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Third Semester B.Tech. Degree Examination, Dec.2019/Jan.2020
Statistical Applications to Textiles

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
 2. Use of Statistical tables is permitted.*

Module-1

- 1 a. Draw Histogram, frequency polygon and ogive for the frequency distributions of linear density for two delivery of the same type of worsted yarn and comment on the shape of the histogram.

Mid Point	Frequency	
	I Delivery	II Delivery
29.3	05	00
29.8	11	05
30.3	26	06
30.8	44	18
31.3	54	29
31.8	29	42
32.3	15	23
32.8	06	12
33.3	02	04
33.8	0	01

(14 Marks)

- b. Draw different types of frequency distribution curves. (03 Marks)
 c. With the help of graphs explain meaning of Skewness and Kurtosis. (03 Marks)

OR

- 2 a. A fibre gave the following results when tested for length on certain instrument. Calculate mean, S.D, CV% and variance for the length of fibre.

Length (mm)	8.1-8.2	8.3-8.4	8.5-8.6	8.7-8.8	8.9-9.0	9.1-9.2	9.3-9.4
Frequency	03	08	24	32	26	06	01

(10 Marks)

- b. 5 standard count tests, when carried out on a cone of yarn with the following results. Determine standard deviation and mode of the count.

Count values NE	41.3	41.1	40.9	41.2	41.3
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(05 Marks)

- c. State and define different types of mean and taking your own example determine arithmetic, harmonic and geometric mean. (05 Marks)

Module-2

- 3 a. What are normal distributions? Give the properties of normal distributions. The chest girths of large sample of men were measured. The mean and standard deviation of measurement were found to be mean = 96cm, S.D. = 8cm. Determine the proportions of men with chest girths i) Greater than 104cm ii) Less than 100cm iii) Less than 90cm iv) Between 100 and 110cm. (10 Marks)
 b. Mean count of 200 tests have been found to be 37.22 and the S.D be 0.93. Find the confidence interval within which the mean and S.D. of population is expected to lie. (10 Marks)

OR

- 4 a. Of the results of 1000 single thread strength done on a yarn strength of 48 threads are less than 4.5kgs and 394 are between 4.5 and 7.75kgs. Determine mean strength and standard deviation. (10 Marks)
- b. Thirty Six Leas of 32^s Ne cotton yarn were tested for Lea strength and gave mean strength of 65kgs with S.D of 9.0 kgs. The 95% CI was 65 ± 2 kg giving a maximum error of 4.5%. How many leas must be tested in order to reduce the error to 2.0% and calculate the maximum error of S.D, and the percentage error? Find the number of tests to be conducted to reduce the percentage error to 10%. (10 Marks)

Module-3

- 5 a. A reed manufacturing company produces all metal reed wires. The following are the \bar{X} and R values for sub group size of five. Determine control limits for \bar{X} and R charts, plot the chart and comment on the Quality control of the process. (Take $D_2 = 2.326$, $D_3 = 0$, $D_4 = 2.114$).

Sl. No.	1	2	3	4	5	6	7	8	9	10
\bar{X}	34.0,	31.6,	30.8,	33.0,	35.0,	32.2,	33.0,	32.6,	37.8,	35.8
R	04,	04,	02,	03,	05,	02,	05,	13,	19,	06

(10 Marks)

- b. State the components of time series. Fit a straight line trend for the following time series using method of least squares. Graph the observed and trend value. Estimate the production for 2020.

Year	2013	2014	2015	2016	2017	2018	2019
Production	77	81	88	94	94	96	98

(10 Marks)

OR

- 6 a. The following data refer to production and number of defectives for 15 consecutive days. Each day 400 units were inspected. Using suitable control chart comment on statistical control of the process and determine control limits for future use:

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Number of defectives	2	5	0	0	3	0	1	0	0	8	6	0	3	0	6

(10 Marks)

- b. Fit a Quadratic trend for the following time series using method of Least squares and estimate the value for 2021. Graph the observed and trend values.

Year	1961	1971	1981	1991	2001
Population (crore)	36	44	55	68	84

(10 Marks)

Module-4

- 7 a. State the meaning of chance causes, assignable causes and null hypothesis. Certain style of garment have been produced for some time and the masses of finished garments were known to have mean (\bar{X}) of 260gms and S.D of 8.0gms. A modification was made to the finishing process and the sample 40 garments made by new finishing procedure gave a mean mass of 263 gms. Is there a sufficient evidence to conclude that new finishing process has reduced the mean weight loss? (10 Marks)
- b. Two spinning machine were nominally spinning the same count of yarn. Five bobbins chosen at random from each frame and their linear density (in tex) of each was found. On this evidence were the frames spinning significantly different counts.

FRAME-1	30.0	30.3	30.5	30.8	31.0
FRAME-2	30.5	30.8	31.0	31.2	31.3

(10 Marks)

OR

- 8 a. The number of thin places in equal lengths of similar yarn spun on four different spinning machine was counted with the following results. Does the data suggest that there is significant differences among the machines.

Machine Number	1	2	3	4
Number of thin places	51	32	47	38

(10 Marks)

- b. Two Yarns are tested for lea strength with the following results:

Particulars	Yarn A	Yarn B
No. of tests	32	32
Mean Lea Strength	58	65
S.D	7.2	8.4

Test whether yarn B is more variable than yarn A

(10 Marks)

Module-5

- 9 a. Define the term co-relation. Give the meaning of positive, negative and no-corelation. Give one example for each in textile field. (05 Marks)
- b. In a laboratory the effect of florescent agent on a hospital bedspread was studied. Following table gives the whiteness index values. Carryout an analysis of variance for the data.

Flurescent agents		
X	Y	Z
77	72	76
81	58	85
71	74	82
76	66	80
80	70	77

(15 Marks)

OR

- 10 a. Write a concized note one way and two way analyses. (05 Marks)
- b. Following data were obtained in an experiment to investigate the relation between the tenacity of sliver and the processing speed. Calculate the correlation coefficient for the given data and draw your conclusion.

Speed (m/min)	06	12	18	24	30
Tenacity (MN/Tex)	0.76	0.70	0.65	0.59	0.57

(15 Marks)

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