M.Sc.

2018

4th Semester Examination

ZOOLOGY

PAPER—ZOO-402

Subject Code—35

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.

Answer *all* questions.

Group–A

(*Biostatistics*)

1. Answer any *two* questions : 2×2

(a) When alternative hypothesis is accepted ?

(b) What do you mean by probability distribution ?

(c) What is strength of association ?

(d) What are criterion and predictor ?

2. Answer any *two* questions : 2×4

(a) The data shows value of $N_1 = 15$, $N_2 = 10$, $\Sigma X_1 = 1331$, $\Sigma x_2 = 949$, $\Sigma x^2_1 = 8980.86$, $\Sigma x^2_2 = 2236.9$.

Find out whether there is any significant difference between the data. Given value $a_{0.05} = 1.71$. Draw your inference. 4

(b) In a group of 150 students, the product moment correlation coefficient (r) between performance score (X_1), memory score (X_2) and age (X_3) were found to be as follows :

$r_{12} = + 0.45$, $r_{13} = + 0.36$, $r_{23} = + 0.18$

Compute partial r between performance score and memory scrore, eliminating the effect of age and compute multiple correlation taking all the variables. 4

(c) The Shell height (X) and Shell breadth (Y) of 9 snails are represented in following table. Find Regression equation of height (X) and breadth (Y) and estimate Shell height when breadth is 3.75 mm. Correlation coefficient is 0.74

	(X)	(Y)
Mean	3	0.59
SD	8	1.68

(d) The blood sugar level of three groups of animals after injection of different doses of anti-diabetic drug was measured. F ratio was found to be significant. Apply Scheffee's F test to find whether $(\bar{X}_1 - \bar{X}_2)$ and $(\bar{X}_2 - \bar{X}_3)$ where significant with given data :

$\bar{X}_1 = 126.7$ $\bar{X}_2 = 118.5$ $\bar{X}_3 = 89.2$
$n_1 = 10$ $n_2 = 10$ $n_3 = 10$

$Sw^2 = 46.67$

$[F_{0.01}(2,27) = 10.98 \quad F_{0.05}(2,27) = 6.70]$

3. Answer any *one* question : 1×8

(a) The following are the change in body weight of mice given different types of protein. Test whether are the proteins similar in changing body weights.

Change in body weights due to proteins

Replicates	P_1	P_2	P_3	P_4	P_5
1	1.8	2.5	3.0	2.5	3.4
2	2.0	2.6	3.5	2.5	3.5
3	1.5	2.0	3.0	3.0	4.0
4	1.5	2.8	3.0	3.0	3.0

$F_{0.05}$ (3, 16) = 3.24, $F_{0.05}$ (4,16) = 3.01 8

(b) (i) Certain Stimulus administered to each patients resulted in the following changes in blood pressure : 12

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. 5

(ii) What are the positive and negative skewness ? How do you measure skewness ? 1½+1½

(Group–B)

(Developmental Biology)

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

(a) What happens to newt embryo if they are made to synthesize excess 'Frisbee' (Frzb) ?

(b) If antisense norpholinos are used to eliminate Noggin Chordin and Follistatin, what will be the fate of resulting amphibian embryo ?

(c) Name the factors stimulating new DNA and protein synthesis during late responses of the egg to the sea urchin sperm.

(d) State the function of nicotinic acid adenine dinucleotide phosphate.

5. Answer any *two* questions : 2×4

(a) How does induction of the mouse aerosome reaction occur by Zona protein z ?

(b) Write a brief note on an evolutionary conserved set of signals in cnidaria that function as organizers throughout the animal kingdom.

(c) How can you prove that Proximalization of newt blastema occurs by respecification by retinoic acid ?

(d) Write briefly the para paracrine antagonist function in the ectoderm.

6. Answer any *one* question : 1×8

(a) Explain the mechanism by which the Disheveled protein stabilizes β-catenin in the dorsal portion of the amphibian egg with the help of a model.

(b) Describe the role of calcium release in activating a series of metabolic reactions in sea urchin embryonic development.

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