ITM(SLS) BARODA UNIVERSITY, VADODARA

School of Computer Science Engineering & Technology

(B.Tech. SEM-VII)

Probability and Statistical Modelling for Computer Science

ASSIGNMENT-2

Q.1 Define the following:

1. Correlation
2. Types and Scatter diagram of correlation.
3. Coefficient of determination

Q.2 Solve the following:

1. Following is the data of production of a machine component by two companies. Calculatethe corrleation coefficient and comment on your result.

Company-1	10	11	14	14	20	22	16	12
Company-2	12	14	15	16	21	26	21	15

Ans: r=0.9551

2.

Age	20	21	22	23	24	25
No. of Students	500	400	300	240	200	160
Regular Players	400	300	180	96	60	24

Calculate Karl Pearson's coefficient of correlation between age & playing habits from data

r=(−0.9912)

3. The following table gives indices of industrial production and number of registeredunemployed people (in lakhs). Calculate the value of correlation coefficient.

Year	2011	2012	2013	2014	2015	2016	2017	2018
Index	100	102	104	107	105	112	103	99
No. of Unemployed	15	12	13	11	12	12	19	26

Ans: r=(−0.619)

4. The ranks of 15 students in two subjects *A* & *B* are given in the data. The

two numberswithin the brackets denote the ranks of a student in *A* & *B* respectively:
(1,10), (2,7), (3,2), (4,6), (5,4), (6,8), (7,3), (8,1), (9,11), (10,15), (11,9), (12,5), (13,14),
(14,12) and (15,13). Find Spearman's rank correlation coefficient.

Comment on your result. Ans: r=0.5143

5. Ten competitors in a project fair are ranked by three judges in the following order:

Judge-1	1	6	5	10	3	2	4	9	7	8
Judge-2	3	5	8	4	7	10	2	1	6	9
Judge-3	6	4	9	8	1	2	3	10	5	7

Use the Rank correlation coefficient to determine which pair of judges has the nearestapproach to common tastes in projects.

Ans: $R_{12}=(-0.212)$, $R_{13}=0.636$, $R_{23}=(-0.297)$

6. Compute the two regression coefficients using the following data and hence find the valueof correlation coefficient:

x	7	4	8	6	5
y	6	5	9	8	2

Ans: $b_{xy}=0.4$, $b_{yx}=1.2$, $r=0.69$

7. Following data gives the ages and blood pressure of 10 patients:

Age	56	42	36	47	49	42	60	72	63	55
B.P.	147	125	118	128	145	140	155	160	149	150

(a) Determine the least squares regression equation of blood pressure on age.

(b) Estimate the blood pressure of a patient whose age is 45 years. Hint: Take Age=x & Blood pressure=y.

Ans: (*a*) $b_{yx}=1.11$, $y=83.758+1.11\,x$ (*b*)=134

8. A company is introducing a job evaluation scheme in which all jobs are graded by points for skill, responsibility etc. Monthly pay scales (thousands) are then drawn up according tothe number of points, experience etc. To date, the company has applied this scheme to 9 jobs.

Job	A	B	C	D	E	F	G	H	I
Points:	5	25	7	19	10	12	15	28	1.6
Pay(Rs.)	3.0	5.0	3.25	6.5	5.5	5.6	6.0	7.2	6.1

(a) Find the least squares regression line for linking pay scales to points.

(b) Estimate the monthly pay for a job having 20 points. Ans: (*a*) $y = 3.326 + 0.133\,x$, (*b*) *At* $x = 20$, $y = 5986$

9. Given is the information

	Expenses (x) (in lakhs)	Sales (y) (in lakhs)
Arithmetic mean $(\bar{x})$	10	90
Standard Deviation (σ)	3	12

Correlation coefficient = 0.8. Obtain the two regression equations. Ans: $y=58+3.2\,x$