

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– IV (New) EXAMINATION – WINTER 2019****Subject Code: 2142905****Date: 12/12/2019****Subject Name: Statistical Quality Control & Textile Costing****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.

MARKS

Q.1 (a) Define the term: 1. Mode 2. PMD 3. Coefficient of variation **03****(b)** The following table shows test results pertaining to yarn count. **04**

Test No.	1	2	3	4	5	6	7	8
Count	24	20	18	21	22	23	19	20

Find the quartile deviation.

(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) Describe various types of scatter diagram. **03****(b)** Find out D_7 & P_{35} for the following frequency distribution. **04**

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

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

OR**(c)** A 4 X 4 LSD was conducted to study the effects of four different dyes A, B, C, and D on the strength of the fabric. To remove the variation of the laboratory and the operators conducted the experiment in four different laboratories and the results obtained are as follows: **07**

Lab	I	II	III	IV
I	66 (B)	74 (D)	70 (A)	72 (C)
II	75 (D)	68 (A)	68 (C)	65 (B)
III	69 (A)	72 (C)	63 (B)	75 (D)
IV	70 (C)	65 (B)	74 (D)	70 (A)

Carry out analysis of the above data and write the conclusion.

(Table value of F for 3, 6 degree of freedom at 5% level = 4.76)

- Q.3** (a) What is correlation? Explain positive and negative correlation. **03**
 (b) Explain Binomial distribution with their properties **04**
 (c) Calculate the coefficient correlation of the following data and comment on it. **07**

X	1	2	3	4	5	6	7	8	9
Y	2	6	7	8	10	11	11	10	9

OR

- Q.3** (a) State the properties of Normal distribution. **03**
 (b) Explain Poisson distribution with their properties. **04**
 (c) Two judges in a fabric assessment rank 6 fabric samples in the following order. **07**

Find out spearman's rank correlation coefficient.

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

- 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) 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.

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) 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 $t_{23,0.1}=1.319$)

- Q.5** (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) Write short note on Material cost. **04**

- (c) For spinning 18s warp carded yarn, three qualities of cottons are used. Their proportions and rates/kg. are as shown below. **07**

Cotton Variety	% in mix	Cost/kg. (in Rs.)
A	8	5.84
B	88	5.00
C	4	3.00

Calculate clean cotton cost/kg., if yarn realization is 86% & that out of 14kg. lost per 100kg. put through, 8kg. are saleable at 1.75 Rs./kg.

OR

- Q.5** (a) Discuss about population and sample. **03**
(b) Write short note on labour cost. **04**
(c) Explain in detail about DMAIC process. **07**
