Name:	Printed Pages:
Student University Roll No.:	

School of Engineering

First Sessional Examination, Even Semester (AS: 2023-24)

B. Tech: All | Year: Second | Semester: IV

Course Title: Statistical and Numerical Technique	Max Marks: 30
Course Code: BAS3401	Time: 1 *hr*

Instructions if any: Read the questions Carefully.

	SECTION 'A'		Marks
Q.N.1. Attempt all parts of the following:			
a)	Define Karl Pearson's coefficient of correlation.	CO1	1
b)	What is control chart?	CO2	1
c)	What is UCL & LCL of p-chart?	CO2	1
d)	If the regression coefficients are 0.8 and 0.2, what would be the value of coefficient of correlation?	CO1	1
e)	Define Normal distribution.	CO3	1
	SECTION 'B'		Marks
Q.N.2. Attempt any two parts of the following:			
a)	In a partially destroyed laboratory record of an analysis of correlation data, the following results only are eligible: $\sigma_y^2 = 16$, regression equations: $5y-8x+17=0$, $2y-5x+14=0$. What are (a) the mean values of x and y, (b) the standard deviation of x, (c) coefficient of correlation between x and y.	CO1	7.5
b)	The following is data of defectives of 10 samples of size 100 each. Construct np- chart and give your comments.	CO2	7.5
c)	The following table gives the sample mean and range for 10 samples each of size 5. Construct control chart for mean and range and comment on nature of control. (given $A_2 = 0.58$; $D_3 = 0$; $D_4 = 2.115$)	CO2	7.5

Sample No.	1	2	3	4	5	6	7	8	9	10
No. of defectives	6	9	12	5	12	8	8	16	13	17

S.No	1	2	3	4	5	6	7	8	9	10
X	43	49	37	44	45	37	51	46	43	47
R	5	6	5	7	7	4	8	6	4	6

d)	A sample of 100 dry battery cell tested to find the length of life produced the following results: $\bar{x} = 12hr$, $\sigma = 3\,hr$, Assuming the data to be normally distributed, what percentage of battery cell are expected to have life: (i) More than 15 hours, (ii) less than 6 hours (iii) between 10 and 14 hours. where z(1)=0.3413, z(2)=0.4772, z(0.67)=0.2485	CO1	7.5

SECTION 'C'

Q.N.3. Attempt any one part of the following:

a) Calculate the correlation coefficient and regression lines to the following data; — CO1 — 10

x	5	7	8	10	11	13	16
y	33	30	28	20	18	16	9

b) Certain locomotive parts produced are inspected for casting. The results are given as follows: — CO2 — 10

Sample No. (each of 100 items)	1	2	3	4	5	6	7	8	9	10
No. of defectives	12	10	6	8	9	9	7	10	11	8

Construct p- chart and give your comments.

c) Calculate the rank correlation coefficient to the following data; — CO1 — 10

x	5	7	8	10	11	13	16
y	33	30	28	20	18	16	9

Table 1: Mapping between COs and questions

(Number of COs may vary from course to course)

COs	Questions Numbers	Total Marks
CO1	1a, 1d, 2a, 3a, 3c.	29.5
CO2	1b.1c, 2b, 2c, 3b	27
CO3	1e, 2d.	8.5