - Turner's syndrome
 - poly X females
 - Down's syndrome
20. In crossing over, synaptonemal complex dissolves during
- synapsis
 - duplication
 - terminalization
 - all of the choices
