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SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

AN AUTONOMOUS INSTITUTION

Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai

INTERNAL ASSESSMENT EXAMINATION – I

Fourth Semester

B.E – Mechanical Engineering

19MA407 – Statistics and Numerical Methods

Regulations 2019

Duration : 1 Hours 30 Minutes
Date : 15.03.2023 **Session : FN** **Maximum: 50 Marks**

Answer ALL questions

PART A - (5 X 2 = 10 marks)

Q.No	Question	M	CO	BL
1.	Define Type-I error and Type-II error?	2	CO-1	L -1
2.	What are the applications of t-test?	2	CO-1	L -1
3.	What are the expected frequencies of 2x2 contingency table? $\begin{matrix} a & b \\ c & d \end{matrix}$	2	CO-1	L -1
4.	State the basic principles of design of experiments.	2	CO-2	L -1
5.	Name the basic designs of experiments.	2	CO-2	L -1

PART B - (2 X 13 = 26 marks)

6 (a) The time taken by workers in performing a job by Method I and Method II is givenbelow:

Method I	20	16	26	27	23	22	
Method II	27	33	42	35	32	34	38

Do the data show that the variances of time distribution from population fromwhich these samples are drawn do not differ significantly? 13 CO-1 L-2

$S_2^2 = 22.918$

$S_1^2 = 15.88$

$F = 1.44$

4.95

OR

(b) (i) A random sample of 10 boys had the following I.Q's :70, 120, 110, 101, 88, 83, 95, 98, 107, 100. Test whether the population mean I.Q may be 100. 7 CO-1 L-2

(ii) In 120 throws of a single die, the following distribution of faces was observed. 6 CO-1 L-2

Face	1	2	3	4	5	6
Frequency	30	25	18	10	22	15

Can you say that the die is biased?

7. (a) A sample of 900 members has a mean 3.4 cm and standard deviation 2.61 cm.
(i) Is the sample from a large population of mean 3.25 cm and standard deviation of 2.61 cm? 6 CO-1 L-2

(ii) Two sample polls of votes for two candidates A and B for a public office are taken one form among residents of rural areas. The results ate given below. Examine whether the nature of the area is related to voting preference in the election. 7 CO-1 L-2

Area / Votes for	A	B	Total
Rural	620	380	1000
Urban	550	450	1000
Total	1170	830	2000

OR

(b) The following are the numbers of mistakes made in 5 successive days of 4 technicians working for a photographic laboratory: Test at the level of significance $\alpha = 0.01$, whether the differences among the 4 sample means, can be attributed to chance

Technician I (X1)	Technician II (X2)	Technician III (X3)	Technician IV (X4)
6	14	10	9
14	9	12	12
10	12	7	8
8	10	15	10
11	14	11	11

C V = 8.43 CO-2 L-3
TSS = 114.55
SSC = 12.95
MSC = 4.31
SSE = 101.6
MSE = 6.35

PART C – (1 x 14 = 14 Marks)

8. (a) A group of 10 rats fed on diet A and another group of 8 rats fed on diet B, recorded the following increase in weight

Diet A	5	6	8	1	12	4	3	9	6	10
Diet B	2	3	6	8	10	1	2	8		

C·V = 1.47
TV = 26.8
$\Sigma(x-\bar{x})^2 = 102.4$ $\Sigma(x_2-\bar{x})$
$S_1^2 = 1.02$ $S_2^2 = 11.71$
14 CO-1 L-3
C.V 1.02 T.V 3.29

Test the hypothesis that the sampled have same populations with equal variances at 5% level of significance.

OR

(b) A completely randomized design experiment with 10 plots and 3 treatments gave the following results:

Plot No:	1	2	3	4	5	6	7	8	9	10
1Treatment:	A	B	C	A	C	C	A	B	A	B
Yield:	5	4	3	7	5	1	3	4	1	7

T = 40
N = 10
C.F = 160
TSS = 40
MSC = 6.3
SSC = 6
14 CO-2 L-3
SSE = 34
MSE = 4.85

Analyze the results for treatment effects.

C.V T.V
1.61 < 19.3
accepted.

13/3/23
Course Coordinator

13/3/23
HOD