M.Sc. 1st Semester Examination, 2012

ZOOLOGY

PAPER—ZOO-102

Full Marks : 40

Time : 2 hours

The figures in the right-hand margin indicate marks

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

GROUP – A

(*Biostatistics*)

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

(*a*) Explain binomial distribution.

(*b*) What is skewness ?

(*c*) "Anova is an extension of student's *t* test."—Explain.

(*d*) Write a brief note on *Z*-score.

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

(*a*) Write about the properties of Binomial distribution. State its application in interpreting biological data. 3 + 1

(*b*) Prove that the correlation co-efficient '*r*' lies between –1 and +1. 4

(*c*) Distinguish between : 2 + 2

(*i*) Continuous and discrete variables.

(*ii*) One-tailed and two-tailed tests.

(*d*) From the following information of an agricultural area of West Bengal, estimate the probable crop yield when rainfall is 40 inches. Correlation coefficient between the variables is 0·65. 4

Variables	Rainfall in inches (X)	Crop yield in unit per area (Y)
Mean	25	40
S.D.	3	6

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

(*a*) In an experiment different concentrations of Arsenic were orally administered to white Rats of same age and sex group. Concentration of interleukin-6 (IL-6) in blood were measured and the following results were obtained.

Replicates	IL-6 measurement under different conc. of Arsenic (PPM)			
	0 (PPM)	10 (PPM)	20 (PPM)	40 (PPM)
1	1	2	3	5
2	2	3	3	4
3	1	3	4	5
4	0	4	3	4
5	1	3	4	4

Apply one way anova to test whether the different concentration of Arsenic have any effect on IL-6 production in white rats.

$[F_{0.01(3, 16)} = 5{\cdot}29;\ F_{0.05(3, 16)} = 3{\cdot}24]$. 8

(*b*) What is correlation-coefficient ? Find whether or not there is significant correlation between the shell

height (mm) and shell breadth (mm) of the snails from a field survey and the data are given below :

Serial No.	1	2	3	4	5	6	7	8	9
Shell height (in mm)	5·5	9·3	5·8	6·9	9·7	9·5	9·1	9·2	7·0
Shell breadth (in mm)	2·3	4·0	2·4	2·7	3·5	3·6	2·5	3·0	3·0

Critical t value : 1 + 7

$t_{0\cdot05(7)} = 2\cdot365$
$t_{0\cdot05(8)} = 2\cdot306$
$t_{0\cdot01(7)} = 3\cdot499$
$t_{0\cdot001(7)} = 5\cdot406$

GROUP – B

(*Ethology*)

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

(*a*) Differentiate vitalistic and mechanistic approach of Ethology.

(*b*) Briefly highlight the theory of 'optimal foraging' in habitat selection.

(*c*) Primary and operational sex ratio.

(*d*) Arrhenotoky and Thelytoky.

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

(*a*) Explain individual and social strategies of animals in escaping from enemies.

(*b*) Mention the factors associated with social dominance.

(*c*) Explain the phenomenon of mate choice copying with the help of an experimental proof.

(*d*) What is sensitisation ? In what way does habituation differ from extinction of a learned response.

6. Write any *one* question out of the following : 8 × 1

(*a*) Differentiate between intersexual and intrasexual selection. Discuss hypothesis put forward by R. Fisher, A. Zahavi and R. Trivers to explain the phenomenon of female choice. 2 + 6

(*b*) Differentiate between 'Home Range' and 'Territory'. Discuss different types of territory of birds according to Hinde (1956). How territoriality is related to reproductive success in animals? 3 + 3 + 2