

2008

ZOOLOGY

PAPER—VII B

*Full Marks : 50*

*Time : 2 hours*

Answer any four questions taking  
two from each Unit

*The figures in the right-hand margin indicate marks*

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

*Illustrate the answers wherever necessary*

UNIT—I

(*Microbiology*)

1. (a) Which groups of microorganisms undergo 'Alternation of Generation'?

(Turn Over)

(b) How do microorganisms contribute in increasing soil fertility? Add a note on Rhizosphere microbial ecology.

(c) Draw the phosphorus cycle highlighting the role of microbes in it.

(d) Compare the contrasting features of Bacteria and Mycoplasma.

$$2 + (3 + 1) + 4 + 2 \frac{1}{2}$$

2. (a) Describe the Basal structure of bacterial cell wall with the help of a diagram.

(b) Name the causal organisms of any *two* of the following diseases :

(i) Syphilis

(ii) Meningitis

(iii) Anthrax

(iv) Mumps.

(c) How can you distinguish between aerobic and facultative anaerobic bacteria by examining the respective culture tubes ?

(d) Name the chromogenic bacteria that produce white pigment. Compare the structure and chemistry of gram-positive and gram-negative bacteria.

$$3 + 2 + 2 \frac{1}{2} + (1 \frac{1}{2} + 3 \frac{1}{2})$$

3. (a) What is the uniqueness of Bergey's Manual ?
- (b) Classify media broadly on the basis of composition and give examples for each type.
- (c) Is the bacterial growth curve same while plotting Total count and Viable count? Justify your answer with figure.
- (d) Draw the life-cycle of a spore-forming bacteria. What are the factors inducing sporulation ?

$$2 + (3 + 1 \frac{1}{2}) + 2 + (2 + 2)$$

4. (a) Distinguish between Lithotrophs and Organotrophs.
- (b) Answer any *five* of the following:
- (i) Methyl - Red Test
  - (ii) Mesosome
  - (iii) Coliform bacteria

(iv) Pseudomycetes

(v) Reproduction in Algae

(vi) Chemotaxis

(vii) Essential elements

(viii) Archaeobacteria.

$$2\frac{1}{2} + (2 \times 5)$$

## UNIT—II

### *(Environmental Physiology and Evolution)*

5. (a) Let us suppose the allele frequency of  $A$  is 0.7 in the donor population and 0.3 in the recipient population. A group of 20 individuals migrates and joins the recipient population, which originally had 80 members. Calculate the allele frequency in the conglomerate.
- (b) Let's suppose that pigmentation in a species of insect is controlled by a single gene existing in two alleles,  $D$  for dark and  $d$  for light. The heterozygote  $Dd$  is intermediate in color. In a heterogeneous environment, the allele frequencies are  $D = 0.7$  and  $d = 0.3$ . This polymorphism is maintained because the environment contains some dimly lit forested

areas and some sunny fields. During a hurricane, a group of 1000 insects is blown to a completely sunny area. In this environment, the fitness values are  $DD = 0.3$  and  $Dd = 0.7$  and  $dd = 1.0$ . Calculate the allele frequencies in the next generation.

$$6 + 6 \frac{1}{2}$$

6. (a) What do you mean by genetic polymorphism ?

(b) Differentiate between SNPs and CNPs.

(c) How average heterozygosity is calculated assuming Hardy-Weinberg equilibrium ?

(d) Discuss the sequence variation and the drift vs. selection theory.

$$2 + 2 + 4 \frac{1}{2} + 4$$

7. (a) What is environmental stress ? How does it differ from oxidative stress ? Explain both with examples.

(b) How does set point mechanism control thermogenesis and thermolysis ? Explain with figures.

( 6 )

(c) Compare the oxygen dissociation curves of Haemoglobin and Myoglobin.

(d) Draw the pathway by which free radicals are produced and destroyed.

$$3\frac{1}{2} + 4 + 2 + 3$$

8. (a) Describe the mechanism of chloride cell to maintain the osmolarity of body fluids of marine fish.

(b) Discuss the hormonal control of the activity of salt glands that maintains body fluid homeostasis in marine birds.

$$4\frac{1}{2} + 8$$