

**POST GRADUATE DIPLOMA IN  
APPLIED STATISTICS (PGDAST)**

**Term-End Examination**

**June, 2015**

00898

**MST-002 : DESCRIPTIVE STATISTICS**

*Time : 3 hours*

*Maximum Marks : 50*

**Note :**

- (i) *Question no. 1 is compulsory. Questions no. 2 to 5 have internal choices.*
- (ii) *Use of scientific calculator is allowed.*
- (iii) *Use of Formulae and Table Booklet for PGDAST is allowed.*
- (iv) *Symbols have their usual meaning.*

1. State whether the following statements are *True* or *False*. Give reason in support of your answer.  $5 \times 2 = 10$
- (a) Mode is the best measure of central tendency.
  - (b) The coefficient of correlation will have positive sign when X does not change with changes in Y.

- (c) If two variables are not correlated, the lines of regression become perpendicular to each other.
- (d) The regression coefficient of Y on X is 3.2 and that of X on Y is 0.8.
- (e) Attributes A and B are said to be independent, if  $(AB) < \frac{(A)(B)}{N}$ .
2. (a) The average salary of male employees in a firm was ₹ 52,000 and that of female employees was ₹ 42,000. The mean salary of all the employees was ₹ 50,000. Find the percentage of male and female employees in the firm. 5
- (b) In a frequency distribution, the coefficient of skewness based on the quartiles is 0.6. If the sum of the upper and lower quartiles is 100 and median is 38, find the values of upper and lower quartiles. 5

**OR**

- (a) An incomplete frequency distribution is given as follows :

<i>Class Interval</i>	<i>Frequency</i>
10 – 20	12
20 – 30	30
30 – 40	?
40 – 50	65
50 – 60	?
60 – 70	25
70 – 80	18
Total	229

Given that the median value is 46, determine the missing frequencies of the distribution.

6

- (b) The first of the two samples has 100 items with mean 15 and standard deviation 3. If the whole group has 250 items with mean 15.6 and standard deviation  $\sqrt{13.44}$ , find the standard deviation of the second group.

4

3. (a) Fit a second degree curve to the following data related to the profit of a certain company :

<i>Year</i>	<i>Profit (in ₹ lakhs)</i>
1960	125
1962	140
1964	165
1966	195
1968	230

Estimate the profit in the year 1975.

4

- (b) The coefficient of rank correlation of the marks obtained by 10 students in Maths and Statistics was found to be 0.5. It was later discovered that the difference in ranks in the two subjects obtained by one of the students was wrongly taken as 3 instead of 7. Find the corrected rank correlation coefficient.

6

**OR**

- (a) A computer while calculating correlation coefficient between two variables X and Y from 25 pairs of observations obtained the following results :

$$\Sigma X = 125, \Sigma X^2 = 650, \Sigma Y = 100, \Sigma Y^2 = 460, \\ \Sigma XY = 508$$

It was later found that the operator had copied down two pairs (6, 14) and (8, 6) as (X, Y) while the correct values were (8, 12) and (6, 8) respectively. Obtain the correct value of  $r(X, Y)$ .

7

- (b) Explain the method of least squares.

3

4. (a) . The equations of two regression lines obtained in a data analysis are as follows :

$$3X + 12Y = 19$$

$$3Y + 9X = 46$$

Obtain (i) mean values of X and Y ; and  
(ii) the value of correlation coefficient.

7

- (b) Explain what are regression lines. Why are there two such lines ?

3

**OR**

(a) For 50 students of a class, the regression equation of marks in Statistics (X) on marks in Mathematics (Y) is  $3Y - 5X + 180 = 0$ . The mean marks in Mathematics are 44 and the variance of marks in Statistics is  $(9/16)^{\text{th}}$  of the variance of marks in Mathematics. Find the mean marks in Statistics and the coefficient of correlation between marks in the two subjects.

7

(b) In a trivariate distribution,  $r_{23.1} = 0.69$ ,  $r_{12} = 0.8$  and  $r_{13} = 0.6$ . Compute  $r_{23}$ .

3

5. (a) What are the possible types of association between attributes? Explain the distinction between them.

5

(b) Given that  $(AB) = 150$ ,  $(A\beta) = 230$ ,  $(\alpha B) = 260$  and  $(\alpha\beta) = 2340$ . Find the frequencies of A and B. Also obtain the value of N.

5

**OR**

The following table shows the IQ values of 1000 students at a college according to the economic conditions of their parents :

<i>Economic Condition</i>	<i>IQ level</i>		<i>Total</i>
	<i>High</i>	<i>Low</i>	
Rich	460	140	600
Poor	240	160	400
Total	700	300	1000

Use the coefficient of contingency to determine the amount of association between economic condition and IQ level. It is given that the value of  $C_{\max}$  is 0.707.

10