



PG (CBCS)
M.Sc. Semester- IV Examination, 2023
ZOOLOGY
PAPER: ZOO 401

(ENVIRONMENTAL POLLUTION & MANAGEMENT AND BIOSTATISTICS)

Full Marks: 40

Time: 2 Hours

Write the answer for each unit in separate sheet

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.

ZOO 401.1
ENVIRONMENTAL POLLUTION AND MANAGEMENT
F.M. - 20

GROUP-A

1. Answer any **TWO** of the following questions: 2×2=4
- a) Define biological invasion with example.
 - b) What is biosafety? Give example.
 - c) State the difference between point and non-point source of pollution with examples.
 - d) Mention two species serving as bioindicators.

GROUP-B

2. Answer any **TWO** from the following questions: 2×4=8
- a) Write a note on photochemical smog.
 - b) What are the effects of acid rain on aquatic life?
 - c) Describe two major sources of water pollution.
 - d) State the role of agricultural waste in soil pollution.

GROUP-C

3. Answer any **ONE** of the following questions: 1×8=8
- a) Write notes on 4+4
 - i) Chipko movement
 - ii) Eutrophication and its effects
 - b) Discuss the importance of deforestation as a major environmental issue.
Mention different routes of pathogen entry resulting in biohazards. 5+3

(P.T.O)



ZOO 401.2
 BIOSTATISTICS
 F.M. - 20

MCC21/M.SC./SEM.-IV/ZOO/1

4. Answer any **TWO** from the following questions:

2×2=4

- Distinguish between nominal data and ordinal data with examples.
- What is the basic difference between student's t-test and paired t-test?
- Cite a situation when the study of correlation between 2 variables has no practical significance.
- What do you mean by type-I error of inference?

GROUP-B

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

2×4=8

- Calculate correlation coefficient between 'x' and 'y' from the following data and state whether the data indicate that 'x' and 'y' are independent of each other.

x_i	-3	-2	-1	1	2	3
y_i	9	4	1	1	4	9

- Earthworms were collected from 10 different, small plots of uniform size, of a grassland. The number of earthworms obtained from those 10 plots are shown in the table below. Examine the distribution pattern of earthworms. [Given that $\chi^2_{(0.05)}(9) = 16.92$]

Plot No	1	2	3	4	5	6	7	8	9	10
Earthworms	25	32	17	23	15	34	27	19	22	26

- The arithmetic mean for the following frequency distribution is 67.45, find the value of the missing frequency (f_3).

Height (inches)	60-62	63-65	66-68	69-71	72-74
Frequency (f_i)	15	54	f_3	81	24

- The mean score of 374 girls in an aptitude test is found to be 98.7 (s.d= 14.08) while the mean score of 255 boys in the same test is 95.5 (s.d= 13.02). Judge by a suitable statistical test if there exists any significant difference between the mean scores of the boys and the girls. [Given that $t_{(0.01)}(627) = 2.326$]

(P.T.O)

(2)



GROUP-C

MCC21/M.SC./SEM.-IV/ZOO/1

6. Answer any **ONE** from the following questions:

1×8=8

- State the salient properties of normal distribution. Draw a normal distribution curve and indicate how much areas of the curve are occupied by mean $\pm \sigma$ and mean $\pm \sigma$ of the values, respectively. 2+2
- A small town has 10,000 men whose mean height is 64.5" (s.d. = 4.5"). The height of man is known to show a normal distribution pattern. Find out the number of men whose height is (a) less than 55.5", and (b) greater than 73.5".
- The following data show the yield of wheat (in quintal/bigha) in 12 fields belonging to 3 villages, after using 3 different varieties of fertilizers (A, B and C). Is there any significant difference in the average yield of wheat in the 3 villages after using three different varieties of fertilizers? [Given that $F_{at\ df(2,9)}$ at 5% level of significance = 4.26].

Fertilizer A	Fertilizer B	Fertilizer C
25	20	24
22	17	26
24	16	30
21	19	20

- A box contains 3 red and 7 white balls. You are allowed to draw two balls one after another from the box, without any replacement. What will be the probability of getting a red ball first and then a white ball in the two consecutive draws?

(3)