GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–IV(NEW) – EXAMINATION – SUMMER 2019

Subject Code:2142905   **Date:15/05/2019**
Subject Name: Statistical Quality Control & Textile Costing
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.**

			MARKS
Q.1	**(a)**	Define the term: 1. Standard Deviation 2. PMD 3. Coefficient of variation	**03**
	(b)	Explain significance of control chart.	**04**
	(c)	Following are the results of the fabric strength (in 10 gm) obtained from the samples of two different fabrics.	**07**

Fabric A	22.0	21.5	22.8	21.0	23.0	20.9	21.6	22.0	22.8	21.2
Fabric B	22.3	21.6	22.0	22.1	22.0	22.3	21.8	21.8	21.6	21.8

Find out using above data which fabric is more consistent in terms of the strength.

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)	Explain Binomial distribution with their properties.	**04**
	(c)	Conduct the analysis of variance (one-way classification) for the following data. State whether the lea cunt differ between the bobbins.	**07**

Lean	Bobbin No.					
No.	1	2	3	4	5	6
1	22	23	24	21	20	19
2	21	20	22	23	24	19
3	20	19	21	20	22	23
4	18	24	20	19	22	24

Table value of F for 5, 18 d.f. at 5% level=2.77 & level=4.25

OR

	(c)	An experiment was conducted to study the effect of the speed of the ring frame on the count of the yarn. The yarn was spun with four different speeds on three different ring frames and the results yarn counts are follows.	**07**

		Speed (RPM)			
		15000	16000	17000	18000
Ring Frame	I	85	88	85	90
	II	70	85	90	95
	III	80	82	88	92

Carry out analysis of the above data and write the conclusions.
(Table value of F for 3, 6 degree of freedom at 5% level = 4.76)
(Table value of F for 2, 6 degree of freedom at 5% level = 5.14)

Q.3	**(a)**	What is correlation? Explain positive and negative correlation.	**03**
	(b)	Find out Quartile deviation of the following data and its relative measure.	**04**

Value	10	15	20	25	30	35	40
Frequency	5	10	16	20	14	8	4

	(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.3 **(a)** Explain Poisson distribution with their properties. **03**

(b) State the properties of Normal distribution. **04**

(c) Following are the marks obtained by eight different students in the subjects of mathematics and the subject of statistics. **07**

Student no.	1	2	3	4	5	6	7	8
Marks in Mathematics	50	52	68	70	72	70	63	75
Marks in statistics	50	90	60	80	67	62	65	80

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

Q.4 **(a)** Briefly explain about the small sample t-test. **03**

(b) Five knitted garments each were selected at eight different times during the production and following results of number of defective garments were obtained. **04**

Sample nos.	1	2	3	4	5	6	7	8
No. of defective garments	0	2	1	1	2	0	0	0

Draw the np-chart for the above data.

(c) Ten ring bobbins selected from the production of the day shift and fifteen ring bobbins selected from the production of the night shift have shown following results. **07**

	Day shift	Night shift
No. of tests	10	15
Average count	40.2	39.3
Std. dev. of count	2.5	3.8

From these sample results, is there any evidence that the yarn spun during night shift is coarser than the day shift? Use 10% los. (Table value $t_{23,0.1}=1.319$)

OR

Q.4 **(a)** Explain about collection and types of data. **03**

(b) Following data represents average and range of linear density of the yarn obtained from eight different samples each size five, selected during a spinning process. **04**

Sample nos.	1	2	3	4	5	6	7	8
Avg. 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 the mean charts for the above data.($A_2=0.577$)

(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.5 **(a)** Find out median from the following data. **03**

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

(b) Discuss about population and sample. **04**

(c) Explain in detail about DMAIC process. **07**

Q.5 **(a)** Write short note on Material cost. **03**

(b) Write short note on labour cost. **04**

(c) A spinning mill is working with following mix: **07**

Cotton Variety	Proportion (%)	Cost/Kg. (in Rs.)
P1	10	4
P2	20	5
P3	30	6
P4	40	7

Calculate clean cotton cost/kg. If yarn realization is 88% & that out of the 25 kg lost per 100kg. put through, 8 kg. are saleable at 1.75 Rs./kg.

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