B.Sc. DEGREE EXAMINATION,NOVEMBER 2018
III Year V Semester
Core Elective - Paper I
NUMERICAL METHODS

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Write Newton-Raphson formula.
2. Define absolute error and relative error.
3. State one direct method and Iterative method for solving system of linear equations.
4. When a matrix is said to be diagonally dominant?
5. Write Lagrange's Interpolation formula.
6. Find the divided difference table for the function $f(x) = x^2 + 2x + 2$ whose arguments are 1, 2, 4, 7, 10.
7. Write Newton-cote's quadrature formula.
8. Write the truncation error in Simpson's 1/3rd rule.
9. Solve $y' = 1 - y$, $y(0) = 0$ find y at x =0.1 using Euler's method.
10. Write Adams-Bashforth predictor and corrector formula.
11. Find the value of x when y = 7 from the following data

X	1	3	4
Y	4	12	19

12. Prove that $\delta = E^{1/2} - E^{-1/2}$

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Use the method of iteration solve $3x - log_{10}x = 6$
14. Solve the system of equations by Gauss Elimination method
$x + y + z = 9$
$2x - 3y + 4z = 13$
$3x + 4y + 5z = 40$
15. Find the value of y when x = 9 using Newton's divided difference method from the following data

X	5	7	11	13	17
Y	150	392	1452	2366	5202

16. Find $y^{'}(x)\, at\ x{=}\ 0.5$ from the following data

X	0	1	2	3	4
Y	1	1	15	40	85

17. Find an approximate solution of the initial value problem $y^{'}{=}\ 1{+}y^2,\ y\,(0)\ =\ 0$ by Picard's method and compare with the exact solution.
18. Find $\triangle^n sinx$ taking h $=$1.
19. Find the real root of the equation $x^3{-}3x{+}1\ =\ 0$ using Regula-Falsi method.

Section C $(3\ \times\ 10\ =\ 30)$ Marks

Answer any **THREE** questions

20. Find the real root of the equation $x^3{-}x{-}11\ =\ 0$ using bisection method.
21. Solve the system of equations by Gauss-Seidel method
    $6x{+}15y{+}2z{=}\ 72$
    $x{+}y{+}54z{=}\ 110$
    $27x{+}6y{-}z{=}\ 85$
22. Find the value of y when x $=$ 48 and x $=$ 84 from the following data

X	40	50	60	70	80	90
Y	184	204	226	250	276	304

23. Evaluate $\int_0^1 \frac{dx}{1{+}x}$, $h{=}\frac{1}{6}$ using (i) Trapezoidal rule (ii) Simpson's 1/3rd rule (iii) Simpson's 3/8th rule
24. Compute y(0.1), y(0.2) by Runge-kutta method of order four for the differential equation $y^{'}{=}xy{+}y^2,\ y\,(0)\ =\ 1.$

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