

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.CSc.(CGS) - END SEMESTER EXAMINATIONS - APRIL 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 solve the equation $3x - \log_{10} x - 6 = 0$.
2. Find the real root of the equation $xe^x - 2 = 0$ correct to three places of decimals using Newton - Raphson method.
3. Prove that $y_4 = y_3 + \Delta y_2 + \Delta^2 y_1 + \Delta^3 y_1$.
4. Find the value of y from the following data at $x = 2.65$

x	-1	0	1	2	3
y	-21	6	15	12	3

5. The population of a town is as follows:

Year X	1941	1951	1961	1971	1981	1991
Population in Lakhs Y	20	24	29	36	46	51

Apply Newton's forward interpolation to estimate the population in the year 1946.

6. With usual notation prove that $\Delta + \nabla = \frac{\Delta}{\nabla} - \frac{\nabla}{\Delta}$
7. Evaluate $\int_0^5 \frac{dx}{4x+5}$ by Trapezoidal rule using 11 coordinates.
8. Evaluate $\int_0^5 \frac{dx}{1+x}$ by Simpson's three eight rule with $h = \frac{1}{6}$.

Section C

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

9. Find the real root lying between 1 and 2 of the equation $x^3 - 3x + 1 = 0$ upto 3 places of decimals using Regula-falsi method.

Contd...

10. Estimate the missing term in the following table.

x	0	1	2	3	4
u(x)	1	3	9	-	81

Explain why the resulting value differs from 3^3 .

11. From the data given below, find the number of students whose weight is between 60 and 70.

Weight	0-40	40-60	60-80	80-100	100-120
No.of students	250	120	100	70	50

12. From the following data obtain the first and second derivatives of $y = \log_e x$ at $x = 500$.

x	500	510	520	530	540	550
y	6.2146	6.2344	6.2538	6.2729	6.2916	6.3099

13. A curve passes through the points as given in the table. Using Simpson's one third rule find

(i) the area bounded by the curve, the x axis and $x = 1$ to 9.

(ii) the volume of the solid generated by revolving this area about the x - axis.

x	1	2	3	4	5	6	7	8	9
y	0.2	0.7	1	1.3	1.5	1.7	1.9	2.1	2.3
