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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

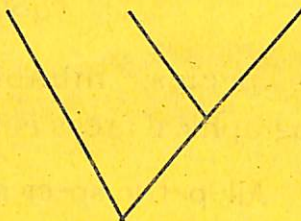
(i) What are coacervates ?

- (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 ?

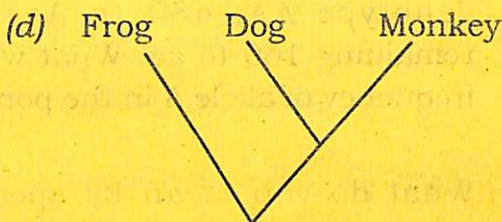
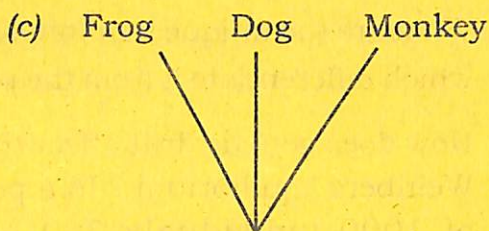
- (a) Monkey Frog Dog



- (b) Dog Monkey Frog







(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