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**M.Sc. (Semester-I) Examination,
Dec.-Jan. (2025-26)**

ZOOLOGY

**(Systematics, Biodiversity and
Evolution)**

Time Allowed : Three Hours

Maximum Marks : 70

Note : This question paper is divided into **four** sections. Attempt questions from **all four** sections as per given direction. Distribution of marks is given in each section.

SECTION-A

(Objective Type Questions)

Note : Attempt **any ten** questions. Each question carries **1** mark. [10×1=10]

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(1)

[P.T.O.]

1. (A) Fill in the blanks :

- (i) Darwin defined evolution as _____.
- (ii) Nucleotide sequence within a gene that is removed by RNA splicing during maturation of final RNA product is called _____.
- (iii) Molecular clock hypothesis proposed by _____.
- (iv) A small, extrachromosomal DNA molecule within a bacteria is referred as _____.

(B) Multiple choice questions :

- (v) Which of the following molecule utilized by Carl Woese to construct phylogenetic tree :
 - (a) 5 S r-RNA
 - (b) 16 S r-RNA
 - (c) 23 S r-RNA
 - (d) 30 S r-RNA

(vi) Molecular phylogeny exploits the sequential information of an organism of :

- (a) DNA
- (b) RNA
- (c) Protein
- (d) All of the above

(vii) Transposons are also called as :

- (a) Mobile DNA elements
- (b) Selfish DNA
- (c) Both (a) and (b)
- (d) None of the above

(viii) All GEIs (Genomic Islands) contain a recombination module which consist of an :

- (a) integrase
- (b) aft L
- (c) aft R
- (d) all of the above

(ix) Species occurring in different geographical area are called :

- (a) Sibling
- (b) Neopatric
- (c) Sympatric
- (d) Allopatric

(x) Causes of speciation is :

- (a) random mating
- (b) hybridization
- (c) isolation
- (d) migration

(xi) The concept of molecular clock implies that :

- (a) many proteins show a constant rate of change with time
- (b) organism evolve at a constant rate
- (c) One can date evolutionary event with molecules alone
- (d) all molecules change at the same rate of evolution

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(4)

(xii) The order of appearance of the main groups of organisms during evolution can best be described as follows :

- (a) autotrophic, anaerobic heterotrophic, aerobic heterotrophic
- (b) aerobic heterotrophic, anaerobic heterotrophic, autotrophic
- (c) anaerobic heterotrophic, aerobic heterotrophic, water oxidizing autotrophic
- (d) anaerobic heterotrophic, water oxidizing autotrophic, aerobic heterotrophic

SECTION-B

(Very Short Answer Type Questions)

Note: Attempt any five questions. Each question carries 2 marks. (Word limit : 25-30 words) [5×2=10]

2. (i) What is an Operational Taxonomic Unit (OTU)?
- (ii) Define horizontal gene transfer.
- (iii) Define Systematics in Biology.

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(5)

[P.T.O.]

- (iv) What is Fossilized Cells?
(v) What do you understand by itegrons?
(vi) Define Molecular Drive.
(vii) Explain Adaptive Radiation.

SECTION-C

(Short Answer Type Questions)

Note: Attempt **any five** questions. Each question carries 4 marks. (Word limit : 250 words) [5×4=20]

- 3.
- (i) Explain introns as ancient component of genes.
 - (ii) Explain the concept of three domains of living kingdom.
 - (iii) Explain the concept of speciation in bacteria.
 - (iv) Describe the role of plasmid in DNA transfer.
 - (v) How first cell arose?
 - (vi) Write theories of biological classification.
 - (vii) Write about the types of taxonomy.

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(6)

SECTION-D

(Essay Type Questions)

Note: Attempt **any three** questions. Each question carries 10 marks. (Word limit : 500 words) [3×10=30]

- (i) Write about the concept of organic evolution during pre and post-Darwin era.
- (ii) Discuss the methods of Phylogenetic tree construction using molecular data.
- (iii) Discuss evolution of eukaryotic genome with suitable example.
- (iv) Explain mechanism of speciation.

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