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 : 2×4=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)*** 5×3=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