

M.Sc. ZOOLOGY
Third Semester
GENETICS & 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

Answer any *five* of the following questions:

1. Define Stromatolites. How does fossil presents the evidence of evolution? Also, explain the origin of life on the basis of Oparin and Haldanes theory.

(2+3+5=10)

Or

Describe about the evolution of Bird. Mention how they are linked to reptiles.

(5+5=10)

2. What is meant by Unique and repetitive DNA? State in detail about the euchromatic and heterochromatic region of a chromosome. Mention its significance.

(2+6+2=10)

3. Explain Kimura's Neutral theory of Evolution and its view against Natural selection.

(5+5=10)

4. How does the sex determination in mammal differ from that of a bird? Explain the sex determination in drosophila. State the significance of Y chromosome.

(2+6+2=10)

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5. Describe about the evolution of human being with reference to its various stages of development of posture and Brain. (10)

Or

Write short notes on any *two* of the following: (2×5=10)

i) Genetic counseling and its principles.

ii) Mechanism of dosage compensation in human females.

iii) Role of SRY gene in sexual differentiation in human.

6. What is the difference between macro and micro evolution? State the various types of Micro evolution. State the significance of macro evolution and evolutionary synthesis. (1+4+5=10)

7. What is meant by cell cycle checkpoint? Explain with proper illustration how a cell stops progression of a cell division after a single stranded DNA damage. (2+8=10)

8. Discuss common autosomal and sex chromosomal abnormalities in human being. Describe their chromosomal basis and their phenotypic character. (2+8=10)

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Duration: 20 minutes

Marks – 20

PART-A (Objective)

Time: 20 mins

Total Marks: 20

I. Choose the correct option:

1×20=20

- Which of the following describes gene flow?
a) Random mating b) Migration
c) Genetic drift d) Selection
- In the process of evolutionary changes, the resultant alterations and loss of genetic variability has been termed as:
a) Genetic drift b) Bottleneck effect
c) Mutation d) founder effect
- The microevolution is associated with the process of:
a) Mutation, recombination and natural selection.
b) Recombination, allele frequency suffling and natural selection.
c) Genetic drift, recombination and natural selection.
d) Mutation, genetic variation and genetic bottleneck.
- Which of the following is not an assumption of Hardy-weinberg equilibrium?
a) Mating occurs preferentially.
b) The size of the population is very large.
c) There is no migration.
d) There are no mutations.
- The eukaryotic cell cycle is controlled several points ; which of these statement is not true?
a) Cell growth is assessed at the G₁/S checkpoint.
b) DNA Replication is assessed at the G₂/M checkpoint.
c) The chromosomes are assessed at the G₂/M checkpoint.
d) Environmental conditions are assessed at the G₀ checkpoint.
- Prezygotic isolating mechanisms include all of the following except:
a) Hybrid sterility b) Courtship rituals
c) Habitat separation d) Seasonal reproduction
- Which of the following is an example of living fossils?
a) Pinus b) Riccia c) Gingko d) Gnetum

19. Match the following:

Column -I

- A. Down's syndrome
- B. Cri-du-chat
- C. Klinefelter's syndrome
- D. Turner's syndrome

Column-II

- P. An additional sex chromosome
- Q. Loss of a part of chromosome
- R. Absence of sex chromosome
- S. Presence of an extra chromosome
- T. Presence of two extra chromosome

- a. A-S, B-Q, C-P, D-R
- b. A-T, B-S, C-P, D-Q
- c. A-S, B-T, C-Q, D-R
- d. A-S, B-Q, C-R, D-P

20. Dosage compensation in human female is achieved by:

- a) Hypoactivation of both X chromosome.
- b) Hypoactivation of anyone X chromosome.
- c) Hypoactivation of Maternal X chromosome.
- d) Hypoactivation of Paternal X chromosome.
