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## **GUJARAT TECHNOLOGICAL UNIVERSITY**

BE - SEMESTER - VI EXAMINATION - WINTER 2015

Subject Code:162901 Date:15/12/ 2015

**Subject Name: Statistical Quality Control & Textile Costing** 

Time:2:30pm to 5:00pm 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 design was prepared to compare the performance of four mixings A, B, C, & D processed on four spindle sets. The allotment of treatment of different spindles was altered from day to day. 25 leas from each mixing were tested for strength every day. The average of these 25 leas is as given below:

|      | Spindle Set |         |         |         |  |  |  |
|------|-------------|---------|---------|---------|--|--|--|
| Days | 1           | 2       | 3       | 4       |  |  |  |
| 1    | 46.2 (A)    | 42.8(B) | 43.4(C) | 43.0(D) |  |  |  |
| 2    | 43.2(D)     | 47.0(A) | 41.8(B) | 42.5(C) |  |  |  |
| 3    | 44.0(C)     | 42.0(D) | 46.5(A) | 42.0(B) |  |  |  |
| 4    | 43.0(B)     | 42.5(C) | 41.6(D) | 44.5(A) |  |  |  |

- (a) Identify the design
- (b) Test whether four mixing differ in terms of lea strength
- (c) Also check the effect of spindle and days on lea strength of four mixing. Table values for FTest at 5% is 4.76 & 1% is 9.78
- Q.2 (a) Define mean, SD and CV%. Calculate Mean, SD, Variance and CV% from 07 following data:

Defect per loom 0 1 2 3 4
Frequency 30 44 18 6 2

(b) Give formula for "inter quartile range". Quartile deviation and coefficient for QD. Find QD and its coefficient from following data:

4 5 Roll No. 1 2 3 6 7 20 28 40 12 30 15 50 Marks OR

- (b) Define quartile deviation. If the mean and SD of normal distribution are 60 & 5 respectively, find inter quartile range and mean deviation of the distribution.
- Q.3 (a) (i) Define producer risk and consumer risk.

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- (ii) Define replication and treatment.
- (iii) State advantages of acceptance sampling
- (b) The following table refers to the number of missing stitches noted during the inspection in the large garment manufacturing company.

| Garment No.             | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
|-------------------------|----|----|----|----|----|----|----|
| No. of missing stitches | 8  | 15 | 15 | 19 | 9  | 15 | 9  |
| Garment No.             | 8  | 9  | 10 | 11 | 12 | 13 | 14 |
| No. of missing stitches | 12 | 21 | 13 | 23 | 16 | 9  | 25 |
| Garment No.             | 15 | 16 | 17 | 18 | 19 | 20 | 21 |

