

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-III (NEW) EXAMINATION – WINTER 2024****Subject Code: 3132908****Date: 21-11-2024****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)** Describe various types of scatter diagram **03**
- (b)** What is correlation? Explain positive and negative correlation. **04**
- (c)** Compute Karl Pearson's coefficient of correlation from the following data of price of garment (in Rs.) and number of garments sold and comment on it. **07**

Price of garment	100	105	110	115	120	125	130
Number of garments sold	85	80	70	75	65	60	60

- Q.2 (a)** Explain briefly frequency distribution. **03**
- (b)** Explain Poisson distribution with their properties. **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

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)** State the steps in planning of an experiment. **03**
- (b)** Explain Normal distribution with their properties. **04**
- (c)** Following data represents average & range of linear density of the yarn obtained from eight different samples each of size five, selected during a spinning process. **07**

Sample no.	1	2	3	4	5	6	7	8
Average linear density	19.6	20.1	20.5	19.4	22.3	21.7	20.3	19.9
Range®	1.2	2.1	1.6	1.8	2.0	1.7	2.0	1.8

Draw $\bar{X}$ bar and R chart for the above and write conclusion about the state of the process.
(Table value: $A_2 = 0.577$, $D_3=0$, $D_4=2.155$).

OR

- Q.3 (a)** Explain about assignable causes and chance of causes **03**
- (b)** Explain Binomial distribution with their properties **04**
- (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 equation of line of regression, find warp breakage rate if humidity percentage on a specific day is 60 for given data.

- Q.4 (a)** Explain about relative measures of dispersion. **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) 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.

OR

- Q.4 (a)** Ten strength test made on certain yarn have shown the following results; 03
22.8, 23.2, 22.9, 22.6, 23.4, 23.0, 23.1, 23.0, 22.9, 23.0
Find the median for the above data and comment on it.

- (b) Explain significance of control chart. 04

- (c) Following are the marks obtained by ten different students in the subject of mathematics and the subject of statistics. 07

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

Calculate rank correlation coefficient using the above data and comment on it

- Q.5 (a)** Define the terms: i) Standard Deviation ii) Median iii) CV% 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) 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]

OR

- Q.5 (a)** Discuss the significance of sampling. 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) Following is the distribution of 200 samples of five garments each, according to the number of effective garments. 07

No. of defective garments	0	1	2	3	4	5	Total
No. of samples	50	80	40	15	10	5	200

Fit the binomial probability distribution to the above data and test the goodness of fit assuming, (i) Probability of the defective garments "p" is unknown. (ii) 20% of the garments are defective. (d.f. at 5% level $X^2_{2,0.05} = 5.991$ & $X^2_{3,0.05} = 7.815$)
