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

Question Paper Code: 44022

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

Fourth Semester

Civil Engineering

14UMA422 - NUMERICAL METHODS

(Common to EEE, EIE and ICE Branches)

(Regulation 2014)

Duration: 1:45 hour Maximum: 50 Marks

PART A - (10 x 2 = 20 Marks)

(Answer any ten of the following questions)

1. Find an iterative formula for finding $\sqrt{N}$ where N is a real number, using Newton-Raphson formula.
2. Compare Gaussian elimination & Gauss-Jordan methods in solving system $[A]\{X\} = \{B\}$.
3. Using Lagrange's interpolation, find the polynomial through $(0, 0)$ $(1, 1)$ and $(2, 2)$.
4. State the formula for three Point Gaussian-quadrature.
5. By method of least squares find the normal equations to fit straight line.
6. If a real root of the equation *f(x)* = 0 lies in (*a*, *b*). state the formula that gives the root approximately as per Regula Falsi method.
7. Write down the condition for convergence of Gauss Seidel method.
8. Define Lagrange's inverse interpolation formula.
9. Evaluate $\int_{-3}^{3} x^4 dx$, by Trapezoidal rule.
10. Fit a straight line of the form $y = a + bx$, by the method of group averages for the following data.

x	0	5	10	15	20	25
y	12	15	17	22	24	30

11. Find an iterative formula for finding $\sqrt{N}$ where N is a real number, using Newton-Raphson formula.

12. Compare Gaussian elimination & Gauss-Jordan methods in solving system $[A]\{X\} = \{B\}$.

13. Using Lagrange's interpolation, find the polynomial through $(0, 0)$ $(1, 1)$ and $(2, 2)$.

14. State the formula for three Point Gaussian-quadrature.

15. By method of least squares find the normal equations to fit straight line

PART – B (3 x 10= 30 Marks)

(Answer any three of the following questions)

16. Find an approximate root of $x \log_{10} x - 1.2 = 0$ by False position method. (10)

17. Solve by Gauss-Seidal method:
$27x + 6y - z = 85, x + y + 54z = 110, 6x + 15y + 2z = 72.$ (10)

18. Apply Lagrange's interpolation formula to find *f(9)* using the following data: (10)

x	*5*	*7*	*11*	*13*	*17*
y	*150*	*392*	*1452*	*2366*	*5202*

19. Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 1.5$ from the data. (10)

x	*1.5*	*2.0*	*2.5*	*3.0*	*3.5*	*4.0*
y	*3.375*	*7*	*13.625*	*24*	*38.875*	*59*

20. By the method of least squares find the best fitting straight line to the data given below. (10)

x	*5*	*10*	*15*	*20*	*25*
y	*15*	*19*	*23*	*26*	*30*