

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III EXAMINATION – SUMMER 2025****Subject Code:3132908****Date:13-06-2025****Subject Name:Statistics for Textile Engineering****Time:02:30 PM TO 05:00 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)** Describe various types of scatter diagrams. **03****(b)** Find out median from the following data. **04**

Class	0-10	10-20	20-30	30-40	40-50
Frequency	18	30	46	34	22

(c) Find out D_3 & P_{35} for the following frequency distribution. **07**

Class	30-34	35-39	40-44	45-49	50-54	55-59	60-64
frequency	3	5	12	18	14	6	2

Q.2 (a) Ten-count tests carried out on the yarn of a cone have shown AM 25.62 and another 15-count tests carried out on the yarn of same cone have shown AM 26.25. what is the AM of the yarn if all 25 tests taken together? **03****(b)** What is the correlation? Explain the positive and negative correlation. **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**(c)** Two judges in a fabric assessment rank 6 fabric samples in the following order. Find out spearman's rank correlation coefficient. **07**

Sample	A	B	C	D	E	F
Judge A	2	1	5	6	4	3
Judge B	3	2	6	4	5	1

Q.3 (a) Explain briefly frequency distribution. **03****(b)** Explain significance of control chart. **04****(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?

OR**Q.3 (a)** Define the terms: i) Standard Deviation ii) Median iii) CV% **03****(b)** Discuss Poisson distribution briefly. **04****(c)** The time taken by an operator to replace bobbin on a spinning frame are as follows: **07**

Time (in Sec)	15.1-15.2	15.3-15.4	15.5-15.6	15.7-15.8	15.9-16.0	16.1-16.2	16.3-16.4
No. of Occasions	1	7	17	22	15	7	2

Calculate quartile deviation for the above data and comment on it.

Q.4 (a) Discuss Binomial distribution briefly. **03**

(b) Mean of the following frequencies distribution is 18.1. Find the missing frequencies. **04**

class	5-10	10-15	15-20	20-25	25-30	30-35
Frequencies	11	20	35	20	?	6

(c) Compute Karl Pearson's coefficient of correlation from 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

OR

Q.4 (a) Explain the term: (1) Assignable causes (2) Chance causes **03**

(b) Find out mean from the following data. **04**

Class	0-10	10-20	20-30	30-40	40-50
Frequency	18	30	46	34	22

(c) The following data are related to the percentage of humidity and the warp breakages rate recorded for a week in a loom shed. **07**

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

Using above data, find two equations of lines of regression. In addition, find warp breakage rate if humidity percentage on a specific day is 60.

Q.5 (a) State the properties of normal distribution. **03**

(b) Briefly discuss about the design of experiment. **04**

(c) Calculate the mean deviation of the following values about the mean and median in respect of the following data. **07**

18, 25, 63, 59, 29, 72, 17, 25, 105, 87

OR

Q.5 (a) Briefly explain about the small sample t-test. **03**

(b) Enlist the various process control chart and state the formula for CL, LCL and UCL of $\bar{X}$ chart **04**

(c) An experiment was conducted to study the effect of a dye produced by four different companies (A, B, C and D) on the strength of the fabric and following results were obtained. **07**

	Dye			
	A	B	C	D
Fabric strength	250	225	250	300
	275	250	275	250
	275	225	250	275
	300	300	250	300

Carry out the analysis (One way ANOVA) of above data and write the conclusion. (Table value of F for 3, 12 degree of freedom at 5% level = 3.49)
