

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III(NEW) EXAMINATION – SUMMER 2023****Subject Code:3132908****Date:24-07-2023****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 diagram. **03**
 (b) What is correlation? Explain positive and negative correlation. **04**
 (c) Find the Q_3 , D_7 and P_{85} from the following data. **07**

Weight in lbs	115	120	130	140	145
No. of men	8	20	35	24	12

- Q.2** (a) AM weights of 100 boys is 50 kg and the AM of weights of 50 girls is 45 kg. Calculate AM of weight of combined group of boys and girls. **03**
 (b) Explain Binomial distribution with their properties **04**
 (c) Five Strength tests each carried out on the two fabrics have shown 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 fabrics is more consistent?

OR

- (c) Find the mean and mode for the following classified data. **07**

Class	0-5	5-10	10-15	15-20	20-25	25-30
Frequency	2	4	4	6	5	3

- Q.3** (a) State the steps in planning of an experiment. **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) Briefly explain about the small sample t-test. **03**
 (b) 24 ring bobbins are tested for count and the mean found to be 52.4 Ne, The standard deviation of the sample is 4.1. if the nominal count is 50 Ne, is the yarn too fine? (find using t-test, $n < 30$, At 5% $t_{23} = 2.069$) **04**
 (c) Following are the marks obtained by eight different students in the subject of mathematics and the subject of statistics. **07**

Student No.	1	2	3	4	5	6	7	8
Marks in Mathematics	48	85	70	72	70	68	65	80
Marks in statistics	42	92	65	80	67	62	60	72

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

Q.4 (a) Enlist the various process control chart and state the formula for CL, LCL and UCL of $\bar{X}$ chart. **03**

(b) What is correlation? Explain 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

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

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

(c) The results of percentage humidity and end breakages recorded from a ring frame of a spinning mill are as follows: **07**

Percentage humidity	60	62	59	70	56	58	75
End breakages	10	12	10	14	6	8	15

Find the two equations of lines of regression using the above data. Find the end breakages if the humidity is 65%.

Q.5 (a) 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. **14**

	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)

OR

Q.5 (a) Explain Normal distribution with their properties. **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 linear density of yarn. **07**

Linear density	13.0-13.25	13.25-13.50	13.50-13.75	13.75-14.00	14.00-14.25	14.25-14.50	14.50-14.75
No. of tests	8	12	20	25	22	10	3

Calculate Karl Pearson and Bowley's coefficient of skewness using the above data and comment on it.

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