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3 (Sem-6/CBCS) ZOO HC 2

2023

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. Find out the correct answer from the following: 1×7=7

(i) What was the mode of respiration for the prokaryotes during biological evolution ?

- (a) Aerobic
- (b) Cellular
- (c) Anaerobic
- (d) External

Contd.

- (ii) Evolution can be defined as
- (a) History of race
 - (b) Development of race
 - (c) History and development of race with variation
 - (d) Progressive history of race
- (iii) Which of the following principles is not part of Darwin's theory of evolution by natural selection ?
- (a) Variation occurs among individuals in a population
 - (b) Mutations are the ultimate source of genetic variation
 - (c) Individuals that possess the most favourable variations have the best chance of reproducing
 - (d) More individuals are born than will survive
- (iv) The factor that leads to founder effect in a population is
- (a) Mutation
 - (b) Natural selection
 - (c) Genetic drift
 - (d) Genetic recombination

- (v) Which is the earliest known ancestor of man ?

- (a) Dryopithecus
- (b) Homo erectus
- (c) Homo habilis
- (d) Australopithecus

- (vi) The traditional use of phylogenetic analysis is to discover evolutionary relationships among species.

(State True **or** False)

- (vii) A species inhabiting different geographical areas is known as

- (a) Allopatric species
- (b) Sympatric species
- (c) Sibling species
- (d) Biospecies

2. Answer the following :

2×4=8

- (i) What are coacervates ?

- (ii) The following data shows four amino acids found across three species :

Species	Amino acid sequence
Dog	Ile-Cys-Trp-Ser
Monkey	Ile-Cys-Trp-Ser
Frog	Met-Cys-Trp-Arg

Which phylogenetic tree best represents the information in the chart ?

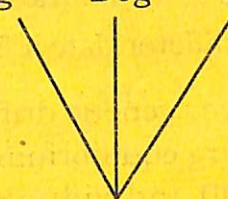
- (a) Monkey Frog Dog



- (b) Dog Monkey Frog



- (c) Frog Dog Monkey



- (d) Frog Dog Monkey



- (iii) What is gene flow ?
(iv) Concept of kin selection.

3. Answer **any three** of the following : $5 \times 3 = 15$

- (i) Explain the concept of "Three Domains of Life" as an evolutionary model of phylogeny.
(ii) Write short note on Neo-Darwinism.
(iii) Discuss adaptive radiation in the context of Darwin's finches.

- (iv) What are the unique hominin characters which differentiate it from the primates ?
- (v) How does genetic drift affect the Hardy-Weinberg equilibrium ? In a population of 1000 individuals 360 belong to genotype AA, 480 to Aa and the remaining 160 to aa. What will be the frequency of allele A in the population ?
4. (a) What do you mean by speciation ? Discuss the various modes of speciation. 2+8=10

Or

- (b) Describe Stanley Miller's experiment and explain how does it prove the biochemical theory of origin of life. 10
5. (a) Discuss Hardy-Weinberg law of equilibrium citing the evolutionary forces that upset the law. 10

Or

- (b) What is fossil ? Describe the process of fossilization. Enumerate the methods for determination of the age of a fossil. 1+5+4=10

6. (a) What are the major five mass extinction events that occurred in the history of Earth ? Discuss them with special emphasis on its causes and effects. 5+5=10

Or

- (b) Give the concept of phylogenetic tree. What are the different methods of molecular phylogenetic analysis ? State the significance of phylogenetic trees in evolutionary biology. 2+6+2=10