

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (NEW) EXAMINATION – WINTER 2023****Subject Code:3132908****Date:12-01-2024****Subject Name:Statistics for Textile Engineering****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

Marks

- Q.1** (a) Define the term: 1. CV% 2. Mean 3. Standard deviation % **03**
- (b) AM of weights of 100 boys is 50 kg and the AM of weight of 50 girls is 45 kg. Calculate AM of weights of combined group of boys and girls. **04**
- (c) Find Q3, D9 and P35 for the following frequency distribution. **07**

Class	31-34	35-39	40-44	45-49	50-54	55-59	60-64
<i>f</i>	3	5	12	18	14	6	6

- Q.2** (a) Describe various types of scatter diagrams. **03**
- (b) What is the correlation? Explain the positive and negative correlation **04**
- (c) The following data are related to the number of defective garment produced by a group of workers in an industry. **07**

No. of defective garments	28	32	40	50	58	62	Total
No. of days	5	10	12	20	10	3	60

Find the mean deviation about mean for the above data and comment about the variation of the data.

OR

- (c) Five strength tests each carried out on the two fabrics have shown the following results. **07**

A	15.2	15.5	15.0	15.4	15.6
B	15.0	14.8	13.6	15.5	15.2

Find CV% for both and decide which fabric is more consistent?

- Q.3** (a) Explain frequency distribution briefly. **03**
- (b) Explain Poisson distribution with their properties. **04**
- (c) Following are the marks obtained by ten different students in the subject of physics and the subject of science. **07**

Student no.	1	2	3	4	5	6	7	8	9	10
Marks in physics	68	64	75	50	64	80	75	40	55	64
Marks in science	62	58	68	45	81	60	68	48	50	70

Calculate spearman's rank correlation coefficient using the above data.

OR

- Q.3** (a) State the steps in the planning of an experiment. **03**
(b) Discuss Binomial distribution briefly **04**
(c) Compute Karl Pearson's coefficient of correlation from the following data of percentage humidity and warp breakages were recorded from a weaving factory and comment on it. **07**

% Humidity	60	62	59	70	56	58	75
Warp Breakages	112	110	120	102	122	118	90

- Q.4** (a) State the properties of normal distribution. **03**
(b) Enlist the various process control chart and state the formula for CL, LCL, and UCL of $\bar{X}$ chart. **04**
(c) Sample of five ring bobbins each selected from a ring frame for eight shifts have shown following results of count CV%. **07**

Sample no.	1	2	3	4	5	6	7	8
Average	4.16	4.22	4.08	3.96	3.99	4.03	4.02	3.91
Range	0.32	0.38	0.11	0.19	0.12	0.13	0.22	0.11

Draw $\bar{X}$ bar and R chart for the above data and write conclusion about the state of the process. [Table value: $A_2 = 0.577$, $D_3 = 0$, $D_4 = 2.12$]

OR

- Q.4** (a) Find the mean for the following classified data. **03**
(b) Ten count tests made on certain yarn have shown following results. **04**
22.8, 23.2, 22.9, 22.6, 23.4, 23.0, 23.1, 23.0, 22.9, 23.0
Calculate standard deviation using the above data and comment about the variation of the data.
(c) The following data are related to the percentage of humidity and the warp breakage rate recorded for a week in a loom shed. **07**

% Humidity	54	85	86	50	42	75	65	56
Warp Breakage rate	2.45	1.21	1.20	2.84	3.25	1.86	1.90	2.32

Using the above data, find two equation of lines of regression. In addition, find percentage humidity required for the targeted warp breakage rate of 1.50%.

- Q.5** (a) Explain about relative measures of dispersion. **03**
(b) Briefly explain about the small sample t-test. **04**
(c) If the value of the correlation coefficient between the two variables X and Y is 0.83, find the equation of regression of X on Y and Y on X using following data. **07**

	Variables	
	X	Y
Mean	112	65
Standard deviation	2.5	3.2

OR

- Q.5** (a) Briefly discuss about the Assignable causes and Chance causes. **03**
(b) Briefly discuss about the design of experiment. **04**

- (c) An experiment was carried out to study the effect of the speed of the ring frame on the number of end breakages, and the following results were obtained by taking five readings at each speed. (One way ANOVA)

07

	Speed (rpm)			
	15000	16000	17000	18000
End Breakages	18	22	23	30
	20	20	23	32
	18	21	25	28
	15	18	24	28
	17	23	23	35

Analyze the above data and write the conclusion

[F table value for 3, 16 degrees of freedom at 5% level = 3.24]
