3 (Sem–6/CBCS) ZOO HC 2

2022

ZOOLOGY

(Honours)

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 answers from the options : ***(any seven)*** 1×7=7

   (i) Coacervates were —

   (a) A colloidal systems formed during biochemical evolution,

   (b) Macromolecules

   (c) Proteins

   (d) Viruses formed in prebiotic soup

(ii) In 1953 Stanley Miller put the following mixture in his electrical spark discharge —

(a) HNO_3, CO_2, N_2 and H_2S

(b) CO_2, N_2, and NH_3

(c) CH_4, H_2, NH_3, H_2O

(d) C_2H_6, H_2S, H_2O

(iii) According to Darwin Origin of Species is the result of —

(a) Mutation

(b) Natural Selection

(c) Acquired character

(d) Hybridization

(iv) "Ontogeny recapitulates phylogeny" was established by —

(a) Cal von Nagaelish

(b) Von Bear

(c) Ernst Haeckel

(d) Frederick Muller

(v) Which digits of the surviving horse touches the ground ?

(a) First digits

(b) Second and fourth digits only

(c) Only the third digits

(d) Third and fourth digits only

(vi) Fossilized foot prints of animals are called

(a) Sub fossils

(b) Pseudofossils

(c) Microfossils

(d) Ichnofossils

(vii) Which of the following fossil is reported from India —

(a) Handyman

(b) Taung baby

(c) Ramapithecus,

(d) Peking man

(viii) Primitive earth was absence of free

(a) NH_3

(b) CH_4

(c) O_2

(d) CO_2

(ix) Protohippus gave rise

(a) Orohippus

(b) Parahippus

(c) Amphitherium

(d) Hipparion

(x) What is the difference between micro- and macroevolution ?

(a) Microevolution describes the evolution of small organisms, such as insects, while macroevolution describes the evolution of large organisms, like people and elephants.

(b) Microevolution describes the evolution of microscopic entities, such as molecules and proteins, while macroevolution describes the evolution of whole organisms.

(c) Microevolution describes the evolution of organisms in populations, while macroevolution describes the evolution of species over long periods of time.

(d) Microevolution describes the evolution of organisms over their lifetimes, while macroevolution describes the evolution of organisms over multiple generations.

2. Answer ***any four*** of the following : 2×4=8

(i) Match the fossils of Group–A with the discovery site of Group–B

A. (i) Solo Man

(ii) Heidelberg Man

(iii) Terrifire Man

(iv) Zinjanthropus

(v) Lucy

(vi) Oreopithecus

B. (i) Tuscany

(ii) Ethiopia

(iii) Olduvai Gorge

(iv) Algeria

(v) Germany

(vi) Java

(ii) Describe a situation in which a population would undergo the Bottleneck effect and explain what impact that would have on the population's gene pool.

(iii) Explain why genetic drift is most likely favourable for small population.

(iv) What is the frequency of heterozygotes Aa in a randomly mating population in which the frequency of all dominant phenotypes is 0.19 ?

(v) What is the role of hereditary variation in evolution ?

(vi) Outline the probable causes of Mass Extinction.

(vii) Write down the role of Cyt-c in evolution.

(viii) Differentiate Microfossils and Macrofossils.

(ix) What is hot dilute soup ?

(x) What is genetic load ?

3. Answer ***any three*** of the following : 5×3=15

(i) Construct a Phylogenetic tree using UPGMA method.

	A	B	C	D	E
B	2				
C	4	4			
D	6	6	4		
E	6	6	6	4	
F	8	8	8	8	8

(ii) Construct a phylogenetic tree using any of the character-based method for the following multiple sequence alignment. Consider orangutan as outgroup.

Human	TTAGCTACT
Chimpanzee	CTAGCTCCC
Gorilla	CTGGCCACT
Orangutan	CTGGACCCT

(iii) In a large population of butterflies, the colour brown (B) is dominant over the colour white (b) ; 40% of all butterflies are white. Calculate the following—

(a) The percentage of individuals which are heterozygous.

(b) The frequency of the dominant allele 'B'.

(c) The frequency of the allele 'b'.

(d) The frequency of homozygous dominant individuals.

(e) The frequency of the possible phenotype where 'B' is completely dominant over 'b'.

(iv) Outline the evolutionary changes from ape like form to human form.

(v) Write short notes on Neo Darwinism.

(vi) List out the different periods and epochs of Cenozoic era, Mesozoic era and Palaeozoic era from the time of beginning of periods to present.

(vii) Write briefly on transitional forms.

(viii) What are the drawback of Lamarckian theory ?

(ix) Write short note on adaptive radiation in Galapagos Finches.

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

(i) What are the forces of evolution ? Briefly explain each of the forces. 2+8=10

(ii) Write *four* characteristics of modern horse. Write briefly the phylogeny of horse in Eocene and Oligocene period with suitable diagrams. 2+4+4=10

(iii) What are the modes of speciation ? Explain each with suitable examples. 1+9=10

(iv) Write elaborately about the evidences of evolution giving special emphasis on the fossil record. 10

(v) Define natural selection. Discuss each citing the graphical representation. 1+9=10

(vi) What is extinction ? Give a detailed account of K-T extinction. 2+8=10

(vii) What is macro-evolution ? Give a detailed account of the essential features and patterns of macro-evolution. 2+4+4=10

(viii) Describe the conditions, which have to be in effect for Hardy-Weinberg equilibrium to be valid. 10

(ix) Write the different steps of Chemical origin of life. Describe Miller-Urey's experiment to prove the biochemical theory of origin of life. 5+5=10

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