

2014

(1st Semester)

STATISTICS

FIRST PAPER

(Descriptive Statistics)

12	10	9	8	8	40	32	28	20	14	10
Frequency (f)	3	8	15	23	35	40	32	28	20	14
Size (x)	1	2	3	4	5	6	7	8	9	10

Full Marks : 55

Time : 2 hours

(PART : B—DESCRIPTIVE)

(Marks : 35)

The questions are of equal value

UNIT—I

1. Define primary and secondary data. Describe the methods of collection of primary data.

Or

How will you frame a questionnaire? Mention a few general points which you would be borne in mind while framing a questionnaire.

UNIT—II

2. If \bar{x}_i ($i = 1, 2, \dots, k$) are the means of k component series of sizes n_i ($i = 1, 2, \dots, k$) respectively, then prove that the mean \bar{x} of the composite series obtained on combining the component series is

$$\bar{x} = \frac{n_1\bar{x}_1 + n_2\bar{x}_2 + \dots + n_k\bar{x}_k}{n_1 + n_2 + \dots + n_k}$$

Or

Define mode. Also find the mode of the following distribution :

Size x	1	2	3	4	5	6	7	8	9	10	11	12
Frequency (f)	3	8	15	23	35	40	32	28	20	45	14	16

UNIT—III

3. Define standard deviation, variance and root-mean-square deviation and also show that the standard deviation is the least value of root-mean-square deviation by taking the relation between σ and s .

Or

An analysis of monthly wages paid to the workers of two firms A and B belonging to the same industry gives the following results :

	<i>Firm A</i>	<i>Firm B</i>
No. of workers	500	600
Average daily wages	₹ 186	₹ 175
Variance of distribution of wages	81	100

- (a) Which firm A or B has a larger wage bill?

- (b) In which firm A or B, is there greater variability in individual wages?
- (c) Calculate—
- (i) the average daily wage;
 - (ii) the variance of the distribution of wages of all workers in the firms A and B taken together.

UNIT—IV

4. Show that the correlation coefficient between observed and estimated values of Y is the same as the correlation coefficient between X and Y.

Or

Define rank correlation. Obtain the rank correlation coefficient for the following data :

X	:	68	64	75	50	64	80	75	40	55	64
Y	:	62	58	68	45	81	60	68	48	50	70

UNIT—V

5. Prove that any standard deviation of order p may be expressed in terms of a standard deviation of order $(p - 1)$.

Or

Define attribute. Differentiate between dichotomous and manifold classifications. Also, show that the total number of class frequencies with n attributes is 3^n .

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(PART : A—OBJECTIVE)

(Marks : 20)

The figures in the margin indicate full marks for the questions

SECTION—A

(Marks : 5)

Put a Tick (✓) mark against the correct answer in the
brackets provided for it : 1×5=5

1. Statistics has many importances in different sectors
and discipline such as

- (a) Planning ()
- (b) Mathematics ()
- (c) Economics ()
- (d) All of the above ()

2. The sum of the squares of the deviations of a set of value is — when taken about mean.

(a) maximum ()

(b) minimum ()

(c) zero ()

(d) infinite ()

3. A distribution is said to be skewed if

(a) mean = median = mode ()

(b) mean < median < mode ()

(c) mean \neq median \neq mode ()

(d) mean > median > mode ()

4. Two uncorrelated variables need not necessarily be

(a) dependent ()

(b) independent ()

(c) correlated ()

(d) equal ()

5. The error of a regression coefficient is determined by the number of

(a) primary subscripts ()

(b) secondary subscripts ()

(c) tertiary subscripts ()

(d) both primary and secondary subscripts

()

SECTION—B

(Marks : 15)

Answer the following questions :

3×5=15

1. Prove that the algebraic sum of the deviations of a set of values from their arithmetic mean is zero, if x_i / f_i , $i = 1, 2, \dots, n$ is the frequency distribution.

2. Define skewness. Explain Prof. Karl Pearson's coefficient of skewness.

8	7	6	5	4	3	2	1	0	x
1	3	28	56	70	56	28	8	1	f

(a) independent

(b) correlated

(c) equal

3. The value of a regression coefficient is determined by the number of

(a) primary subscript

(b) secondary subscript

(c) tertiary subscript

(d) both primary and secondary subscript

3. Calculate the first four moments of the following distribution about the mean and hence find β_1 and β_2 .

x	0	1	2	3	4	5	6	7	8
f	1	8	28	56	70	56	28	8	1

4. Prove that two independent variables are uncorrelated.

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(Descriptive Statistics)

(PART : A - OBJECTIVE)

(Marks : 20)

The figures in the margin indicate full marks for the questions

SECTION - A

(Marks : 5)

Put a Tick (✓) mark against the correct answer in the brackets provided below.

1. Pathways has many important in different sectors and disciplines such as

(a) Planning []

(b) Mathematics []

(c) Economics []

(d) All of the above *** []

5. Fit the curve $Y = ab^x$ to a set of n points so that it is the curve of best fit.

(a) maximum

(b) minimum

(c) zero

(d) finite

3. A distribution is said to be skewed if

(a) mean = median = mode

(b) mean > median = mode

(c) mean = median > mode

(d) mean > median ★★★