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 APRIL - 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 sin 52 using Newton's forward interpolation formula.

θ°	45°	50°	55°	60°
$\sin\theta$	0.7071	0.7660	0.8192	0.8660

2. Derive the truncation error in Trapezoidal rule.
3. Solve the following equation using Jacobi's iteration method.
   $20x + y - 2z = 17$
   $3x + 20y - z = -18$
   $2x - 3y + 20z = 25$
4. Write a C program to find the real roots of a non - linear equation using bisection method.
5. Obtain the condition for convergence of the Newton - Raphson method.
6. Using the trapezoidal rule, find the area under the curve y = x^2 between x = 0 and x = 4 using the step size of 1.
7. Evaluate the following using Simpson's 1/3 rule:

x	0.0	0.1	0.2	0.3	0.4
f(x)	1.0000	0.9975	0.9900	0.9776	0.8604

8. Write a C program to solve a differential equation using Euler's method.

Section C

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

9. Using power method to find the dominant eigen value and eigen vector of

$$A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$$

Contd...

10. Solve the given system of equations using Gauss elimination method.
$$28x + 4y - z = 32$$
$$x + 3y + 10z = 24$$
$$2x + 17y + 4z = 35$$

11. Evaluate $\sqrt{12}$ to four decimal places by Newton - Raphson method.

12. Write a C program to obtain the solution of an equation using Simpson's 3/8 rule.

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

13. Consider an ordinary differential equation $dy/dx = x^2 + y^2$ where $y(1) = 1.2$. Find $y(1.05)$ using the fourth order Runge - Kutta method.

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