2013

M.Sc.

3rd Semester Examination

ZOOLOGY

PAPER—ZOO-302

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

Group—A

(Biotechnology)

1. Answer any *two* questions of the following : 2×2

(a) What is a cosmid vector? Mention its advantages.

(b) Define biomarker. What type of molecules are generally used as biomarkers? 1+1

(c) Enumerate the role of microbial enzymes in biodegration process.

(d) What is artificial chromosomes? Give example.

2. Answer any *two* questions of the following : 4×2

(a) Define Biotechnology. Point out in brief different aspects and scopes of Biotechnology. 1+3

(b) A DNA molecule is subjected to single and double digestions with restriction enzymes and the products are separated by gel electrophoresis.

The results are given below :

(fragment sizes are in kb)

Eco RI	Eco RI + Hind III	Hind III	Bam H1	Eco RI + Bam H1	Hind III + Bam H1
8	5	12	6	6	6
4	4		6	4	5
	3			2	1

Draw the restriction map of this DNA molecule. 4

(c) What properties make a biomarker ideal for diagnosis ?

Give example of two biomarkets related to cancer. 3+1

(d) (i) Write down four basic characteristics of a biosensor.

(ii) What are the advantages of vermicompost over other organic manures ? 2+2

3. Answer *one* question of the following : 8×1

(a) What is bioremediation ? Briefly describe ex-situ bioremediation process. Mention the disadvantages of bioremediation process. 2+4+2

(b) The drawing below shows a restriction map of a segment of a DNA molecule. The thick line represents the part of the molecule that has homology with a Probe : 8

Eco RI ↓	Pst ↓	Eco ↓	Pst ↓	Eco ↓	Pst ↓
(1) 5000	(2) 3000	(3) 4000	(4) 2000	(5) 5000	(6)

The thick line represents a Probe.

(i) Individual 1 has restriction sites 1 through 6. If DNA is digested with Pst I, what are the expected sizes of DNA that will hybridize with the Probe ?

(ii) Individual 2 has a mutation that eliminates site 4. If DNA is digested with Pst I, what are the expected sizes of DNA that will hybridize with the Probe ?

(iii) Individual 3 has a mutation that eliminates site 5. If DNA is digested with Pst I, what are the expected sizes of DNA fragment that will hybridize with the Probe ?

(iv) If the DNA of individual 3 is digested with both Pst I and Eco R1, what are the expected sizes of the DNA fragment that will hybridize with the Probe ?

Group—B

(Biochemistry)

4. Answer any *two* questions of the following : 2×2

(a) What is iron sulfur protein ?

(b) Why hexokinase forms glucose-6-phosphate only ?

(c) Name the end products of phosphorolytic and hydrolytic cleavage of glycogen.

(d) What is pKa Value ?

5. Answer any *two* questions of the following : 4×2

(a) Explain electron transfer from NADH to Uniquinone of multienzyme complex in mitochondria with proper diagram.

(b) Explain how the urea cycle and Kerbs cycle are interlinked ?

(c) Describe the periodic structure of protein with the help of Ramachandran's plot.

(d) Describe the structure of α-Keratin with proper diagram.

6. Answer *one* question of the following : 8×1

(a) (i) Write a note on clustering of urea cycle enzymes.

(ii) Mention the characteristics and action of transketolase and transaldolase. 4+4

(b) (i) Describe the differences between mitochondrial and peroxisomal β-oxidation of saturated fatty acid.

(ii) Write a note on anaplurosis. 6+2