2015

M.Sc. Part–I Examination

ZOOLOGY

PAPER—III (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.

Group—B

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

Unit—I

(*Immunology*)

1. (a) Comment on toxin and toxoid.

   (b) Give an account of two important factors regulating immunogenicity.

(c) Write the functional significance of Psoriosin.

(d) Enumerate briefly the steps of hybridoma technique for Monoclonal Antibody (MAb) Production. What is HAT medium ? Write the application of MAb.

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

2. (a) Write the principle of Southern Blotting Hybridization (SBH). Describe the procedure of SBH with labelled diagram. Mention its biological significance.

(b) Write the principle of Radio-Immuno Assay (RIA).

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

3. (a) What do you mean by Antigen Processing and Presentation ? Discuss the mechanism of antigen processing by Cytosolic Pathway.

(b) Describe in brief the structure of Class I MHC molecule.

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

4. (a) Write notes on any *two* of the following : 4×2

(i) Antibody-Dependent Cell Mediated Cytotoxicity (ADCC) ;

(ii) Titer ;

(iii) T-Cell receptors ;

(iv) Immunoglobulin molecule.

(b) Write notes on : $4\frac{1}{2}$

Classical Pathway of Complement activation ;

or

Immunohisto Chemistry.

Unit—II

(*Biostatistics*)

5. (a) Write short notes on any *two* of the following :

(i) Frequency distribution ;

(ii) Bayes Theory of Probability ;

(iii) Poisson distribution ;

(iv) Level of Significance. 4+4

(b) Write short notes on : $4\frac{1}{2}$

Multiple Regression ;

Or

Correlation Coefficient.

6. (a) Distinguish between parametric and non parametric tests.

(b) A couple is heterozygous for albinism (Aa). What is the probability that :

(i) 4 out of 6 children born to them are normal ?

(ii) 4 normal and 2 albino out of 6 children ?

(c) Illustrate the Computational steps of multiple correlations. State its application in biological data.

(d) What do you mean by Fixed model regression ?

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

7. (a) Find the correlation coefficient between microfauna density (x) and soil humus (y). Using the following results obtained from 15 experiments :

$\Sigma x = 106{\cdot}4$, $\Sigma x^2 = 755{\cdot}95$, $\Sigma xy = 2058{\cdot}4$, $\Sigma y = 290$, $\Sigma y^2 = 5696$.

Test whether the above correlation coefficient is significant at 5% level. [*Given*, $t_{0.05(13)} = 2{\cdot}16$]

(b) What is normal distribution ? State the properties of normal distribution.

(c) Certain stimulus administered to each of 12 patients resulted in the following changes in blood pressure : 5, –3, –1, 0, 4, 6, 1, 3, 0, 5, –8, –2.

Can it be concluded that the stimulus will in general be accompanied by an increase in blood pressure. ($P_{0.05}$, 11 = 2.2)

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

8. (a) The impact of four different Bioactive compounds A, B, C and D on the reduction of the serum creatinine level on Kidney patients were studied. The Creatinine level of the patients were measured for 5 (five) replicates. Carry out one-way ANOVA to deduce the effects of the Drugs on the serum creatinine level : [*Given*, $F_{3,16\,(0.05)} = 3{\cdot}24$]

Replicate	Bio-active Compound			
	A	B	C	D
1	4·9	3·2	2·6	6·7
2	4·1	3·6	2·7	6·3
3	4·7	3·8	2·4	6·1
4	4·3	3·4	2·3	6·2
5	4·5	3·5	2·5	6·3

(b) Find the rank correlation coefficient of the following data :

Series X : 112 116 117 95 112 100 98 95 116 95

Series Y : 68 70 75 68 87 65 68 70 68 75

(c) Explain the following equation :

$$y = a + bk$$

$6\frac{1}{2}+4+2$

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