

1. Define: (i) Positive and Negative Correlations, (ii) Simple and Multiple Correlations, (iii) Partial and Total Correlations, and (iv) Linear and Nonlinear Correlations.

2. Draw a Scatter diagram to represent the following data:

x	2	4	5	6	8	11
y	18	12	10	8	7	5

Calculate the coefficient of Correlation between x and y.

**Ans: -0.92**

3. Find the Coefficient of Correlation between x and y for the following data:

**Ans: 0.9032**

x	62	64	65	69	70	71	72	74
y	126	125	139	145	165	152	180	208

4. For the following data, show that  $Cov(x, x^2) = 0$ .

x	-3	-2	-1	0	1	2	3
y	9	4	1	0	1	4	9

5. Calculate the Correlation Coefficient between x and y from the following data:

**Ans: 0.915**

$$n = 10, \sum x = 140, \sum y = 150, \sum (x - 10)^2 = 180, \sum (y - 15)^2 = 215, \sum (x - 10)(y - 15) = 60.$$

6. Find Correlation Coefficient from the following data:

**Ans: 0.197**

$$n = 10, \bar{x} = 5.4, \bar{y} = 6.2, \text{ and sum of the product of deviations from Mean of x and y is } 66.$$

7. A sample of 25 pairs of values x and y lead to the following results:

$$\sum x = 127, \sum y = 100, \sum x^2 = 760, \sum y^2 = 449, \sum xy = 500. \text{ Later on, it was found that two pairs of values were taken as } (8, 14) \text{ and } (8, 6) \text{ instead of the correct values } (8, 12) \text{ and } (6, 8). \text{ Find the corrected Coefficient between x and y.}$$

**Ans: -0.31**

8. Find the likely production corresponding to a rainfall of 40 cm from the following data:

**Ans: 66 quintals**

	Rainfall	Output (in quintals)
Mean	30	50
SD	5	10
$r = 0.8$		

9. Ten students got the following percentage of marks in Mathematics and Physics:

Mathematics (x)	8	36	98	25	75	82	92	62	65	35
Physics (y)	84	51	91	60	68	62	86	58	35	49

Calculate the Rank Coefficient of Correlation.

**Ans: 0.455**

10. Obtain the Rank Correlation Coefficient from the following data:

**Ans: 0.5429**

x	10	12	18	18	15	40
y	12	18	25	25	50	25

11. Ten competitors in a musical test were ranked by the three judges A, B, and C in the following order:

Rank by A	1	6	5	10	3	2	4	9	7	8
Rank by B	3	5	8	4	7	10	2	1	6	9
Rank by C	6	4	9	8	1	2	3	10	5	7

Using the Rank Correlation Method, find which pair of judges has the nearest approach to common liking in music.

**Ans: The pair of Judges A and C [GTU SUMMER-2015]**

12. From the following data, obtain the two regression lines and correlation coefficient.

Sales (x)	100	98	78	85	110	93	80
Purchase (y)	85	90	70	72	95	81	74

**Ans:  $b_{yx} = 0.785, b_{xy} = 1.1746$ , Two equations are  $y = 0.785x + 8.78$  &  $x = 1.1746y - 3.1426$ ,  $r = 0.9602$**

13. The following data give the experience of machine operators and their performance rating as given by the number of good parts turned out per 100 pieces.

Operator	1	2	3	4	5	6
Performance rating (x)	23	43	53	63	73	83
Experience (y)	5	6	7	8	9	10

Calculate the regression line of performance rating on experience and also estimate the probable

performance if an operator has 11 years of experience. **Ans:  $x = 11.429y - 29.3875$  [GTU SUMMER-2015]**