Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – WINTER 2013

Subject Code: 162901 **Date: 27-11-2013**

Subject Name: Statistical Quality Control and 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.**

Q.1 **(a)** i. State advantages of acceptance sampling. **07**

ii. State the properties and applications of Binomial distribution.

iii. Define: - Randomization, Replication and Treatment.

(b) Price fluctuation of two bobbins A and B are given in the following table. Which type of bobbin has more variation in its price? Why? **07**

Bobbin A	218	219	216	223	220	224	222	225	222	221
Bobbin B	152	132	134	132	145	142	146	130	146	141

Q.2 **(a)** Find the mode from the following data. **07**

Class	30-50	20-30	12-20	7-12	4-7	3	2	1	0
Frequency	0	17	23	60	40	20	30	25	15

(b) Obtain the frequency distribution from the following cumulative frequency distribution and calculate Harmonic mean and Geometric mean. **07**

Count less than	10	20	30	40	50	60
Cumulative Frequency	2	5	9	17	19	20

OR

(b) Find range, coefficient of range, quartile deviation, coefficient of quartile deviation, mean deviation and coefficient of mean deviation from the following data. **07**

Class	3	5	8	12	17	20	24	30	35
Frequency	1	3	7	15	20	13	10	7	4

Q.3 **(a)** Conduct the analysis of variance (one-way classification) for the following data. State whether the lea count differ between the bobbins: **07**

Lea No.	**Bobbin No.**					
	1	**2**	**3**	**4**	**5**	**6**
1	42	43	44	41	40	39
2	41	40	42	43	44	39
3	40	39	41	40	42	43
4	38	44	40	39	42	44

Table value of F for 5, 18 d.f. at 5% level = 2.77 and 1% level = 4.25

(b) Two judges have given ranks to ten students for their honesty. Find the rank correlation coefficient. **07**

X	26	27	28	35	37	42	39	39	32	22
Y	38	42	40	49	44	50	38	40	45	36

OR

Q.3 **(a)** Four mixing A, B, C and D were prepared and allocated at random on six different R.F. Conduct the analyses of variance (two-way classification) and give your conclusions. Figure in the table indicate lea strength in lbs. Strength origin = 70 lbs. **07**

Mixing	**Ring Frame**					
	I	**II**	**III**	**IV**	**V**	**VI**
A	11	13	10	11	12	11
B	09	09	11	11	08	08
C	14	13	14	11	15	14
D	08	08	07	06	07	08

Table value:-

For 3 and 15 d.f. at 5% level is 3.29 and 1% level is 5.42

For 5 and 15 d.f. at 5% level is 2.9 and 1% level is 4.56

(b) Mixing A, B, C and D were tested for lea strength. Every day 28 leas from each mixing were tested for lea strength and average of 25 leas test where as follows. A 4 x 4 latin square design was used. **07**

Days	**Spindle set**			
	1	**2**	**3**	**4**
I	46.2(A)	42.8(B)	43.4(C)	43(D)
II	46.2(D)	47(A)	41.8(B)	42.5(C)
III	44(C)	42(D)	46.5(A)	42(B)
IV	43(B)	42.5(C)	41.6(D)	44.5(A)

Does mixing defer significantly in terms of lea strength? Also study the effect of days and spindle set on yarn strength offer your conclusion.(F table value for D.f. 3 and 6 5% lead 4.76 and 1% lead 9.78)

Q.4 **(a)** Write down different methods of studying correlation. Discuss in detail about scatter diagram method also write down merit and demerits of it. **07**

(b) The sampling data of garment company is given. Draw X and R charts and decide whether the process may be regarded under control or not. **07**

Sample No.	**I**	**II**	**III**	**IV**
1	30	38	42	50
2	20	30	18	42
3	22	32	36	40
4	50	40	30	25
5	28	42	35	25
6	48	22	20	30
7	32	32	42	42
8	36	34	35	37
9	31	48	51	71
10	20	22	24	31
11	22	33	44	55
12	72	62	65	25
13	18	68	74	50
14	14	18	52	62
15	60	62	65	63

[For n=4 $A_2 = 0.73$, $D_3 = 0$, $D_4 = 2.28$]

OR

Q.4 **(a)** The following table shows the scores of different group. Find the correlation coefficient between age and scores of the test. Also find coefficient of determination. **07**

Scores	**Group**			
	A	**B**	**C**	**D**
50-100	4	4	2	1
100-150	3	5	4	2
150-200	2	6	8	5
200-250	1	4	6	10

(b) Daily 250 samples were collected for 10 days. The numbers of defective samples found are given below. Draw an appropriate control chart and report on the state of control. **07**

Date	1	2	3	4	5	6	7	8	9	10
Defects	18	25	38	39	29	60	52	12	29	25

Q.5 **(a)** The sales and profits during the two periods are given below **07**

Years	**Sales(Rs.)**	**Profits(Rs.)**
2012	240000	18000
2013	280000	26000

Calculate: - (i) Profit/Volume ratio. (ii) Amount of sales at Break point.
(iii) Profit when sales are Rs. 200000. (iv) Margin of safety in 2013.

(b) i. Describe different methods of costing. **07**
ii. Explain scheme of Cost distribution in textile mill.

OR

Q.5 **(a)** Explain marginal costing. What are the assumptions made in it? Give its advantages and limitations. **07**

(b) The following figures relates to the factory **07**

Fixed cost:- Rs. 400000 Variable cost/unit:- Rs. 10
Output:- 80000 units Selling price/unit:-20

i. Draw a break even chart.
ii. If new selling price is Rs. 18/unit, what will be the new break even point?

****