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3 (Sem-6/CBCS) ZOO HC 2

2025

ZOOLOGY

(Honours Core)

Paper : ZOO-HC-6026

(*Evolutionary Biology*)

Full Marks : 60

Time : Three hours

*The figures in the margin indicate full marks for the questions.*

1. Choose the correct option from the following questions : 1×7=7
- (i) A population has 36% of homozygous recessive genotype 'pp'. The frequency of allele 'p' is
- (a) 40%
- (b) 50%
- (c) 60%
- (d) 70%

(ii) Which of the following is the first genetic material?

- (a) RNA
- (b) DNA
- (c) Amino acid
- (d) Nucleic acid

(iii) Kimura suggested that most evolutionary changes at the molecular level are due to random genetic drift. This is known as

- (a) Theory of natural selection
- (b) Neutral theory of molecular evolution
- (c) Theory of equilibrium
- (d) Theory of germplasm

(iv) The reduction in a population's average fitness due to the presence of deleterious alleles or genotypes in the gene pool is known as

- (a) Genetic drift
- (b) Mutation
- (c) Genetic load
- (d) Relative fitness

(v) The ancient primates, believed to be the common ancestors of both apes and humans, who lived during the middle to late Miocene period are

- (a) Dryopithecus
- (b) Ramapithecus
- (c) Australopithecus
- (d) Sivapithecus

(vi) Choose the incorrect statement regarding the terminologies of a phylogenetic tree.

- (a) Branches are the lines in the tree.
- (b) Tips of the branches have long lost species.
- (c) Nodes indicate common ancestors where lineages diverge.
- (d) The root represents the common ancestor of all the taxa.

(vii) A small group of individuals from a larger population migrates to a new location and establishes a new population. This is known as

- (a) Bottleneck effect
- (b) Founder effect
- (c) Natural selection
- (d) Adaptation

2. Answer the following questions :  $2 \times 4 = 8$

- (i) What is the basic difference between Lamarckism and Darwinism ?
- (ii) What is the difference between connecting link and missing link ?
- (iii) What is the advantage of Heterozygous superiority ?
- (iv) What do you mean by 'root' and 'branch' in a phylogenetic tree ?

3. Write short notes on : **(any three)**  $5 \times 3 = 15$

- (i) Theory of Endosymbiosis
- (ii) Convergent and divergent evolution
- (iii) Adaptive radiation
- (iv) K-T extinction
- (v) Natural selection and its types

4. Answer **any three** of the following questions : 10×3=30

(i) Describe the key concepts of Darwin's theory of evolution. What are the differences between Darwinism and Neo-Darwinism ? 7+3=10

(ii) What are fossils ? Describe different types of fossils with examples. 1+9=10

(iii) What are the sources of hereditary variation and their role in evolution ? Elaborate it. 5+5=10

(iv) (a) State the Hardy-Weinberg principle of equilibrium. Mention the conditions required for a population to be in Hardy-Weinberg equilibrium. 1+5=6

(b) In a population of 1000 individuals, 36% of the individuals are recessive homozygotes for a certain trait. Calculate the number of homozygous dominant individuals and heterozygous individuals. (Assume that the population is in Hardy-Weinberg equilibrium) 4

(v) What do you mean by speciation ? Describe the different modes of speciation with suitable examples. 1+9=10

(vi) What are hominin characteristics ? Describe the evolution of man from *Australopithecus* to *Homo sapiens*. 3+7=10

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