

1-1-122

**Subject : STATISTICS ( with Mathematics combination)**

**SEMESTER - I**

**Paper - I : Descriptive Statistics and Probability**

**UNIT - I**

Concepts of Primary and Secondary data. Methods of collection and editing of primary data, Designing a questionnaire and a schedule. Measures of Central Tendency - Mean, Median, Mode, Geometric Mean and Harmonic Mean.

**UNIT - II**

Measures of dispersion : Range, Quartile Deviation, Mean Deviation and Standard Deviation. Central and Non-Central moments and their interrelationship Sheppard's correlation for moments, Skewness and kurtosis.

**UNIT - III**

Basic concepts of Probability, random experiments, trial, outcome, sample space, event, mutually exclusive and exhaustive events, equally likely and favourable outcomes. Mathematical, Statistical, axiomatic definitions of probability. Conditional Probability and independence of events.

**UNIT - IV**

Addition and multiplication theorems of probability for 2 and for a n events. Boole's inequality and Baye's theorems and problems based on Baye's theorem.

**UNIT - V**

Definition of random variable, discrete and continuous random variables, functions of random variable. Probability mass function, Probability density function, Distribution function and its properties. Bivariate random variable - meaning, joint, marginal and conditional Distribution, independence of random variables.

**Practicals - Semester - I**

1. Diagrammatic representation of data (Bar and Pie)
2. Graphical representation of data (Histogram, Frequency Polygon, Frequency curves, Ogives)
3. Central and non central moments and Sheppard's corrections for moments.
4. Measures of Skewness and Kurtosis.
5. MS - Excel methods for the above serial numbers 1,2,4.

**Reference Books:**

1. Introduction to probability - Charles M. rinstead, J. Laurie Snell.
2. Fundamentals of Mathematical Statistics by VK Kapoor & S.C. Gupta
3. Fundamentals of Statistics - Goon gupta, Das Gupta
4. Sambavyatha avadi Sidhantam - Telugu Academy
5. Hoog, Taims Rao: Probability and Statistical Inference 7<sup>th</sup> edition Pearson.
6. B.A / B.Sc., I Year Statistics - descriptive Statistics, probability distribution - Telugu Academy - Dr. M. Jaganmohan Rao, Dr. N. Srinivasa Rao, Dr. P. Tirupathi Rao, Smt. D. Vijayalakshmi.

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(20.....Exams)**

1-1-22  
15

THREE YEAR B.A / B.Sc. DEGREE EXAMINATIONS  
FIRST SEMESTER - MODEL QUESTION PAPER  
PART II - STATISTICS  
(With Mathematics Combination)

Time : 3 hours

Max Marks : 75

**PART A**

Answer any FIVE questions. Each question carries 5 Marks

5 X 5 = 25 Marks

1. Given two values  $X_1$  and  $X_2$ , prove that  $AM \geq GM \geq HM$
2. Define skewness and give the measures of skewness.
3. Show that for discrete distribution  $\beta_2 > 1$
4. Define mathematical definition of probability and give its properties.
5. Prove that if A & B are any two events, then

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

6. Define conditional probability and Independent events.
7. A Random variable X has the following probability distribution

X	0	1	2	3	4	5	6	7	8
P(X)	a	3a	5a	7a	9a	11a	13a	15a	17a

- (i) Determine a
- (ii) Find  $P(X < 3)$
8. Define distribution function and give its properties

**PART B**

Answer one question from each unit. Each question carries 10 MARKS

5 X 10 = 50 Marks

**UNIT - I**

- (a) What is meant by classification of data? What are the methods of classification  
(OR)

- (b) Find Mean and Mode to the following frequency distribution

X	1	2	3	4	5	6	7	8
f	4	9	16	25	22	15	7	3

**UNIT - II**

- (a) Derive the central moments in terms of raw moments.  
(OR)
- (b) Prove that moments are independent of change of origin but not scale. Also give the Sheppard's Correction for moments.

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## UNIT - III

(a) Explain the Axiomatic definition of the probability and also give its properties.

(OR)

(b) If  $B \subset A$  then prove that

$$(i) \quad P(A \cap \bar{B}) = P(A) - P(B)$$

$$(ii) \quad P(B) \leq P(A)$$

~~UNIT - IV~~

## UNIT - IV

(a) State and Prove Boole's Inequality

(OR)

(b) Let A and B be two events such that

$$P(A) = \frac{3}{4} \text{ and } P(B) = \frac{5}{8}$$

Then show that (i)  $P(A \cup B) \geq \frac{3}{4}$

$$(ii) \quad \frac{3}{4} \leq P(A \cap B) \leq \frac{5}{8}$$

## UNIT V

(a) A continuous random variable X has the following density function

$$f(x) = Ax^2, \quad 0 \leq x \leq 1$$

(i) Determine A

(ii) Find  $P(0.2 \leq x \leq 0.5)$  and  $P(x < 0.3)$

OR

(b) The joint p.d.f. of X and Y is given by  $f(x, y) = 4xy e^{-(x^2 + y^2)}$ ,  $x \geq 0$ ,  $y \geq 0$

Test whether X and Y are independent.

*P. J.*  
Chairman, B.O.S. in Statistics

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