

2016

M.Sc. Part-II Examination

ZOOLOGY

PAPER—VII (Group—B)

Full Marks : 50

Time : 2 Hours

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Write the Answers to Questions of each Unit in separate Booklet.

Answer any *four* questions taking *two* from each unit.

Unit—I

[Microbiology]

1. (a) Classify bacteria on the basis of temperature preference. 3
- (b) Why anaerobic bacteria are unable to grow in presence of oxygen? 4

(Turn Over)

- (c) Elaborate the relationship of microbes with fossil fuel formation. 3
- (d) Describe the steps in Bacterial spore formation. $2\frac{1}{2}$
2. (a) Compare the salient features of 5-kingdom and 8-kingdom classification system. 4
- (b) Draw and describe the scaffolding in the peptidoglycan layer of a bacterial cell wall. 4
- (c) How can the growth of Bacteria be measured by different methods? Distinguish between Viable count and Total count. $3+1\frac{1}{2}$
3. (a) Why *E. Coli* is considered as an indicator of water pollution? 4
- (b) Elaborate the structural components of Flagella and Fimbriae. $2\frac{1}{2}+2\frac{1}{2}$
- (c) State the variety of characteristics observed after colony formation of bacteria. $3\frac{1}{2}$

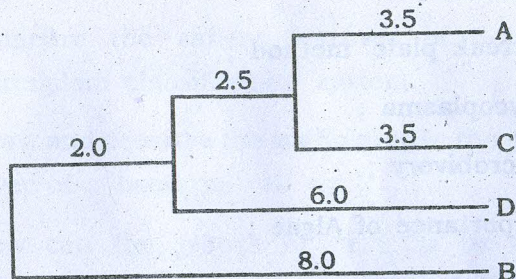
4. Write short notes on any five of the following: $5 \times 2\frac{1}{2}$
- (a) Protista ;
- (b) Plasmid ;
- (c) 'Streak plate' method ;
- (d) Mycoplasma ;
- (e) Microbivory ;
- (f) Importance of Algae ;
- (g) Magnetosome.

Unit—II

[Environmental Physiology and Evolution]

5. (a) Why the sequences of human and horse β -globin are much similar than the sequences of the human α -globin and β -globin. $2\frac{1}{2}$
- (b) What are the factors responsible for genetic drift? $2\frac{1}{2}$

- (c) What is the UPGMA distance matrix? Make a distance matrix from the following gene tree : 5



- (d) What is the difference between rooted & unrooted trees? $2\frac{1}{2}$

6. (a) A population of 60 adult squirrels reside in a campus and the frequency of G6PD allele among them is 0.70. Another population of squirrel residing in nearby forest and their G6PD allele frequency is 0.6. During flood 40 squirrels from the forest migrate to campus for shelter and mate with the resident. What will be the allele frequency of G6PD allele in the campus population after migration? $6\frac{1}{2}$

- (b) At a particular locus there are two alleles, B and b. The mutation rate of B to b is 3.5×10^{-4} , whereas the mutation rate of b to B is 6×10^{-8} . What is the equilibrium frequency of the b allele, assuming no other factor is operating in this population? 6

7. (a) Explain the pathway of destruction of free radicals.
 (b) State the role of thyroid in thermoregulation.
 (c) Mention the role of antioxidants in oxidative stress management.

$12\frac{1}{2}$

8. (a) A homologous DNA region, which was 1000 bp in length was sequenced among four different species. The following number of nucleotide differences were obtained :

	Human	Baboon	Chimpanzee	Gorilla
Human	0	44	72	50
Baboon	44	0	79	40
Chimpanzee	72	79	0	77
Gorilla	50	40	77	0

Construct a phylogenetic tree that describes evolutionary relationship among these 4 species. Your tree should indicate the percentage of variation.

$6\frac{1}{2}$

(b) What is Cambrian explosion? Mention the probable cause of this biotic events. 6