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MST–002

POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)

Term-End Examination

December, 2025

MST-002 : DESCRIPTIVE STATISTICS

Time : 3 Hours *Maximum Marks : 50*

Note : *(i) Question No. **1** is compulsory.*

*(ii) Attempt any **four** questions out of the remaining Question Nos. **2** to **7**.*

(iii) Use of scientific (non-programmable) calculator is allowed.

(iv) Use of Formulae and Statistical Tables Booklet for PGDAST is allowed.

(v) Symbols have their usual meanings.

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1. State whether the following statements are True *or* False. Give reasons in support of your answers : 5×2=10

   (a) If $x_1, x_2, x_3, ..., x_n$ and $y_1, y_2, y_3, ..., y_n$ are the variate-values of two variables X and Y, and their geometric means are G_1 and G_2, respectively, then the geometric mean of $\left(\frac{x_i}{y_i}\right); i = 1, 2, ..., n$ will be $\left(\frac{G_1}{G_2}\right)$.

   (b) If n = 10, $\bar{x} = 5$ and $\sum_{i=1}^{n} x_i^2 = 340$, then coefficient of variation is 50 percent.

   (c) If X is measured in ₹ and Y is measured in kg, then the unit of $r(x, y)$ is ₹/kg.

   (d) If r_{12} = 0.87, r_{13} = 0.82 and r_{23} = 0.62, then the partial correlation coefficient $r_{12.3}$ is approximately 0.81.

   (e) If (AB) = 150, $(A\beta) = 230, (\alpha B) = 260$ and $(\alpha\beta) = 2340$, then N is 2990.

2. (a) Assume that the following data are in ascending order :

$$2, 5, 7, x + 2, 3x, 22, 25, 30.$$

Find the value of x, if the median of the data is 14. 2

(b) For the data 8, 15, 27, 50, 25, 20, 10, find the square root of the mean of squares of the deviations from the mean of this data. Also, find out the unit of this measure, if the unit of the given data is in meters. 3

(c) In the given data, two frequencies are missing and its mean is found to be 2.2.

No. of Accidents (x)	**Frequency (f)**
0	6
1	?
2	?
3	5
4	7
5	4
Total	50

Find the missing frequencies. 5

3. (a) Fit the exponential curve $y = ab^x$ to the following data (use log base e) : 5

x	y
12	5
14	7
26	8
28	10
30	14

(b) Suppose X and Y are the two variables having the correlation 0.97 for the following values : 5

X	Y
15	20
25	35
55	85
75	90

Then two new variables W and Z are obtained by multiplying each observation of X and Y by 2 and 3, respectively. Find the correlation between W and Z using the given data. Also, interpret the result.

4. (a) Regression lines of Y on X and X on Y respectively are :

$$3x - 2y = -4$$

$$2x - y = 1$$

Then, find : 5

(i) The mean values of x and y,

(ii) Coefficient of correlation between x and y, and

(iii) The standard deviation of y for given variance of $x = 36$.

(b) Write a short note on skewness and kurtosis. 5

5. From the data given in the following table, find out : 10

(i) Least squares regression equation of X_1 on X_2 and X_3.

(ii) Estimate the value of X_1 for $X_2 = 35$ and $X_3 = 7$.

X_1	X_2	X_3
10	9	12
12	5	13
13	13	14
15	12	19
13	11	11

6. (a) In a study of 100 cases, it was found that the number of unmarried students was 30, number of failing the examination was 50 and the number of married who failed was 60. From the given information, find out : 5

(i) The number of married students.

(ii) The number of students passing the examination.

(iii) The number of married students who passed.

(iv) The number of unmarried students who passed.

(v) The number of unmarried students who failed.

(b) Define multiple correlation with an example. If $r_{12} = 0.82$, $r_{23} = -0.47$ and $r_{13} = -0.50$, then calculate the multiple correlation coefficients $R_{1.23}$ and $R_{2.13}$. 5

7. (a) In a sample of 1000 children, 600 came from higher income group and rest from lower income group. The number of drop out children from education in these groups was 100 and 250, respectively. Calculate the coefficient of association between drop-outs and income groups. 5

(b) 1000 students at college level were graded according to their IQ level and the economic condition of their parents :

Economic condition	IQ level		
	High	Low	Total
Rich	350	150	500
Poor	250	250	500
Total	600	400	1000

Use the coefficient of contingency to determine the amount of association between economic condition and IQ level. 5

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