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

Question Paper Code: 34023

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Fourth Semester

Mechanical Engineering

01UMA423 - STATISTICS AND NUMERICAL METHODS

(Regulation 2013)

(Statistical tables may be permitted)

Duration: One hour Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. The χ^2 test should not be applied if N is
   (a) ≤ 50 (b) ≥ 50 (c) < 50 (d) > 50

2. The variable t-distribution ranges from
   (a) $-\infty \; to \; 0$ (b) $-\infty \; to \; \infty$ (c) $-1 \; to \; 1$ (d) $-1 \; to \; 0$

3. Mean square between the samples is given by
   (a) SSE/c-1 (b) SSE/n-c (c) SSC/c-1 (d) SSC/n-c

4. Latin square are most widely used in the field of
   (a) agriculture (b) industry (c) medicine (d) astronomy

5. 2x2 Latin square is not possible. Why?
   (a) Comparison is not possible (b) One Comparison is not possible
   (c) Mean Squared Error possible (d) Sum of Square is possible

6. The order of Convergence of Newton-Raphson's method is
   (a) 1 (b) 0 (c) 2 (d) 3

7. Newton's forward interpolation formula used only for _____ intervals.
   (a) equal (b) unequal (c) open (d) closed

8. The n^{th} degree divided differences of a polynomial of the n^{th} degree are

(a) equal (b) unequal (c) constant (d) variable

9. Error in Simpson's rule is of order

(a) h (b) h^2 (c) h^3 (d) h^4

10. Two point Gaussian Quadrature formula is $\int_{-1}^{1} f(x)dx =$

(a) $f\left(-\frac{1}{\sqrt{3}}\right) + f\left(\frac{1}{\sqrt{3}}\right)$ (b) $f\left(-\sqrt{3}\right) + f\left(\sqrt{3}\right)$

(c) $f(-1) + f(1)$ (d) None of these

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. 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? (8)

12. A completely randomized design experiment with 10 plots and 3 treatments gave the following results. Analysis the CRD design. (8)

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

13. Solve the following system of equation by Gauss Seidel method.

$27x + 6y - z = 65\,;\, x + y + 54z = 110\,;\; 6x + 15y + 2z = 72.$ (8)

14. Using Lagrange's interpolation formula, find $f(4)$ given that

$f(0) = 2, f(1) = 3, f(2) = 12, f(15) = 3587.$ (8)

15. 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. (8)