

Roll.No.

21UCGAT2002

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. Cs with CGS- END SEMESTER EXAMINATIONS - NOVEMBER 2025
SEMESTER - II

21UCGAT2002 - Numerical Methods

Total Duration : 2 Hrs.30 Mins.

Total Marks : 60

Section B

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

1. Use the method of iteration to find the real root lying between 1 and 2 of the equation $x^3 - 3x + 1 = 0$
2. Find the real root of the equation $x^3 - x - 11 = 0$ by using bisection method.
3. Form the forward difference table for the following data

| | | | | | |
|---|---|----|---|----|---|
| x | 0 | 1 | 2 | 3 | 4 |
| y | 8 | 11 | 9 | 15 | 6 |

4. If $y(75) = 246$, $y(80) = 202$, $y(85) = 118$, $y(90) = 40$ then find $y(79)$.
5. Construct Newton's forward interpolation polynomial for the following data . Also find y for $x = 5$.

| | | | | |
|---|---|---|---|----|
| X | 4 | 6 | 8 | 10 |
| y | 1 | 3 | 8 | 16 |

6. Find $y'(x)$ and hence find $y'(x)$ at $x = 0.5$.

| | | | | | |
|------|---|---|----|----|----|
| X | 0 | 1 | 2 | 3 | 4 |
| Y(x) | 1 | 1 | 15 | 40 | 85 |

7. Evaluate $\int_0^1 \frac{dx}{(1+x^2)}$ using Trapezoidal rule with $h = 0.2$
8. Evaluate $\int_0^{\frac{\pi}{2}} \sin x dx$ by Simpson's one-third rule dividing the range into six equal parts.

Section C

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

9. Find the real root of $xe^x - 2 = 0$ correct to three places of decimals using Newton-Raphson method.

10. If $u_1 = 1, u_3 = 17, u_4 = 43, u_5 = 89$ then find u_2 .

11. Using Newton backward interpolation formula find the value of y when $x = 84$.

| | | | | | | |
|---|-----|-----|-----|-----|-----|-----|
| X | 40 | 50 | 60 | 70 | 80 | 90 |
| y | 184 | 204 | 226 | 250 | 276 | 304 |

12. Using Lagrange's interpolation formula find the polynomial and value of y when $x = 3$.

| | | | | |
|---|---|---|----|-----|
| X | 0 | 1 | 2 | 5 |
| y | 2 | 3 | 12 | 147 |

13. The velocity v of a particle at distance s from a point on its path s given by the table below

| | | | | | | | |
|---|----|----|----|----|----|----|----|
| s | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
| v | 47 | 58 | 64 | 65 | 61 | 52 | 38 |
