Tutorial sheet - 2

Curve fitting and Correlation Analysis

Q .1. Using the method of least Squares, fit a straight line to the following data.

X	1	2	3	4	5
y	2	4	6	8	10

Ans. y = 2 x

Q2. Find the Least Squares line that fits the following data, assuming that x – values are free from error.

x	1	2	3	4	5	6
Y	5.04	8.12	10.64	13.18	16.20	20.04

Ans. 2.0253 + 2.908 x

Q3. Find the Least Square line for the data points. (-1, 10), (0, 9), (1, 7), (2, 5), (3, 4), (4, 3), (5, 0), and (6, -1) Ans. y = - 1.607 x + 8.6429

Q 4. If P is the pull required to lift a load W by means of a pulley block, find a linear law of the form P = m W + c, connecting P and W using the data

P	12	15	21	25
W	50	70	100	120

Where P and W are taken in kg – wt. (Ans. P = 2.2759 + 0.1879 W)

Q5. Find the best values of a and b so that y = a + b x fits the given data.

X	0	1	2	3	4
y	1.0	2.9	4.8	6.7	8.6

Ans. y = 2.0253 + 0.502 x

Q 6. The following data regarding the heights (y) and weights of 100 college students are.

$\sum x = 15000,\ \sum x^2 = 2272500,\ \sum y = 6800,\ \sum y^2 = 463025\ and$

$\sum x\ y = 1022250$, Find the correlation Coeff. Between height and weight

Ans. r = 0.6

Q 7. Find the Coefficient of correlation for the following dable.

x	10	14	18	22	26	30
y	18	12	24	6	30	36

Ans. r = 0.6

Q 8. Calculate the Coefficient of correlation from the following results

$N = 10,\ \sum x = 100,\ \sum (x-10)^2 = 180,\ \sum y = 150,\ \sum (y-15)^2 = 215\ and$

$\sum (x-10)\,(y-15) = 60$ Ans. (r = 0.305)

Q9. Calculate Karl Pearsons Coefficient of Correlation between x and y for the following information.

$N = 12,\ \sum x = 120,\ \sum (x-8)^2 = 150,\ \sum y = 130,\ \sum (y-10)^2 = 200\ and$

$\sum (x-8)\,(y-10) = 50$ Ans. (r = 0.2146)

Q10. A computer while calculating correlation co-efficient between two variables x and y from 25 pairs of the observations obtained the following results.

$N = 25,\ \sum x = 125,\ \sum x^2 = 650,\ \sum y = 100,\ \sum y^2 = 460\ and\ \sum xy = 508$

It was, however, later discovered at the time of checking that he had copied down two pairs as

x	6	8	**While the correct values were**	x	8	6
y	14	6		Y	12	8

Ans. (r = 0.305)

Q **11.** Two Judges in a music competition rank the 12 entries as follow

X	1	2	3	4	5	6	7	8	9	10	11	12
y	12	9	6	10	3	5	4	7	8	2	11	1

What is the degree of agreement is there between the judgement of the two judges

(Ans. -0.454)

Q12. Obtain the rank correlation coefficients for the following data

X	68	64	75	50	64	80	75	40	55	64
y	62	58	68	45	81	60	68	48	50	70

(Ans 0.545)

Q13. Ten competitors in a beauty contest were ranked by three judges in the following orders

First judge	7	8	1	6	5	10	3	2	4	9
Second judge	6	9	3	5	8	4	7	10	2	1
Third judge	5	7	6	4	9	8	1	2	3	10

Use the method of rank correlation to determine which pair of judges has the nearest approach to common taste in beauty. **(Ans. I and III)**