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B.E / B. Tech (Full Time) END SEMESTER EXAMINATIONS April / May 2019

PRINTING TECHNOLOGY

IV-SEMESTER
MA7352-APPLIED STATISTICS
(Regulation 2015)

(Use of statistical tables is permitted in the Exam Hall)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. State Central limit theorem.
2. Give any two uses of χ^2 -distribution.
3. What are the advantages of a Non-parametric test?
4. The following is an arrangement of defective, d, and non-defective, n, pieces produced in the given order by a certain machine, n n n n n d d d d n n n n n n n n n n d d n n d d d n n n d d d n n d d d d d n d n d n d n d n d d n n, Find the number of runs.
5. What are the basic principles of the design of experiments?
6. Write down the ANOVA Table for RBD.
7. Define Tolerance limits.
8. Write down any two purposes of acceptance sampling.
9. State irregular variation.
10. Calculate the three yearly moving average of the following data

year	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Production (in tonnes)	50	36	43	45	39	38	33	42	41	42

Part – B (5 x 16 = 80 marks)
(Question No.11 is Compulsory)

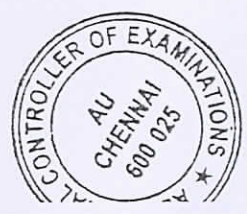
11. a)(i) Find the seasonal index from the following table by ratio to moving average method (8)

Seasons	1970	1971	1972	1973	1974
I Quarter	40	42	41	45	44
II Quarter	35	37	35	36	38
III Quarter	38	39	38	36	38
IV Quarter	40	38	42	41	42

- (ii) Given below are the figures of production (in thousand quintals) of a sugar factory

Year	1974	1975	1976	1977	1978	1979	1980
Production	77	88	94	85	91	98	90

Fit a straight line by the least squares method and tabulate the trend values. (8)



12. a) The nicotine contents in two random samples of tobacco are given below:
 Sample I : 21 24 25 26 27
 Sample II: 22 27 28 30 31 36
 Can you say that the two samples came from the same population? Justify your answer. (16)

(OR)

- b) (i) The fatality rate of typhoid patients is believed to be 17.26 percent. In a certain year 640 patients suffering from typhoid were treated in a metropolitan hospital and only 63 patients died. Can you consider the hospital to be efficient? (8)

(ii) A sample of 100 students is taken from a large population. The mean height of the students in this sample is 160cm. Can it be reasonably be regarded that, in the population, the mean height is 165cm, and the S.D is 10cm? (8)

13. a) (i) The following data represent the number of hours that a rechargeable hedge trimmer operates before a recharge is required 1.5, 2.2, 0.9, 1.3, 2.0, 1.6, 1.8, 1.5, 2.0, 1.2 and 1.7 Use the sign test to test the hypothesis at the 0.05 level of significance that this particular trimmer operates with a median of 1.8 hours before requiring a recharge. (8)

(ii) The following is an arrangement of men, M and women, W, lined up to purchase tickets for a rock concert:

M W M W M M M W M W M M M W W M M M W W M W M
 M M W M M M W W W M W M M M W M W M M M M W W M

Test for randomness at the 0.05 level of significance. (8)

(OR)

- b) Two methods of instruction to apprentices is to be evaluated. A director assigns 15 randomly selected trainees to each of the two methods. Due to drop outs, 14 complete in batch 1 and 12 complete in batch 2. An achievement test was given to these successful candidates, their scores are as follows.

Method I : 70, 90, 82, 64, 86, 77, 84, 79, 82, 89, 73, 81, 83, 66

Method II: 86, 78, 90, 82, 65, 87, 80, 88, 95, 85, 76, 94

Test whether the two methods have significant difference in effectiveness. Use Mann-Whitney test at 5% significance level. (16)

14. a) (i) The following data represents the results of a 2^2 factorial design. Analyse the data for response. (12)

Treatment combination	Replications			
	I	II	III	IV
1	12	12.3	11.8	11.6
a	12.8	12.6	13.7	14
b	11.5	11.9	12.6	11.8
ab	14.2	14.5	14.4	15

- (ii) Compare and contrast LSD and RBD. (4)

(OR)



- b) The following is a Latin square design when 4 varieties of seeds are being tested. Set up the analysis of variance table and state your conclusion. You may carry out suitable change of origin and scale. (16)

A 105	B 95	C 125	D 115
C 115	D 125	A 105	B 105
D 115	C 95	B 105	A 115
B 95	A 135	D 95	C 115

15. a) The following data give the coded measurements of 10 samples each of size 5, drawn from a production process at intervals of 1 hour. Calculate the sample means and S.D's and draw the control charts for \bar{x} and Range chart s. (16)

Sample no.	1	2	3	4	5	6	7	8	9	10
Coded	9	10	10	8	7	12	9	15	10	16
meaurem	15	11	13	13	9	15	9	15	13	14
ents (x)	14	13	8	11	10	7	9	10	14	12
	9	6	12	10	4	16	13	13	7	14
	13	10	7	13	5	10	5	17	11	14

(OR)

- b) The data given below are the number of defectives in 10 samples of 100 items each. Construct a p-chart and an np-chart and comment on the results. (16)

Sample no.	1	2	3	4	5	6	7	8	9	10
No. of defectives	6	16	7	3	8	12	7	11	11	4

