

D. K. M. COLLEGE FOR WOMEN (AUTONOMOUS), VELLORE-1**SEMESTER EXAMINATIONS****NOVEMBER – 2017****15SMA5A****SKILL BASED SUBJECT - III : NUMERICAL METHODS****Time : 2 Hours****Max. Marks : 50****SECTION - A (10 x 2 = 20)****Answer ALL the questions.**

1. State the iterative formula for Regula Falsi method to solve $f(x) = 0$.
2. Write the condition for convergence of an iteration method for $f(x) = 0$ written as $x = g(x)$.
3. Using Newton's formula calculate $f(54)$ from the following table.

x	50	60	70	80
$f(x)$	12	15	20	27

4. State Gregory - Newton's backward difference interpolation formula.
5. Using trapezoidal rule, find $\int_0^6 f(x)dx$ from the following set of values of x and $f(x)$.

x	0	1	2	3	4	5	6
$f(x)$	1.56	3.64	4.62	5.12	7.08	9.22	10.44

6. State Simpson's three - eight rule.
7. Solve the system of equations $x - 2y = 0$, $2x + y = 5$ by Gaussian elimination method.
8. Explain factorization method.
9. Using Euler's method, find $y(0.2)$ from $\frac{dy}{dx} = x + y$, $y(0) = 1$.
10. Write down the Runge - Kutta formula of second order to solve $\frac{dy}{dx} = f(x, y)$ with $y(x_0) = y_0$.

SECTION - B (3 x 10 = 30)**Answer any THREE of the following questions.**

11. Obtain Newton's iterative formula for finding \sqrt{N} where N is a positive real number. Hence evaluate $\sqrt{142}$.
12. From the third degree polynomial $f(x)$ and $f(4)$ from the following data using Lagrange's interpolation formula.

x	1	3	5	7
$f(x)$	24	120	336	720

13. Find $f'(3)$ and $f''(3)$, for the following data

x	3.0	3.2	3.4	3.6	3.8	4.0
$f(x)$	-14	-10.032	-5.296	-0.256	6.672	14

14. Solve the system of equations by Gauss elimination method.

$$10x - 2y + 3z = 23$$

$$2x + 10y - 5z = -33$$

$$3x - 4y + 10z = 41.$$

15. Using Taylor's series method, find $y(1.1)$ and $y(1.2)$ correct to four decimal places given

$$\frac{dy}{dx} = xy^{1/3} \text{ and } y(1) = 1.$$