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.
M.Sc.Physics - END SEMESTER EXAMINATIONS - NOV' 2024
SEMESTER - II

22PPHCT2007 - Computational Methods and C Programming

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

Section B

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

1. Find the value of y for $x = 0.2$ using Newton's forward interpolation.

x	0	1	2	3	4	5	6
y	176	185	194	203	212	220	229

2. Use Gauss-Jacobi method to find the inverse of the matrix $A = \begin{bmatrix} 1 & 3 \\ 2 & 7 \end{bmatrix}$.
3. Find the zero of the function $f(x) = x^3$ - $2x^2 + x - 3$ with $x_o = 4$ by Newton-Raphson method up to three iterations.
4. Approximate the integral $\int_2^5 \frac{1}{x}\, dx$ using trapezoidal rule for 6 subintervals.
5. Find $f(3)$ for the data $f(1) = 1$, $f(2) = 4$, $f(5) = 10$ using Lagrange interpolation.
6. Solve the integral $\int_0^2 \sqrt{1 + e^x} dx$ for $n = 4$ by Simpson's $1/3$ rule.
7. Using Euler's method, solve the following ordinary differential equation $\frac{dy}{dx} = 3x^2 y$.
8. Solve by triangularisation method: $4x - 5y = -6$; $2x - 2y = 1$.

Section C

I - Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

9. Following data gives the temperature in °C between 8.00 AM and 8.00 PM on a particular day in Chennai. Using Newton's backward interpolating formula to compute the temperature in Chennai on that day at 5.00 PM.

Time(Hrs)	8.00	12.00	16.00	20.00
Temperature(°C)	30	37	40	38

Contd...

10. Apply Gauss elimination method to find the solution of the following system: $2x + y + z = 7$; x - $y + z = 0$; $4x + 2y - 3z = 4$.

11. Find the solution that lies between 2 and 3 for, $xlog_{10}\ x = 1.2$, correct to three decimal places using bisection method. Also write a C program for the same.

12. Explain the method of Simpson's 3/8 th rule. Write a program in C language for the same.

II - Compulsory question $(1 \times 10 = 10$ Marks)

13. Using Runge - Kutta of fourth order, solve $\frac{dy}{dx} = (x + y)\ sinxy$, $y(0) = 5$, at $0 \leq x \leq 2$ with steps $h = 0.2$.

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