2015

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) Explain why 16S rRNA is significant in systematic bacteriology. 4

(b) Draw and describe different parts of a bacterial flagella. 2+3

(c) What is magnetosome ? 1

(d) Write down two advantages each of solid and liquid media. $2\frac{1}{2}$

2. (a) Classify antibiotics on the basis of their mode of action. 5

(b) Write down different groups of fungi. Mention at least one character of each group. 5

(c) What is oxygen toxicity? $2\frac{1}{2}$

3. (a) What happens during lag phase of bacterial growth? What is MPN in microbial growth measurement?

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

(b) Write down role of bacteria in enhancing soil fertility. 6

(c) Explain S–R variation. 2

4. Write short notes on any *five* of the following: $5\times2\frac{1}{2}$

(a) Functions of pili ;

(b) Prions ;

(c) Bergey's manual ;

(d) Bacterial growth curve ;

(e) Peptidoglycan ;

(f) Bacterial endospore ;

(g) Biofilm.

Unit—II

[*Environmental Physiology and Evolution*]

5. (a) An allele 'A' is a hotspot of mutation and undergoes mutation at a frequency of 10^{-4} generation. If the frequency of reverse mutation from a to A 10^{-7} per generation, what is the expected equilibrium allele frequency of a?

(b) In a donor population, the allele frequencies for the common (Hb^A) and sickle cell alleles (Hb^S) are 0·90 and 0·10 respectively. A group of 550 individuals move to a new population containing 10,000 individuals, in the recipient population, the allele frequencies are Hb^A = 0·99 and Hb^S = 0·01. Calculate the allele frequencies in the conglomerate population for the both alleles Hb^A and Hb^S.

$5\frac{1}{2}+7$

6. (a) Illustrate the counter-current cooling exchange mechanism.

(b) What are the factors facilitating conversion of oxyhaemoglobin to deoxyhaemoglobin?

(c) Distinguish between sweating and panting.

$5\frac{1}{2}+2\frac{1}{2}+4\frac{1}{2}$

7. (a) A completely recessive allele g is lethal in homozygous condition. If the dominant allele G mutates to g at a mutation rate of 10^{-6} per generation, what is the expected frequency of the lethal allele when the population reaches mutation selection equilibrium ?

(b) What is the role of gene duplication in evolution ?

(c) Explain the hormonal regulation of body temperature adjustment in brief.

$5+3\frac{1}{2}+4$

8. (a)

Elephant :	P	T	A	V	H	S	T	M	N	S	T	P	L	S	L	G	G	P	M	A
Tiger :	.	.	.	–	.	.	–	.	.	.	.	.	A	.	.	.	M	.	.	.
Baboon :	.	.	.	A	.	.	M	.	.	–	.	.	.	–	.	G	.	L	M	A	P
Chimpanzee :	.	.	.	.	–	.	.	.	.	–	.	.	.	–	.	S	.	.	.	.	M
Gorilla :	.	.	.	–	–	.	.	.	.	–	A	.	–	.	T	.	.	.	S	.	
Monkey :	.	.	.	–	–	.	.	L	G	.	.	.	–	.	.	.	L	.	A	.	

(i) Make a distance matrix comparing the amino acid sequences above.

(ii) Make a gene tree using UPGMA method.

(b) What is orthology gene ? Give example.

$4\frac{1}{2}+5+2\frac{1}{2}$