Reg. No. :

Question Paper Code: 44023

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

Fourth Semester

Mechanical Engineering

14UMA423 - STATISTICS AND NUMERICAL METHODS

(Regulation 2014)

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 nth degree divided differences of a polynomial of the nth 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) $f(-\sqrt{3}) + f(\sqrt{3})$

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

<div align="center">PART – B (3 x 8= 24 Marks)</div>

(Answer any three of the following questions)

11.   Two types of Manure were applied to 16 one hectare plots, other conditions remaining the same. The yield in quintals are given below. Is there any significant difference between the mean yield? Use 5% level of significance.   (8)

Manure I	8	20	36	50	49	36	34	49	41
Manure II	29	28	26	35	30	44	46		

12.   The following Latin square of a design when 4 varieties of seeds are being tested. Set up the analysis of variance table and state your conclusion.   (8)

            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

.13   Find a root of $x \log_{10} x - 1.2 = 0$ by Newton Raphson method correct to three decimal places.   (8)

14.   Using Lagrange's formula fit the polynomial.   (8)

x	0	1	4	5
$y = f(x)$	4	3	24	39

15.   The table given below gives the velocity V of a moving particle at time t seconds. Find the distance covered by the particle in 12 seconds and also the acceleration at $t = 2$ seconds using Simpson's rule.   (8)

          X : 0 2 4 6 8 10 12
          V : 4 6 16 34 60 94 136

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