

FACULTY OF INFORMATICS

**M.C.A. (2 Years Course) I- Semester (CBCS) (Main & Backlog) Examination,
April/May 2023**

Subject: Probability and Statistics

Time: 3 Hours

Max. Marks: 70

**Note: I. Answer one question from each unit. All questions carry equal marks.
II. Missing data, if any, may be suitably assumed.**

Unit-I

1. a) Explain about Vector Spaces and Subspaces.
b) Prove the set of solutions (x,y,z) of the equations $x + y + 2z = 0$ is a subspace of the space $R^3(R)$.

(OR)

2. a) Define column space of a $(m \times n)$ matrix A.
b) Determine Whether set of polynomial form a basis of P_3 .

$$5-3t+4t^2+2t^3,$$

$$9+t+8t^2-6t^3,$$

$$6-2t+5t^2,$$

$$t^3.$$

Unit – II

3. a) Explain types of Events.
b) State and prove Baye's theorem.

(OR)

- 4.a) What is Random Variable.
b) Three cards are drawn at random successively with replacements from a well shuffled pack of cards. Getting a card of diamond is termed as a success. Obtain the probability distribution of the number of success.

Unit – III

5. a) What is Random Sampling?
b) The heights of 10 males of a given locality are found to be 70,67,62,68,61,68,70,64,64 and 66 inches. Is it reasonable to believe that the average height is greater than 64 inches. (Table value=1.833)

(OR)

6. a) Define Interval Estimates.
b) Explain Random and Non Random sampling.

Unit – IV

7. a) What is standard deviation?
 b) A Random sample of 40 student selected from a college and their average height is found to be 175cms with a standard deviation of 10cms. Another sample of 50 students selected from a college, their average height is found to be 170cms. with a standard deviation of 4cms. Test an average, the average height of the students of 1st college is > 2nd college.

(OR)

8. a) Explain large sample test.
 b) Before increasing the exercise duty 40 out of 70 were smokers, after increasing the tax a random sample of 150 persons selected. In this sample 90 persons were found smokers. Test, is there any decrease in the proportion of smokers after increasing the tax.

Unit – V

9. a) Define (i) Population (ii) Sample (iii) Parameter
 (iv) Statistics (v) Standard error

- b) A survey of 320 families with 5 children each revealed the following distribution:

No. of boys: 5 4 3 2 1 0

No. of girls: 0 1 2 3 4 5

No. of Families: 14 56 110 68 40 12

Is this result consistent with the hypothesis that male and female births are equally probable.

(OR)

10. a) The following are the regression lines $8x-10y+66=0$ and $40x-18y=214$. Find:
 i) Regression equation Y on X.
 ii) Correlation coefficient between X and Y
- b) The following are the regression lines $8x-10y+66=0$ and $40x-18y=214$. Find:
 i) Regression equation X on Y.
 ii) Mean Values of X and Y

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