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.Computer Science - END SEMESTER EXAMINATIONS - APRIL 2025
SEMESTER - II

**20UCSAT2002 - Allied Mathematics - II**

Total Duration : 2 Hrs.30 Mins. Total Marks : 60

## Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Calculate a real root of the equation $\cos x = 3x - 1$ by Iteration method.
2. Find the value of $x$ correct to one decimal place for which $y = 7$ given

| **x** | 1 | 3 | 4 |
|---|---|---|---|
| **y** | 4 | 12 | 19 |

3. Compute $\frac{dy}{dx}$ at $x = 51$ from the following data

| **x** | 50 | 60 | 70 | 80 | 90 |
|---|---|---|---|---|---|
| **y** | 19.96 | 36.65 | 58.81 | 77.21 | 94.61 |

4. Using Taylor's method, find $y(0.1)$ correct to 3 decimal places from $\frac{dy}{dx} + 2xy = 1$, $y_0 = 0$.
5. Apply Newton's forward interpolation formula to find $y(79)$ for the following information If $y(75) = 246$, $y(80) = 202$, $y(85) = 118$, $y(90) = 40$.
6. Construct the divided difference table for the following table

| **x** | -1 | 0 | 2 | 4 | 5 |
|---|---|---|---|---|---|
| **y** | 0 | 1 | 9 | 65 | 126 |

7. Evaluate $\int_0^5 \frac{dx}{4x+5}$ by Trapezoidal rule using 11 coordinates.
8. Solve $\frac{dy}{dx} = 1 - y$, $y(0) = 0$ using Eular's method and find y at $x = 0.1$ and $x = 0.2$. compare the result with results of the exact solution.

## Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. Use false position method, to find the root between 2 and 3 of the equation $x^3$ - $3x - 5 = 0$ correct to four places of decimals.

**Contd...**

10. Analyse that $\Delta \tan^{-1}\left[\left(n-\frac{1}{n}\right)\right] = \tan^{-1}\left(\frac{1}{2n^2}\right)$.

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

| **x** | 0 | 1 | 3 | 4 |
|---|---|---|---|---|
| **y** | -12 | 0 | 6 | 12 |

Also estimate the value of y when $x = 2$.

12. Compute $\int_0^{10} \frac{dx}{1+x^2}$ by using
(i) Trapezoidal rule (ii) Simpson one third rule.

13. Evaluate the value of $y$ when $x = 1.1$ given that $\frac{dy}{dx} + \frac{y}{x} = \frac{1}{x^2}$, $y(1) = 1$ using Runge-kutta method.

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