GALGOTIAS UNIVERSITY

ADMISSION NUMBER												

School of Computing Science and Engineering

Bachelor of Technology in Computer Science and Engineering
Mid Term Examination - May 2024

Duration : 90 Minutes
Max Marks : 50

Sem VI - E2UC512T - Advanced Numerical Methods

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1) Discuss cubic spline interpolation — K2 (2)

2) Find the largest Eigen value and corresponding Eigen vector of the matrix $\begin{bmatrix} 5 & 4 \\ 2 & 2 \end{bmatrix}$ by power methods. — K1 (3)

3) Define Jacobi method for symmetric matrices. — K2 (4)

4) Transform the matrix $\begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ to tri-diagonal form using Householder's method. — K2 (6)

5) Solve the equations $x^2 + y = 11,\ y^2 + x = 7$ correct to three decimal places, by applying Newton-Raphson method, given that $x_0 = 3.5\ and\ \ y_0 = -1.8$ — K3 (6)

6) Obtain the cubic spline for the following data: — K3 (9)

x	0	1	2
f(x)	2	-6	-8

7) Transform the following matrix into tridiagonal form by using Given's method, reduce $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ — K4 (8)

8) Apply Muller's method to find the root of the equation $x^3 + 2x^2 + 10x - 20 = 0$ taking $x_0 = 0, x_1 = 1, x_2 = 2$. — K4 (12)

OR

Obtain by power method, the numerically dominant eigen value and eigen vector of the matrix. $\begin{bmatrix} 2 & 3 & 1 \\ 3 & 2 & 2 \\ 1 & 2 & 1 \end{bmatrix}$. — K4 (12)