PG/IVS/ZOO/401.1&401.2
/25

M. A. 4th Semester Examination, 2025

ZOOLOGY

PAPER — ZOO-401.1 & 401.2

Full Marks : 50

Time : 2 hours

Answer **all** questions

The figures in the right hand margin indicate marks

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

PAPER — ZOO-401.1

(*Environmental Pollution & Management*)

[*Marks* : 20]

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

    (*a*) Define cryptogenic species. Give one
    example.   1 + 1

(b) What is the difference between gully erosion and rill erosion of soil. 2

(c) How would you distinguish between primary and secondary pollutants ? 2

(d) Enumerate the major direct drivers of biodiversity changes. 2

2. Answer any *two* questions : 4 × 2

(a) Explain the roles of 'Traditional Knowledge' for environmental Resource management. 4

(b) Mention the features of 'invasive species'. Enumerate the harmful effects of bioinvasion. 2 + 2

(c) Define biosafety. Write a short note on Cartagena protocol on biosafety. 1 + 3

(d) Write down different steps in environmental management. 4

(*Continued*)

3. Answer any *one* question : 8×1

   (a) Define sustainable development. Mention it different types. Briefly discuss the pathways to achieve it. $2 + 2 + 4$

   (b) Mention the harmful effects of gaseous pollution on animals. Add a note on biomagnification. $5 + 3$

PAPER — ZOO-401.2

(*Biostatistics*)

[*Marks* : 20]

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

   (a) Write a note on one-tailed and two-tailed tests.

   (b) If the random variable X follows a Poisson distribution with mean $\lambda = 1$,

(4)

what is the probability that in 3 indepen-
dent trials, X>1 in all 3 cases ?

(c) What do you mean by regression line ?
State the expression of the regression
coefficient.

(d) Briefly describe the types of correlations
using graphs.

5. Answer any *two* questions from the following :

$$4 \times 2$$

(a) A teacher claims that the mean score of
students in his class is greater than 82
with a standard deviation of 20. If a
sample of 81 students was selected with
a mean score of 90, then check if there
is enough evidence to support this claim
at a 0.05 significance level.

(b) Calculate the two regression equations
of X on Y and Y on X from the data
given below, taking deviations from the
actual means of X and Y.

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X	10	12	13	12	16	15
Y	40	38	43	45	37	43

(c) A researcher is interested in the relationship between a person's Body Mass Index (BMI) and their fitness level. She claims that a lower BMI leads to a greater level of fitness. She randomly selects ten 18-year-old volunteers and calculates each individual's BMI. The volunteers then ran a race and their finishing positions were recorded. The results are shown in the table.

Individual	A	B	C	D	E	F	G	H	I	J
BMI	17.4	21.4	18.9	24.4	19.4	20.1	22.6	18.4	25.8	28.1
Finishing position	3	5	1	9	6	4	10	2	7	8

Justify the researcher's claim using appropriate statistical test.

(*Turn Over*)

(6)

(d) ρ is the probability of 'Heads' of a coin. Let X be a random variable that takes on the value k if it takes k tosses to obtain the first 'Heads' in a sequence of coin tosses. What are the possible values of X ? What is the PMF of X ?

6. Answer any *one* question from the following :

8×1

(a) Determine if there is a difference in the mean daily calcium intake for people with normal bone density, osteopenia and osteoporosis at a 0.05 alpha level. The data was recorded as follows :

Normal Density	Osteopenia	Osteoporosis
120	100	89
100	110	65
98	70	110
90	80	90
75	50	40
80	70	35

$F_{0.05 (2, 15)} = 3.68$, $F_{0.05 (3, 15)} = 3.29$

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(b) From the data relating to the yield of dry bark (X1), height (X2) and girth (X3) for 18 cinchona plants, the following correlation coefficients are obtained. $r12 = 0.77$, $r13 = 0.72$, $r23 = 0.52$ Find the partial correlation coefficient $r12.3$ and multiple correlation coefficient $R1.23$. Test their significance at a 0.05 alpha level. Critical $t_{0.05(18)} = 2.10$, $t_{0.05(17)} = 2.11$, $t_{0.05(16)} = 2.12$, $t_{0.05(15)} = 2.10$. $4 + 4$

[Internal Assessment — 10 Marks]