POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)

Term-End Examination

June, 2021

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 questions no. 2 to 7.*

(iii) *Use of scientific calculator is allowed.*

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

(v) *Symbols have their usual meanings.*

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

(a) The following data is in ascending order of magnitude :

2, 23, 24, 29, 3x + 2, 3x + 4, 39, 40, 60, 90

If the median of the data is 33, then value of x is 10.

(b) If $b_{yx} = -0{\cdot}40$ and $b_{xy} = -0{\cdot}50$, then the value of correlation coefficient between x and y will be 0·44.

(c) If n = 1000, (A) = 800, (B) = 400, (AB) = 80, then the data is inconsistent.

(d) Range of coefficient of determination is from $-\frac{1}{2}$ to $\frac{1}{2}$.

(e) If standard deviation of X is 5, then standard deviation of Y = 2X – 3 is 7.

2. (a) For the data

7, 9, 15, 19, 27, 13, 18, 21, 11, 16,

find the values of A and B such that $\sum_{i=1}^{10} (x_i - A)^2$ is minimum and $\sum_{i=1}^{10} |x_i - B|$ is minimum. *4*

(b) Ten patients with high blood pressure participated in a study to evaluate the effectiveness of a new drug in reducing their blood pressure. The following table shows systolic blood pressure measurements taken before and after two weeks of treatment. Calculate the mean and standard deviation of the change in the blood pressure. *4*

Patient	Before	After
1	172	159
2	186	157
3	170	163
4	205	207
5	174	164
6	184	141
7	178	182
8	156	171
9	190	177
10	168	138

(c) Give two data sets having same mean and mode but different standard deviation. *2*

3. (a) Calculate the coefficient of concurrent deviation for the following data : *4*

x	y
368	122
384	121
385	124
360	125
347	122
384	126

(b) Compute the correlation ratio of Y on X for the following data : *6*

y \ x	47	52	57	62	67
57	4	4	2	0	0
62	4	8	8	1	0
67	0	7	12	1	4
72	0	3	1	8	5
77	0	0	3	5	6

4. (a) Assume that the following data are measured on ordinal scale. Calculate the appropriate correlation coefficient. *3*

x	y
10	6
15	25
14	12
25	18
14	25
14	40
20	10
22	7

(b) Calculate the correlation coefficient between age of husband and age of wife for the following bivariate frequency distribution : *7*

Age of husband	Age of wife					
	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	Total
15 – 25	6	3	–	–	–	9
25 – 35	3	16	10	–	–	29
35 – 45	–	10	15	7	–	32
45 – 55	–	–	7	10	4	21
55 – 65	–	–	–	4	5	9
Total	9	29	32	21	9	100

5. (a) For the given data in the following table :

x	y
5	9
4	8
3	10
2	11
1	12

Calculate

(i) both regression coefficients,

(ii) correlation coefficient,

(iii) regression lines of y on x and x on y,

(iv) estimate y for x = 4·5, and

(v) if two lines are perpendicular or parallel or coincide or intersecting at an acute angle. *2+1+2+1+2*

(b) Explain order and ultimate class frequencies, with example. *2*

6. From the given data in the following table :

X_1	X_2	X_3
1	3	4
2	4	5
3	5	6
4	6	7
5	7	8

(a) Find the least square regression equation of X_1 on X_2 and X_3.

(b) Estimate the value of X_1 for $X_2 = 45$ and $X_3 = 8$. *9+1*

7. (a) In a sample of 1000 children, 400 came from higher income group and rest from lower income group. The number of delinquent children in these groups was 50 and 200 respectively. Calculate the coefficient of association between delinquency and income groups. *5*

(b) The following table consists of data of 1000 college students who were graded according to their IQ level and the economic condition of their parents :

Economic condition	IQ level		
	High	Low	Total
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. *5*