

PG AGRICULTURE
M.Sc. Semester-II Examination 2023
PAPER: STAT 502 (THEORY)
(STATISTICAL METHODS FOR APPLIED SCIENCES)

Full Marks: 50

Time: 3 Hours

GROUP-A

Answer any **FIVE** of the following questions:

2×5=10

1. Define statistics and its limitations.
2. What is the relationship between mean, median and mode?
3. What do you mean by relative frequency and cumulative frequency.
4. Define Random experiment with example.
5. What do you mean by random variable? Classify it.
6. Using the Classical definition of probability, prove that $P(A^c) = 1 - P(A)$.
7. Write about the difference of CV and CD.
8. What is ANOVA?
9. Define Probability Density Function. Write the Probability Density Function (PDF) of Normal distribution.
10. Write the test statistic (formula) of independent sample t-test and paired t-test.

GROUP-B

Answer any **FOUR** of the following questions:

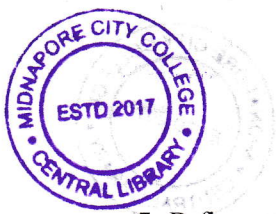
4×5=20

1. Differentiate between classification and tabulation of data. Explain the applications of Chi-square test. (3+2)
2. Explain F-test along with its Null and Alternate hypothesis, Test statistic, Degrees of freedom and Applications.
3. There are two cricket teams A and B. For team A: Mean = 23; Standard deviation = 3 and for team B: Mean = 30; Standard deviation = 5. Find out which team is more consistent?
4. Find out the mean, median and mode of the following frequency distribution:

Class	0-5	5-10	10-15	15-20
Frequency	2	5	4	1

5. Compare the Binomial and Poisson distributions.
6. Show that the probability that exactly one of the events A and B occurs is $P(A) + P(B) - 2P(AB)$.

(P.T.O.)



(2)

7. Define correlation and explain its significance in statistical analysis. Discuss the range of values the correlation coefficient.
8. Calculate the correlation coefficient and determine the regression lines of y on x and x on y for the sample

x	8	10	5	8	9
y	1	3	1	2	3

GROUP-CAnswer any **TWO** of the following questions:**10×2=20**

1. Discuss on merits and demerits of non-parametric tests. The weights of 8 ear heads of sorghum are 14, 29, 9, 15, 20, 17, 12, and 11. Find Standard Deviation and Variance and coefficient of variation. (5+5)
2. A die was thrown times and the frequencies of different faces were observed to be the following:

Face	1	2	3	4	5	6
Observed frequency	25	17	15	23	24	16

Test the hypothesis that the die is fair using a significance level of 0.05. Given $P(\chi^2 > 11.1) = 0.05$ for 5 degrees for freedom.

3. The following figures relate to the number of units of an item produced per shift by two workers A and B for a number of days
A: 19 22 24 27 24 18 20 19 25
B: 26 37 40 35 30 30 40 26 30 35 45

Can it be inferred that worker A is more stable compared to worker B? Answer using the F-test at 5 % level of significance (critical value: $F_{0.05}=3.5$).

4. Briefly explain any four of the followings: **2.5 x 4**
 - I. Principal Component analysis
 - II. Box-plot
 - III. Standard deviation
 - IV. Cluster analysis
 - V. Standard error
 - VI. Poisson Distribution