| No. of missing s  | stitches   | 15   | 10   | 10  | 12   | 15           | 9         | 10       |   |
|---|--|--|--|---|--|--------------|-----------|----------|---|
| Garment No.   |  | 22   | 23   | 24  | 25   |              |           |          |   |
| No. of missing s  |  | 22   | 8  | 27  | 9  |              |           |          |   |
| Draw the contr  | rol chart for  | C  | OR   |   |  |              |           |          |   |
| Following dat   | a represents   | s produ  |  | f 30s c                                     | one by   | 3 wo         | rkers (   | Conduct  | ( |
| ANOVA for (   | -  | -  |  | 205   | one of   | 20           | ineis.    | conade   | ` |
|   |  |  | N  | <b>Machine</b>                              | S  |              |           |          |   |
|   | Workers  | , ,  | A  | В   |  |              |           |          |   |
|   | X  |  | 16   | 64  | 4  | 0            |           |          |   |
|   | Y  |  | 56   | 72  | 6  |              |           |          |   |
|   | Z  | 1  | 12   | 56  | 2  | 8            |           |          |   |
| (i) Test whe  | ther the me  | ean proc   | ductivity  | is the                                      | same   | for dif      | ferent 1  | machine  |   |
| types.  | 1 0 1  | 1: cc  | *.1  |   |  | 1            | ,         |          |   |
| <ul><li>(ii) Test whet</li><li>Find the coeff</li></ul>   |  |  |  | -   |  |              | •         | · in (V) |   |
| from following  |  | itelatioi  | i betwe  | en enus                                     | /III (A)   | and p        | icks per  | III (1)  | • |
| _   | 27 28  | 28   | 29   | 30  | 31   | 33           | 35        | 36       |   |
| Y 18  | 20 22  | 27   | 21   | 29  | 27   | 29           | 28        | 29       |   |
| & no. of tests =  (i) No.  (ii) No.   | = 40, calcula<br>. of tests hav<br>. of tests hav  | te:<br>ing cour<br>ing cour  | nt less th   | nan 35.5<br>than 36                         | 5s<br>.9s  |              | .2sNe, \$ | SD=0.5,  | ( |
| (ii) No.<br>(iii) No.<br>t table at -1.4  | = 40, calcula<br>of tests hav<br>of tests hav<br>of tests hav<br>= 0.081 &   | te: ring counting counting counting counting at +1.4 =   | nt less that more nt between 1.919   | nan 35.5<br>than 36<br>een 35.5             | 5s<br>.9s<br>5 & 36.9  | )            |           | SD=0.5,  |   |
| & no. of tests =  (i) No.  (ii) No.  (iii) No.  t table at -1.4   | = 40, calcula<br>of tests hav<br>of tests hav<br>of tests hav<br>= 0.081 &   | te: ring countring countring countring countries that the strength is the strength in the stre | nt less that more nt between 1919 th and h   | nan 35.5<br>than 36<br>een 35.5             | 5s<br>.9s<br>& 36.9<br>en follo                              | wing re      |           | SD=0.5,  |   |
| & no. of tests =  (i) No.  (ii) No.  (iii) No.  (iii) No.  t table at -1.4  Two yarns are   | = 40, calcula<br>of tests hav<br>of tests hav<br>of tests hav<br>= 0.081 &   | ite: ing counting counting counting countat +1.4 = a streng  | nt less that more nt between 1919 th and h   | nan 35.5<br>than 36<br>een 35.5             | 5s<br>.9s<br>& 36.9<br>en follo<br>Yarn                      | wing re      |           | SD=0.5,  |   |
| & no. of tests =  (i) No.  (ii) No.  (iii) No.  t table at -1.4   | = 40, calcula<br>of tests hav<br>of tests hav<br>of tests hav<br>= 0.081 &<br>tested for le  | te: ring countring countring countring countries that the strength is the strength in the stre | nt less that more nt between 1919 th and h   | nan 35.5<br>than 36<br>een 35.5             | 5s<br>.9s<br>& 36.9<br>en follo                              | wing re      |           | SD=0.5,  |   |
| & no. of tests =  (i) No.  (ii) No.  (iii) No.  table at -1.4  Two yarns are  No. of tests  Mean lea stren  SD  | = 40, calcula<br>of tests hav<br>of tests hav<br>of tests hav<br>= 0.081 &<br>tested for le  | te: ring counting counting countat +1.4 = a streng Yarn 32 58 7.2  | nt less that more of the thetwood the the thetwood the the thetwood the thetwood the thetwood the thetwood the the the the thetwood the thetwood the thetwood the thetwood the thetwood the | nan 35.5<br>than 36<br>een 35.5             | 5s<br>.9s<br>6 & 36.9<br>en follo<br>Yarn<br>32              | wing re      |           | SD=0.5,  |   |
| & no. of tests =  (i) No.  (ii) No.  (iii) No.  (iii) No.  t table at -1.4  Two yarns are  No. of tests  Mean lea stren   | = 40, calcula<br>of tests hav<br>of tests hav<br>of tests hav<br>= 0.081 &<br>tested for le  | te: ring counting counting countat +1.4 = a streng Yarn 32 58 7.2  | nt less that more nt between 1919 th and head A?   | nan 35.5<br>than 36<br>een 35.5             | 5s<br>.9s<br>5 & 36.9<br>en follo<br>Yarn<br>32<br>65        | wing re      |           | SD=0.5,  |   |
