

I B. Tech II Semester Supplementary Examinations, July/August - 2021

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

1. a) Solve the equations $x + y - 2z + 3w = 0, x - 2y + z - w = 0, 4x + y - 5z + 8w = 0, 5x - 7y + 2z - w = 0.$ (8M)

b) Find the rank of the matrix $\begin{bmatrix} 2 & -4 & 3 & -1 & 0 \\ 1 & -2 & -1 & -4 & 2 \\ 0 & 1 & -1 & 3 & 1 \\ 4 & -7 & 4 & -4 & 5 \end{bmatrix}$ using Echelon form. (7M)

Or

2. a) Solve the equations $2x - 6y + 8z = 24, 5x + 4y - 3z = 2, 3x + y + 2z = 16.$ by Gauss-Elimination method. (8M)

- b) Prove that the Eigen vectors corresponding to distinct Eigen values are lineally independent. (7M)

3. a) Diagonalizable the matrix if possible if $A = \begin{bmatrix} 2 & 0 & 4 \\ 0 & 6 & 0 \\ 4 & 0 & 2 \end{bmatrix}$ (8M)

- b) Reduce the quadratic form $x^2 + 4y^2 + z^2 - 4yz + 2zx - 4xy$ to the canonical form using Lagrange's reduction method. (7M)

Or

4. a) Reduce the quadratic form $3x^2 - 2y^2 + z^2 + 12yz + 8zx - 4xy$ to the canonical form using diaganilazation method hence find the rank index signature. (8M)

- b) Verify Cayley Hamilton theorem and hence find A^4 if $A = \begin{bmatrix} 8 & -8 & 2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$ (7M)

5. a) Solve the system of following equations using Gauss-seidal iteration method (8M)
 $8x - 3y + 2z = 20; 4x + 11y - z = 33; 6x + 3y + 12z = 35$

- b) Find the Real root of the equation $e^x = 3x$ by iteration method. (7M)

Or

6. a) Solve the system of following equations using Gauss-Jacobi iteration method (8M)
 $28x + 4y - z = 32; x + 3y + 10z = 24; 2x + 17y + 4z = 35$

- b) Find the Real root of the equation $x^3 - 5x + 3 = 0$ by bisection method. (7M)

7. a) Find $y(5)$ from the table using Newton's divided differences. (8M)

x	0	1	3	8
y	1	3	13	128

- b) Find $y(23)$ for the following data using Gauss forward interpolation. (7M)

x	10	20	30	40	50
y	9.21	17.54	31.82	55.32	92.51

Or

8. a) Find the Lagrange's polynomial for the following data. (8M)

x	0	2	3	6
y	6	7	9	12

- b) Find $\Delta^3 [(1-ax)(1-bx^2)]$ (7M)

9. a) By modified Euler's formula find $y(0.3)$ given that $\frac{dy}{dx} = x^2 - y^2$, $y(0) = 1$ (8M)

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

Or

10. a) Find $y(0.1)$, $y(0.2)$ given that $\frac{dy}{dx} = 1 - 2xy^2$, $y(0) = 1$ By RK method of second order if $h = 0.1$ (8M)

- b) Using Trapezoidal rule Evaluate $\int_0^2 \frac{dx}{1+x^2}$ (7M)