M.TECH DEGREE EXAMINATIONS: JAN 2015

(Regulation 2014)

First Semester

TEXTILE TECHNOLOGY

P14TXT105: Statistical Application in Textile Engineering

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Which of the following two statements are correct?   [K4]
   1. Normal distribution curve is bell shaped one
   2. The peak value is the mean value
   3. The maximum area of the normal curve is 2
   4. It is used to test the significance of mean value
   a) 1,3   b) 3,2

   c) 1,2   d) 1,4

2. Correct sequence of the following is   [K3]
   1. Mean
   2. Standard deviation
   3. Variance
   4. Coefficient of variation
   a) 3-2-1-4   b) 1-2-3-4

   c) 2-4-1- 3   d) 4-3-2-1

3. Examine the following two statements carefully and select the answers to these items using the   [K3]
   codes given below:
   Assertion (A): The coefficient of variation reflects the sample quality.
   Reason (R) : The coefficient of variation is only the way of comparing the different sample
   quality for confirmation.
   a) Both A and R are individually true and   b) Both A and R are individually true but R is
      R is the correct explanation of A.   not the correct explanation of A.
   c) A is true but R is false.   d) A is false but R is true.

4. Taquchi design of experiment used to analyze   [K2]

   a) Quality loss   b) Quality gain

   c) Production loss   d) Production gain

5. _____ is non- parametric test.   [K2]

   a) median test   b) T test

   c) F test   d) variance test

6. ANOVA was found by _____.   [K1]

a) Sir Ronald B Fisher   b) Lawrence

c) Oxtoby   d) Sir Ronald A Fisher

7. U-Test is otherwise called as _____ test.   [K2]

    a) Kruskal Wallis test   b) F

    c) Mann-Whitney   d) Run Test

8. In Sign test to find variance the formula used is _____.   [K2]

    a) npq   b) pq

    c) n/pq   d) n-pq

9. Rank correlation is used for _____.   [K1]

    a) More than two observer   b) Only one observer

    c) Two observer only   d) Both two observer and more than two observer

10. Threshold value means   [K1]

    a) The minimum value in population   b) The maximum value in population

    c) The most occurring value in population   d) Mean of the population

PART B (10 x 2 = 20 Marks)

11. Asses the CV if the sample mean is 48 and the variance is 9.   [K4]

12. List out any two properties of normal curve.   [K2]

13. Calculate the tolerance limits if the mean value is 24 , number of sample is 6, S value is 4.38 and Table value at 99% is 4.032.   [K4]

14. What do you understand by acceptance sampling?   [K1]

15. Define process capability index.   [K1]

16. What is rank correlation?   [K2]

17. What is coefficient of concordance?   [K1]

18. What is process capability?   [K1]

19. Give the sensitivity rules for process capability.   [K2]

20. What do you mean by regression?   [K2]

PART C (10 x 5 = 50 Marks)

21. The mean strength of 40^s count yarn is found to be 80 lbs, 100 samples were tested and its standard deviation is 4.2.   [K3]

    i) Find the number of samples has strength of more than 90 lbs.

    ii) Find number of samples having strength 75 to 95 lbs.

    iii) Find number of sample below 70 lbs.

22. Two samples of cone were tested in which Sample 'A' is made from local cotton mixing and 'B' is made from imported cotton mixing. The Count tested is given below [K3]

A	10	12	13	11	14
B	9	9	12	14	15

Is there any significant difference between two samples, If not which sample is best? Use 95% confidence level.

23. Four dye brands has been tried on a particular fabric and the defects has been noted down. [K4]

Defects	A	B	C	D
No variance	9	18	17	11
1-5 defects	63	72	85	82
More than 5 defects	28	37	48	37

Test the performance of brand with respect to defects, use 95% significant level.

24. Calculate the number of sample above 90 lbs using the following details [K5]

Mean strength of yarn (lbs)	Nominal count (Ne)	Number of sample tested	Standard deviation
80	40	100	4.2

25. An experiment has been conducted in a spinning mill in which 3 travelers are used on particular count with 5 spindles. The result is listed below. The yarn is tested for hairiness, Carry out ANOVA at 95 % significance level. [K6]

Spindle	Traveler		
1	6,2	7	8.2
2	6.5	7.5	7.8
3	6	7.2	9
4	7	8	8.5
5	5.5	6.5	8.2

26. The data below show the % moisture content remaining in 4 different fabrics after 3 different drying processes. Carry out ANOVA on these data. [K4]

Fabric	Processes		
	Hydro	Suction	Mangle
Worsted	46	54	56
Satin	35	57	56
Twill	47	79	61
Mat	42	86	65

27. A certain fabric has to meet a specification that a tensile strength should not be less than 50newton. The coefficient of variation is 10%. Acceptable quality level is 1%. LTPD is 4 %. Producer risk is 10%, consumer risk is 5 %. Calculate appropriate sampling plan if the producers risk is changed to 5%. What is the effect on sampling plan? [K₃]

28. Elaborate the interpretation techniques used in control charts. [K₂]

29. Explain about Latin square design. [K₂]

30. The fabric primary handle values like Koshi and Numeri are described by two regression equations as follows 5X- 6Y = -90 and 15X - 8Y = 130. Find mean and "r" values. [K₃]

PART D (2 x 10 = 20 Marks)

31. Design a 2^K experiment using following data. The experiment is done to investigate the effects of varying 4 knitting machine parameters on the dimensions of RIB fabrics knitted from P/C yarn. The factors are [K₅]

    A. Dial Height   B. Take down tension   C. Stretcher board width D. Needle timing delay. The levels are "High and Low". The knitted fabrics were allowed to relax and dimensions are measured. Knitting speed is 100 RPM throughout the experiment.

Details		A $_-$		A $_+$	
		B $_-$	B $_+$	B $_-$	B $_+$
C $_-$	D $_-$	0	30	20	22
	D$_+$	2	35	9	28
C$_+$	D$_-$	16	25	11	19
	D$_+$	23	24	13	17

32. The following table gives the proceeding tension and modulus values [K₄]

Processing tension	5	7	9	10	11	12	13
Modulus	30.1	32.1	32.2	32.9	32.9	34.7	36.5

i) Fit an equation that shows the relationship between modulus and processing tension. (3)

ii) Perform the ANOVA.

iii) Find the correlation coefficient (r) and find the significance of (r). (3)

(4)

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