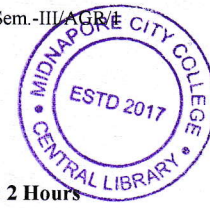


**M.Sc. Semester-III Examination, 2022**  
(Agriculture) in Agronomy  
PAPER: AST-101 (Theory)  
**(STATISTICAL METHODS FOR APPLIED SCIENCES)**

Full Marks: 50

Time: 2 Hours

**GROUP-A****1. Answer any FIVE questions from the following: 2X5 = 10**

- What are the scopes of statistics?
- Briefly discussed about the classification of data.
- What do you mean by 'Population' and 'Sample'?
- What do you mean by cluster analysis?
- Prove that for distribution function  $F(x)$ ,  $F(-\infty) = 0$  and  $F(\infty) = 1$ .
- If A and B are two events such that  $P(A) = P(B) = 1$ , show that  $P(A+B) = 1$ .
- What is the probability that in a leap year will contain 53 Sundays?
- What do you mean by type-I and type-II error in testing of hypothesis?

**GROUP-B****2. Answer any FOUR questions from the following: 5X4 = 20**

- Differentiate between classification and tabulation of data.
- Briefly discuss the relationship between mean, median and mode.
- Calculate the mean deviation of the following frequency distribution:
 

x	1	2	3	4	5	6	7
f	4	2	1	2	4	8	9
- How Wilcoxon signed rank test is an improvement over sign test.
- Define Binomial and Poisson distributions. For a binomial  $(6, p)$  variate, find  $p$  if  $9P(x = 4) = P(x = 2)$ . 2+2
- What do you mean by random variable? Write the density function of the normal distribution. Deduce the standard normal distribution from normal distribution. 1+1+2
- If  $r$  be the sample correlation co-efficient of a bivariate sample  $((x_1, y_1), (x_2, y_2), \dots, (x_n, y_n))$  then  $-1 \leq r \leq 1$ .
- Define Random experiment. State classical definition of probability. Prove that  $0 \leq P(A) \leq 1$ , for any event A using classical definition of probability.

**GROUP-C****3. Answer any TWO questions from the following: 10X2 = 20**

- Compute t-test for the data given below
 

Group A:	10	4	3	2	4	2	5	10	5	5
Group B:	4	6	8	2	9	1	12	13	10	10

(1)

P.T.O.

Critical value: 2.10 at 5% level of significance

Find if there is a significance difference between the mean of Group A and B.

- b. 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

- c. In a test given two groups of students drawn from the normal populations, the marks obtained are as follows:

Group A:	18	20	36	50	49	36	34	49	41
Group B:	29	28	26	35	30	44	46		

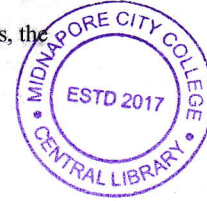
Critical value: 5.60 at 5% level of significance

Examine whether two populations have the same variance.

- d. Discuss on merits and demerits of non-parametric tests. Briefly explain any one non-parametric test. (5+5)

- e. Briefly explain any four of the followings: (2.5 x 4)

- |                                   |                            |
|-----------------------------------|----------------------------|
| i. Arithmetic mean                | ii. Mean deviation         |
| iii. Principal component analysis | iv. Box-plot               |
| v. Standard deviation             | vi. Methods of sampling    |
| vii. Ogives                       | viii. Poisson distribution |



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