

I B. Tech II Semester Supplementary Examinations, March - 2022

MATHEMATICS-II

(Com. to EEE, ECE, CSE, EIE, IT)

Time: 3 hours

Max. Marks: 75

Answer any five Questions one Question from Each Unit

All Questions Carry Equal Marks

UNIT-I

1. a) Find the Eigen values and Eigen vectors of the matrix $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ (8M)

- b) Test the consistency of the system $x + y + z = 6$, $x - y + 2z = 5$, $2x - 2y + 3z = -7$, hence solve. (7M)

Or

2. a) Prove that the Eigen values of diagonal matrix are its diagonal elements. (8M)

- b) Find the rank of $\begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & 2 & 0 \end{bmatrix}$ using Normal form. (7M)

UNIT-II

3. a) Diagonalizable the matrix if possible if $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 3 & 1 \\ 0 & 0 & 1 \end{bmatrix}$ (8M)

- b) Find the Nature of the quadratic form $3x^2 + 2y^2 + 3z^2 - 2yz - 2xy$. (7M)

Or

4. a) Verify Cayley Hamilton theorem and hence find A^4 if $A = \begin{bmatrix} 8 & -8 & 2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$ (8M)

- b) Reduce the quadratic form $3x^2 + 5y^2 - 3z^2 - 2yz + 2zx - 2xy$ to the canonical form using diagonalization method and find the rank index signature. (7M)

UNIT-III

5. a) Solve the system of following equations using Gauss-Jacobi iteration method (8M)
 $9x + 4y + z = -17$; $x - 2y - 6z = 14$; $x + 6y = 4$.

- b) Find the Real root of the equation $xe^x = 2$ by False position method. (7M)

Or

6. a) Solve the system of following equations using Gauss-seidal iteration method (8M)
 $2x + 10y + z = 51$; $10x + y + 2z = 44$; $x + 2y + 10z = 61$

- b) Find the Real root of the equation $3x = 1 + \cos x$ by bisection method. (7M)

UNIT-IV

7. a) Find u_3 using Lagrange's formula given that (8M)
 $u_0 = 580, u_1 = 556, u_2 = 520, \& u_4 = 385$

- b) Prove that $hD = -\log(1 - \nabla) = \sinh^{-1}(\mu\delta)$ (7M)

Or

8. a) Find the $y(10)$ from the table using Newton's divided differences. (8M)

x	5	6	9	11
y	12	13	14	16

- b) Evaluate $\sqrt{5.5}$ given that $\sqrt{5} = 2.236, \sqrt{6} = 2.449, \sqrt{7} = 2.646 \& \sqrt{8} = 2.828$ by (7M)
 Newton forward interpolation formula.

UNIT-V

9. a) Find the solution of $\frac{dy}{dx} = x - y$, $y(0)=1$ at $x=0.1, 0.2$ using modified Euler's (8M)
 method .

- b) Using Simpson's 1/3rd rule Evaluate $\int_1^2 \frac{dx}{x}$ (7M)

Or

10. a) Evaluate $y(1)$ by Euler's method for $\frac{dy}{dx} = \frac{x+y}{y-x}$, $y(0)=1$ if $h = 0.1$ (8M)

- b) Using Simpson's 3/8th rule Evaluate $\int_0^{\pi} e^{2x} dx$ (7M)