Total No. of printed pages = 6

63/2 (SEM-1) ZOO 104

2021

(held in 2022)

ZOOLOGY

(Theory Paper)

Paper Code : ZOO-104

(Evolutionary Biology and Biosystematics)

Full Marks – 80

Time – Three hours

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

1. Answer the following multiple choice questions : 1×6=6

   (i) According to molecular clock theory

   (a) Mutation occurs much faster in non-synonymous sites

   (b) Functionally important genes evolve faster

   (c) Functionally less important genes evolve slower

   (d) Mutation occurs much faster at silent sites

(ii) The mechanism by which species are classified based on their different habitat choices, mating seasons, etc. comes under

(a) Post-zygotic mechanism of speciation

(b) Pre-zygotic mechanism of speciation

(c) Allopatric mechanism of speciation

(d) Parapatric mechanism of speciation

(iii) If a bacterium form conjugation tube, which one of the following plasmids is present in those becteria ?

(a) Col plasmid (b) R-plasmid

(c) F-plasmid (d) All of the above

(iv) Fibrinopeptides exhibit high rate of mutation because

(a) its coding sequence is easily susceptible to variety of mutants

(b) it is functionally less constraint

(c) it is functionally more constraint

(d) it has a very short amino acid sequence.

(v) If a gene duplicates and diverged from a common ancestor but maintaining the same function within the same species is known as

(a) Paralogous gene

(b) Orthologous gene

(c) Homologous gene

(d) Similarity gene

(vi) The globin gene family is a typical example of evolution of genes by

(a) Gene duplication

(b) Lateral gene transfer

(c) Transposable element

(d) Genetic Drift.

2. Answer any *five* of the following short questions : 2×5=10

(a) What do you mean by alpha and beta taxonomy ?

(b) What is synonymous and non-synonymous mutation ?

(c) What are molecular markers in molecular phylogeny ?

(d) What are the salient features of Mutation theory of evolution ?

(e) What is the significance of coacervates and microspheres in evolutionary biology ?

3. Answer any *six* of the following questions : 5×6=30

(a) Describe briefly about the pre-and post-zygotic isolating mechanisms of speciation.

(b) Describe the taxonomic characters and its importance in animal classification.

(c) Describe the three-domain concept of life and their phylogenetic relationship.

(d) Write short notes on RNA world.

(e) Explain how genetic drift in a small population can lead to evolution of a new species.

(f) Describe frequency dependent selection with the help of an example. 2+3=5

(g) What do you understand by 'altruistic behavior' in animals ? Describe in detail genetic basis for reproductive isolation. 1+4=5

(h) Describe the role of transposable elements in evolution of genes and genome.

(i) How did the 'Endosymbiosis theory' explain the origin of eukaryotic organelles ? What were the evidences in support of this theory ? 4+1=5

4. Answer any *two* of the following long answer type questions : 10×2=20

(a) What is molecular taxonomy ? Describe the factors responsible for molecular divergence. 2+8=10

(b) Describe in detail about the evolution of human. Add note on issues of human evolution. 7+3=10

(c) Describe the various of mechanism of origin of new genes by giving examples. What are the fates of duplicated genes ? 6+4=10

5. Answer any *one* of the following very long type question : 14×1=14

(a) What is vertical and horizontal gene transfer ? Describe how plasmids, transposons and integrons help in gene transfer. 4+10=14

(b) What are the salient features of Natural selection ? Explain Disruptive and progressive type of selection by giving suitable examples. How can heterozygote advantage lead to balanced polymorphism in a population ? 3+7+4=14