

Reg. No. :

--	--	--	--	--	--	--	--	--	--

**Question Paper Code: 34022**

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

Fourth Semester

Civil Engineering

01UMA422 - NUMERICAL METHODS

(Common to EEE, EIE and ICE)

(Regulation 2013)

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)

11. Find the positive real root of  $3x - \cos x - 1 = 0$  using Newton-Raphson method. (10)
12. Solve the following system of equation using Gaussian elimination method.  
 $28x + 4y - z = 32$ ,  $x + 3y + 10z = 24$ ,  $2x + 17y + 4z = 35$ . (10)
13. Using Newton's backward formula find  $f(7.5)$  from the following table: (10)

$X$	1	2	3	4	5	6	7	8
$f(x)$	1	8	27	64	125	216	343	512

14. Find the first two derivatives of  $y = (x)^{1/3}$  at  $x = 50$  &  $x = 56$  given the table below.

$x :$	50	51	52	53	54	55	56
$y :$	3.6840	3.7084	3.7325	3.7563	3.7798	3.8030	3.8259

(10)

15. Find the equation of the best fitting straight line to the following data by method of group averages: (10)

x	0	5	10	15	20	25	30
y	10	14	19	25	31	36	39

---