

GUJARAT TECHNOLOGICAL UNIVERSITY**B. E. - SEMESTER – VI • EXAMINATION – WINTER 2012****Subject code: 162901****Date: 02/01/2013****Subject Name: Statistical Quality Control & Textile Costing****Time: 02.30 pm - 05.00 pm****Total Marks: 70****Instructions:**

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** Four warp beams were prepared & given different treatment. Four warp beam then wound on four different looms. A design was prepared. The beams were interchanged between the four experimental looms in such a way that after completion of experiment each warp beam had worked on each loom for one day. Data of warp breakages rate are as follows. **14**

		Days			
		1	2	3	4
Loom	I	(P)5.52	(S)9.16	(R)5.77	(Q)5.07
	II	(S)6.69	(R)5.14	(Q)2.91	(P)6.09
	III	(Q)2.87	(P)6.02	(S)6.53	(R)2.83
	IV	(R)9.76	(Q)6.25	(P)8.90	(S)9.77

- i. Identify the design.
- ii. Conduct the analysis of various (ANOVA) and check whether the warp beam treatment has any effect on breakage rate? Also check the effect of days and loom. Give your conclusion.

Table value for F test at 5% level is 4.76 and
at 1% level is 9.78.

- Q.2 (a)** Answer the following **07**

- i. Define consumer risk and producer risk.
- ii. Enumerate the different types of control chart that can be used in textile industry with at least one example of usage.
- iii. State the properties of normal distribution.

- (b)** From the following data draw the average out going curve (AOQ) and calculate the required constant. $P_1=0.01$, $P_2=0.05$, $\alpha=0.10$, $\beta=0.10$, $h_1=h_2=1.32$, $S=0.025$. **07**

OR

- (b)**
 - i. Define mean, median and mode. State the relationship between them. **07**
 - ii. Define treatment and replication.
 - iii. State the difference between variable chart and attribute chart.

- Q.3 (a)** Following table gives the value of single thread strength(y) and corresponding lea strength(x) for the combed yarn. Calculate the correlation coefficient and regression equation for predicting single strength from lea strength. **08**

X	20	25	30	32	36	42	48	51	54	58	61	64	65	66	68
Y	150	165	172	180	184	195	208	221	230	239	255	258	262	281	300

- (b)**
 - i. A frame is spinning 40s combed yarn. The average lea count of 12 bobbins is 41.125. The SD of count is 1.147. Assuming sample SD as population SD, can we say that frame is spinning a right yarn count? If not, suggest a corrective action. **06**
Table value of t at 5 %level is 2.2 and
at 1% level is 3.11.
 - ii. Mean range of 50s cotton yarn is 3.4. Four bobbins are tested in each sample.

Calculate: - (i) SD, (ii) CV%, (iii) Mean Deviation, (iv) % Mean Deviation.
Take the value of constant for $n=4$, $A_n=0.4857$

OR

- Q.3 (a)** Fibres from two plants A & B were tested for maturity. The results obtain are as follows. **07**

Particulars	Plant A	Plant B
Matured fibre	260	335
Immatured fibre	140	165

Can we say that maturity is same in plant A & B?

The table value for χ^2 at 5 %level is 3.84 and

at 1% level is 6.63.

- (b)** Draw the control charts for defective. Following table shows number of defective while inspecting 250 nos. in each sample. **07**

Sample no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No. of defective	3	2	6	9	5	1	0	0	12	3	2	1	1	1	9

Sample no.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
No. of defective	5	4	2	6	3	1	0	0	2	2	3	2	1	6	4

- Q.4 (a)** Conduct the analysis of variance (one-way classification) for the following data. State whether the lea count differ between the bobbins: **07**

Bobbin No.	Lea No.			
	I	II	III	IV
A	42	41	40	38
B	43	40	39	44
C	44	42	41	40
D	41	43	40	39
E	40	44	42	42
F	39	39	43	44

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

- (b)** Two yarns of 30s were tested for lea strength. The strength results are as follows. **07**

	Yarn A	Yarn B
No. of tests	30	30
Lea strength in lbs	58	62
C.V.%	13.45%	13.23%

Can we say that yarn B is stronger than yarn A?

The table value for t test is 2.0.

OR

- Q.4 (a)** Three Mixing A, B & C were tested for yarn preparation on three different ring frame. The breaking strength in kg. was tested. Conduct ANOVA (Two way Classification) to check the effect of ring frame & mixing on yarn strength. Offer your conclusion. **07**

Ring Frame	Mixing		
	I	II	III
A	36	34	38
B	38	33	37
C	35	36	39

Table value of F for 2 and 4 d.f. at 5% level = 6.94 & 1% level = 18.00.

- (b)** For spinning of 20s carded yarn for warp three qualities of cotton are used. Their product mix and rate/kg are as follows. **07**

Cotton	% Used	Rate/kg (Rs.)
A	10	6
B	86	5
C	4	3

Calculate clean cotton cost if yarn realization is 85% and that out of 15 kg loss per 100 kg. 8 kgs are salable at Rs. 2.75 per kg.

Q.5 (a) Particular of two varieties are as follows.

07

	Sort A	Sort B
Sales in Rs.	150000	150000
V.C.	120000	100000
F.C.	15000	35000
Net Profit	15000	15000

Which sort is better under heavy & low demand?

- (b)**
- Define: - Opportunity cost, Sunk cost and Out of pocket cost.
 - What do you understand by the co-efficient of correlation if the value of $r=1$, $r>0.7$ and $r<0.7$.

07

OR

Q.5 (a) Write in short on: -

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- Marginal costing
 - Break even analysis
- (b)**
- Draw the flow chart of cost distribution in a textile mill.
 - State the steps in planning of an experiment.

07
