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MST-002

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

Term-End Examination

June, 2020

MST-002 : DESCRIPTIVE STATISTICS

Time : 3 Hours

Maximum Marks : 50

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

(ii) Attempt any four questions from the remaining (Question Nos. 2 to 7).

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

(iv) Use of formulae and statistical tables booklet for PGDAST programme 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 : 2 each

(a) Average rainfall of a city from Monday to Saturday is 0.3 inches. Due to heavy rainfall of 1.7 inches on Sunday the average rainfall increased to 0.5 inches.

(b) If 25% of the items are less than 20 and 25% are more than 40, then quartile deviation is 20.

(c) If $X' = 2X$ and $Y' = Y + 3$ and $r(X, Y) = 0.80$, then $r(X', Y') = 0.40$.

(d) If $b_{XY} = -0.9$ and $b_{YX} = -0.4$ then $r(X, Y) = -0.6$.

(e) If $(AB) = 150$, $(\alpha B) = 260$, $(A\beta) = 230$, then $(B) = 490$.

2. (a) The frequency distribution of marks obtained by 55 students in Statistics is as follows :

7

Class	No. of Students
10—14	03
15—19	07
20—24	16
25—29	12
30—34	09
35—39	05
40—44	03

Calculate :

- (i) Ist quartile
 - (ii) IIIrd quartile
 - (iii) 8th decile
 - (iv) 75th percentile
 - (v) Coefficient of Quartile Deviation.
- (b) The mean and standard deviation of a variable of 100 items were found to be 60

and 10, respectively. At the time of calculations two items were wrongly taken as 5 and 45 instead of 30 and 20. Calculate the corrected mean and standard deviation.

3

3. Calculate Karl Pearson's co-efficient of correlation between X and Y from the following bivariate frequency distribution of 140 pairs of X and Y :

10

Y \ X	10—20	20—30	30—40	40—50
10—20	20	26	—	—
20—30	8	14	37	—
30—40	—	4	18	3
40—50	—	—	4	6

4. We are given the following data on three variables X_1 , X_2 and X_3 : 10

X_1	X_2	X_3
64	57	08
71	59	10
53	49	06
67	62	11
55	51	08
58	50	07
77	55	10
57	48	09
56	52	10
51	42	06
76	61	12
68	57	09

Find :

- (i) the least square regression equation of X_1 on X_2 and X_3 .
- (ii) estimate value of X_1 for given values of $X_2 = 54$ and $X_3 = 9$.

5. The following table gives the distribution of students and also of regular players among them, according to age in completed : 10

Years	Age of Minor			Age of Major		
	15	16	17	18	19	20
Age in years						
No. of Students	250	200	150	120	100	80
Regular Players	200	150	90	48	30	12

Calculate the coefficient of association between majority and playing habit, on the assumption that majority is attained in 18th year.

6. (a) For a distribution, the mean is 10, variance is 16, γ_1 (gamma 1) is +1 and β_2 (beta 2) is 4. Obtain the first four moments about the origin.

- (b) The coefficient of rank correlation of the marks obtained by 10 students in Statistics and Accountancy was found to be 0.4. It was later discovered that the difference in ranks in the two subjects obtained by one of the students was wrongly taken as 5 instead of 6. Find the corrected value of coefficient of rank correlation. 4
7. (a) For a bivariate data, the equation of regression lines $4X - 7 = 35$ are $Y = 4X - 35$ and $9X - Y = 135$, find : 6
- (i) the mean value of X and Y.
 - (ii) the value of $r(X, Y)$.
 - (iii) the value of σ_X if $\sigma_Y = 12$.
- (b) Check whether A and B are independent, positively associated or negatively associated in the following case : 4
- $(AB) = 256$, $(\alpha B) = 768$, $(A\beta) = 48$ and $(\alpha\beta) = 144$.