M.Sc 1st Semester Examination, 2010

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. Write briefly about any *two* of the following: 2 x 2

   (*i*) Coefficient of variation

   (*ii*) Confidence interval

   (*iii*) Parametric and non-parametric data

   (*iv*) Z-score.

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

(*a*) Write brief notes on :

(*i*) Variance.

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

(*b*) Write about the properties of normal distribution.

(*c*) An observation on foraging time of the snails *Allopeas gracile* ($n = 8$) was made in the evening along the wall of a garden. Apply *t*-test, to conclude whether the foraging time differs from the known foraging time of 42 minutes. [$t_{0\cdot05,\,(1),\,7} = 1\cdot895$].

SNAIL NO.	1	2	3	4	5	6	7	8
FORAGING TIME (in min.)	43·7	48·4	44·6	42·1	42·6	42·9	49·1	48·9

(*d*) What is Chi-square goodness of fit test? Apply this test, to justify whether the following data on four fish species collected from paddy

fields comply with the ratio of 1 : 1 : 1 : 1 in terms of abundance. [$\chi^2_{0\cdot05,\,3} = 7\cdot815$].

	FISH SPECIES			
	Badis badis	*Puntius ticto*	*Chanda nama*	*Puntius sophore*
f_i	49	71	65	55

3. Answer *one* of the following questions : 8 x 1

(*a*) (*i*) What are dependent and independent variables ?

(*ii*) The following data represents body weight (in mg) and fecundity (in nos. of eggs/clutch) of the fish louse *Argulus bengalensis*. Construct a regression equation, specifying the dependent and independent variables, on the two features. Deduce the coefficient of determination, r^2, of the regression equation and comment on it.

♀ *Argulus bengalensis*	*Body weight* (in mg)	*Fecundity* (eggs/clutch)
1	4·3	14
2	4·6	17
3	3·9	11

♀ *Argulus bengalensis*	*Body weight* (in mg)	*Fecundity* (eggs/clutch)
4	3·8	10
5	4·9	23
6	5·1	27
7	4·5	16
8	4·0	12
9	5·2	30
10	4·2	10

(*iii*) Calculate the expected fecundity of a female *Argulus bengalensis* of 3·01 mg and 5·5 mg body weight.

(*b*) (*i*) What are meant by 'fixed-effects model' and 'random effects model' of ANOVA?

(*ii*) The effect of the antibiotic cephalosporin on the growth of four different bacteria were tested. The colony forming units/ml (X 10^6CFU/ml) was measured for 5 (five) replicates of each bacteria. Carry out one-way ANOVA to deduce the effects of

cephalosporin on the four bacteria. Present your results as : (*A*) Hypothesis, (*B*) ANOVA table and calculations and (*C*) Conclusion.

Replicate	Bacterial growth (X 10^6 CFU/ml)			
	Escherichia coli	*Salmonella typhi*	*Shigella dysenteriae*	*Bacillus sphaericus*
1	7·0	5·3	4·9	8·6
2	9·9	5·7	7·5	8·8
3	8·5	4·8	7·1	9·2
4	5·1	6·2	6·4	7·4
5	10·3	6	5·0	8·0

GROUP – B

(*Ethology*)

1. Answer any *two* questions : 2 x 2

(*a*) Differentiate between vitalistic and mechanistic approaches in the study of ethology.

(*b*) Distinguish between active anting and passive anting.

(*c*) What do you understand by 'Hawk' and 'Dove' strategies of game ?

(*d*) What are proximate and ultimate cause ?

2. Answer any *two* questions : 4 x

(*a*) What is habituation ? In what way does it differ from the extinction of a learned response ? 3 +

(*b*) Explain the phenomenon of mate choice copying.

(*c*) What do you understand by approach -avoidance conflict ?

(*d*) With the help of a suitable example explain the concept of the habitat shift.

3. Answer *one* of the following : 8 x

(*a*) Briefly describe different types of dominance hierarchy. Enlist various factors associated with social dominance. What are the ways through with an individual may rise in the social hierarchy ? 4 + 2 +

(*b*) Distinguish between intrasexual and intersexual selections. With the help of an example discuss male rivalry in sexual selection. What role does a female play in the male rivalry?

2 + 4 + 2