| & no. of tests =  (i) No. (ii) No. (iii) No. t table at -1.4 Two yarns are  No. of tests Mean lea stren SD Is yarn B more   | = 40, calcula<br>of tests hav<br>of tests hav<br>of tests hav<br>= 0.081 &<br>tested for le  | tte: ring counting counting counting counting at +1.4 = a streng Yarm 32 58 7.2 an yarn A  | nt less that more nt between 1919 th and had A   | nan 35.5<br>than 36<br>een 35.5<br>ave give | 5s<br>.9s<br>6 & 36.9<br>en follo<br>Yarn<br>32<br>65<br>8.4 | wing re<br>B | esults:   |          | • |
| & no. of tests =  (i) No.  (ii) No.  (iii) No.  table at -1.4  Two yarns are  No. of tests  Mean lea stren  SD  Is yarn B more  | = 40, calcula<br>of tests hav<br>of tests hav<br>= 0.081 &<br>tested for le<br>gth(lbs)<br>e variable that   | te: ring counting counting countat +1.4 = a streng Yarn 32 58 7.2 an yarn A  | nt less that more of the two sets of the two s | nan 35.5<br>than 36<br>een 35.5<br>ave give | 5s<br>.9s<br>& 36.9<br>en follo<br>Yarn<br>32<br>65<br>8.4   | wing re<br>B | esults:   |          | • |
| & no. of tests =  (i) No.  (ii) No.  (iii) No.  (iii) No.  t table at -1.4  Two yarns are  No. of tests  Mean lea stren  SD  Is yarn B more  A mill is spinn  count on these  | = 40, calcula<br>of tests hav<br>of tests hav<br>of tests hav<br>= 0.081 &<br>tested for le<br>gth(lbs)<br>e variable that<br>ning 30s coutwo ring fra   | te: ring counting counting countat +1.4 = a streng Yarn 32 58 7.2 an yarn A  | nt less that more on the between the second of the second  | nan 35.5<br>than 36<br>een 35.5<br>ave give | 5s<br>.9s<br>& 36.9<br>en follo<br>Yarn<br>32<br>65<br>8.4   | wing re<br>B | esults:   |          | • |
| & no. of tests =  (i) No. (ii) No. (iii) No. (iii) No. t table at -1.4 Two yarns are  No. of tests Mean lea stren SD Is yarn B more  A mill is spinn count on these Ring Frame  | = 40, calcula<br>of tests hav<br>of tests hav<br>of tests hav<br>= 0.081 &<br>tested for le<br>gth(lbs)<br>e variable that<br>aing 30s countwo ring france   | te: ring counting counting countat +1.4 = a streng Yarn 32 58 7.2 an yarn A  | nt less that more nt between 1919 th and has A?  OR  Vo ring lifferent B   | nan 35.5<br>than 36<br>een 35.5<br>ave give | 5s<br>.9s<br>& 36.9<br>en follo<br>Yarn<br>32<br>65<br>8.4   | wing re<br>B | esults:   |          | • |
| & no. of tests =  (i) No.  (ii) No.  (iii) No.  (iii) No.  t table at -1.4  Two yarns are  No. of tests  Mean lea stren  SD  Is yarn B more  A mill is spinn  count on these  | = 40, calcula<br>of tests hav<br>of tests hav<br>of tests hav<br>= 0.081 &<br>tested for le<br>gth(lbs)<br>e variable that<br>ning 30s coutwo ring fra   | ing counting counting counting counting counting at +1.4 = a streng Yarm 32  | nt less that more on the between the second of the second  | nan 35.5<br>than 36<br>een 35.5<br>ave give | 5s<br>.9s<br>& 36.9<br>en follo<br>Yarn<br>32<br>65<br>8.4   | wing re<br>B | esults:   |          | • |
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| & no. of tests =  (i) No. (ii) No. (iii) No. (iii) No. t table at -1.4 Two yarns are  No. of tests Mean lea stren SD Is yarn B more A mill is spinn count on these Ring Frame No. of tests Mean Count CV %                                | = 40, calcular of tests have of tests have of tests have = 0.081 & tested for less tested for less tested for less that the state of tested for less test | tte: ing counting counting counting counting at +1.4 = a streng Yarm 32  | ont less that more int between 1919 th and has A?  OR  or ring different  B  30  31.2  1.6 %  t = 1  | frames or not s                             | 5s<br>.9s<br>& 36.9<br>en follo<br>Yarn<br>32<br>65<br>8.4   | wing re<br>B | esults:   |          | • |
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| & no. of tests =  (i) No. (ii) No. (iii) No. (iii) No. t table at -1.4 Two yarns are  No. of tests Mean lea stren SD Is yarn B more A mill is spinn count on these Ring Frame No. of tests Mean Count CV % Table values  Particulars of t | = 40, calcular of tests have of tests have of tests have of tests have = 0.081 & tested for less tested for le | tte: ring counting counting countat +1.4 = a streng Yarn 32 58 7.2 an yarn 4 ant on two mes is defined and the strength of the | ont less that more int between 1919 th and has A?  OR  For oring different  B  30  31.2  1.6 %  t = 1  t = 2  as below Plant   | frames or not s                             | 5s<br>.9s<br>& 36.9<br>en follo<br>Yarn<br>32<br>65<br>8.4   | wing re<br>B | esults:   |          |   |
| & no. of tests =  (i) No. (ii) No. (iii) No. (iii) No. t table at -1.4 Two yarns are  No. of tests Mean lea stren SD Is yarn B more A mill is spinn count on these Ring Frame No. of tests Mean Count CV % Table values                   | = 40, calcular. of tests have of tests have of tests have = 0.081 & tested for lest tested for | tte: ring counting counting countat +1.4 = a streng Yarn 32 58 7.2 an yarn 4 ant on two mes is defined and the strength of the | nt less that more int between the between the second of th | frames or not s                             | 5s<br>.9s<br>& 36.9<br>en follo<br>Yarn<br>32<br>65<br>8.4   | wing re<br>B | esults:   |          |   |

