Reg. No. : | | | | | | | | | | |

Question Paper Code: 34023

B.E. / B.Tech. DEGREE EXAMINATION, AUGUST 2021

Fourth Semester

Mechanical Engineering

01UMA423 - STATISTICS AND NUMERICAL METHODS

(Regulation 2013)

(Statistical tables may be permitted)

Duration: 1:45 hour Maximum: 50 Marks

PART A - (10 x 2 = 20 Marks)

(Answer any ten of the following questions)

1. Define student's t-test for difference of means of two samples.
2. What is the aim of the design of experiments?
3. State the principle used in Gauss – Jordan method.
4. What is the assumption we make when Lagrange's formula is used?
5. Find the area under the curve passing through the points (0, 0), (1, 2), (2, 2.5), (3, 2.3), (4, 2) (5,1.7) and (6, 1.5).
6. Define Type-I error and Type-II error.
7. Write the differences between RBD and LSD.
8. Solve the following system of equations, using Gauss - Jordan elimination method $2x + y = 3$, $x - 2y = -1$.
9. What is the assumption we make when Lagrange's formula is used?
10. Find the area under the curve passing through the points (0, 0), (1, 2), (2, 2.5), (3, 2.3), (4, 2) (5,1.7) and (6, 1.5).

11. What is a null hypothesis?

12. Write the differences between RBD and LSD.

13. Solve the following system of equations, using Gauss - Jordan elimination method $2x + y = 3$, $x - 2y = -1$.

14. What is the assumption we make when Lagrange's formula is used?

15. Write the Gaussian three points Quadrature formula

PART – B (3 x 10= 30 Marks)

(Answer any three of the following questions)

16. A simple sample of heights of 6400 Englishmen has a mass of 67.85 inches and a standard deviation of 2.56 inches, while a simple sample of heights of 1600 Australians has a mean of 68.55 inches and a standard deviation of 2.52 inches. Do the data indicate the Australians are on the average taller than Englishmen? (10)

17. A completely randomized design experiment with 10 plots and 3 treatments gave the following results. Analysis the CRD design. (10)

Plots no	1	2	3	4	5	6	7	8	9	10
Treatments	A	B	C	A	C	C	A	B	A	B
Yield	5	4	3	7	5	1	3	4	1	7

18. Solve the following system of equation by Gauss Seidel method.
$27x + 6y - z = 65$; $x + y + 54z = 110$; $6x + 15y + 2z = 72$. (10)

19. Using Lagrange's interpolation formula, find $f(4)$ given that
$f(0) = 2, f(1) = 3, f(2) = 12, f(15) = 3587$. (10)

20. A rod is rotating in a plane. The angle θ (in radians) through which the rod has turned for various values of time t (seconds) are given below.

t	0	0.2	0.4	0.6	0.8	1	1.2
θ	0	0.122	0.493	1.123	2.022	3.220	4.666

Find the angular velocity and angular acceleration of the rod when $t = 0.6$ seconds. (10)