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.(CGS) - END SEMESTER EXAMINATIONS APRIL-2023
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. Illustrate the regula falsi method to solve the equation $3x$ - cos$x$-1 = 0.
2. Predict the real root of the equation $f(x) = x^3 + x^2 - 1 = 0$ by using iteration method.
3. Compute u_2 if $u_1 = 1$, $u_3 = 17$, $u_4 = 43$, $u_5 = 89$.
4. Solve by Lagrange's formula the percentage number of criminals under 35 years.

Age	% number of criminals
Under 25 years	52.0
Under 30 years	67.3
Under 40 years	84.1
Under 50 years	94.4

5. Show that the n^{th} divided differences of a polynomial of the nth degree are constant.
6. Apply Simpson's one third rule by dividing the range into eight equal parts of $\int_2^{10} \frac{dx}{1+x}$
7. Predict y(0.1) correct to 3 decimal places from $\frac{dy}{dx} + 2xy = 1, y_0 = 0$ using Taylor's method.
8. Solve $\frac{dy}{dx} = 1 - y, y(0) = 0$ using Euler's method . Find y at x=0.1 and x=0.2.

Section C

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

9. Solve the equation $logx = cosx$ to five decimal places by Newton-Raphson method.

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10. Predict the approximate value for the areas of circles of diameters 82 and 91. The area A of a circle of diameter d is given for the following values:

d	80	85	90	95	100
A	5026	5674	6362	7088	7854

11. Solve by newton's divided difference formula find the values of f(8) and f(15) from the following table:

x	4	5	7	10	11	13
f(x)	48	100	294	900	1210	2028

12. Compute the first and second derivative of the function given below, at the point x=1.5

x	1.5	2.0	2.5	3.0	3.5	4.0
f(x)	3.375	7.000	13.625	24.000	38.875	59.000

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

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