5% = 3.84

1% = 6.63

Calculate clean cotton cost, for spinning 40s Ne warp yarn, from the following

Write a short note on break even analysis.

Q.3

**Q.4** 

**Q.4** 

**Q.5** 

(a)

**(b)** 

(a)

**(b)** 

(a)

**(b)** 

(a)

**(b)** 

data:

X2 table values

**07** 

**07** 

| Quality of cotton            | Proportion          | Rate per kg(Rs.)                 |
|------------------------------|---------------------|----------------------------------|
| (i) Type A                   | 09 %                | 100                              |
| (ii) Type B                  | 87%                 | 90                               |
| (iii) Comber waste           | 04%                 | 60                               |
| Yarn realization is 85 %. Ou | t of 15 kg lost per | every 100 kg production, 7 kg is |
| saleable at Rs. 60 per kg.   |                     |                                  |

OR

Q.5 (a) What is the effect of increasing sales cost, fixed cost & variable cost on P/V or ratio and break even sales?

A mill has two sorts. Calculate which is better from following data.

|                           | Sort A | Sort B  |
|---------------------------|--------|---------|
| Sales price(Rs./m)        | 30     | 60      |
| Variable cost (Rs./m)     | 20     | 30      |
| Time to produce 1 m cloth | 30 min | 180 min |

(b) For textile mills, draw the flow chart for classification of cost by function. 07

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