SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with A+ Grade by NAAC)
Chromepet,Chennai — 600 044.
B.Sc. END SEMESTER EXAMINATION APRIL/NOV – 2021
SEMESTER - V

17UMACE5A01 **&** UMA/CE/5A01 – **Numerical Methods**

Total Duration	**: 3 Hrs**	**Total Marks**	**: 75**
MCQ	: 30 Mins	MCQ	: 15
Descriptive	: 2 Hrs.30 Mins	Descriptive	: 60

Section B

Answer any ***SIX*** questions (6 × 5 = 30 Marks)

1. Solve $cosx - xe^x = 0$ by iteration method.

2. A second degree polynomial passes through (0,1), (1,3), (2,7) and (3,13). Find the polynomial.

3. Apply Lagrange's formula inversely to find a root of the equation $f(x) = 0$, when $f(30) = -30,\ f(34) = -13,\ f(38) = 3,\ f(42) = 18$.

4. A river is 80 metres wide. The depth '*d*' in meters at a distance x meters from one bank is given by the following table. Calculate the area of cross section of the river using Simpson's rule.

x	0	10	20	30	40	50	60	70	80
d	0	4	7	9	12	15	14	8	3

5. Using Taylor method, compute y(0.2) correct to 4 decimal places given $\frac{dy}{dx} = 1 - 2xy \ \ and \ \ \ y(0) = 0$.

6. Find an iterative formula to find $\sqrt{N}$ (Where N is a positive number) and hence find $\sqrt{5}$.

7. If $\boldsymbol{f(x) = \frac{1}{x}}$, find the divided differences $\boldsymbol{f(a, b, c)}$

8. Find the first and second derivative of y at x = 50 for the following data:

x	50	51	52	53	54
y	3.6840	3.7084	3.7325	3.7563	3.7798

Section C

Answer any ***THREE*** questions (3 × 10 = 30 Marks)

9. Find the approximate value for the real root of $\boldsymbol{xlog_{10}x - 1.2 = 0}$. Correct to five decimal places by Newton Raphson method.

Contd…

10. Solve by Gauss Seidal method

$10x - 5y - 2z = 3, \quad 4x - 10y + 3z = -3, \; x + 6y + 10z = -3$

11. Use Lagrange's formula to fit a polynomial to the data

x	-1	0	2	3
y	-8	3	1	12

and hence find $y(x = 1)$.

12. Find an approximate value of $\log_e 2$ by evaluating $\int_0^1 \frac{dx}{1+x}$ using Simpson's 1/3rd rule, taking h = 1/6.

13. Compute y(0.3) given $\frac{dy}{dx} + y + xy^2 = 0, y(0) = 1$ by taking h = 0.1 using Runge - Kutta method of fourth order (correct to 4 decimals).