

I B. Tech II Semester Supplementary Examinations, November- 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

UNIT-I

1. a) Prove that Eigen values of real symmetric matrix are real. (8M)

- b) Find the rank of the matrix $\begin{bmatrix} 2 & 1 & 3 & 5 \\ 4 & 2 & 1 & 3 \\ 8 & 4 & 7 & 13 \\ 8 & 4 & -3 & -1 \end{bmatrix}$ using Echelon form. (7M)

Or

2. a) Solve the equations $x + y + z - w = 2, 7x + y + 3z + w = 12, 8x - y + z - 3w = 5, 10x + 5y + 3z + 2w = 20$. by Gauss-elimination method. (8M)

- b) Solve the system of equations (7M)
 $4x + 3y - z = 0, 3x + 4y + z = 0, x - y - 2z = 0$.

UNIT-II

3. a) Verify Cayley Hamilton theorem and hence find A^{-1} if $A = \begin{bmatrix} 3 & 1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{bmatrix}$ (8M)

- b) Find the transformation which will transform $2xy + 2zx - 2xy$ into a sum of squares (7M)
hence find the rank index signature.

Or

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

- b) Find the Nature of the quadratic form $6x^2 + 3y^2 + 3z^2 - 2xy - 4yz - 4xz$. (7M)

UNIT-III

5. a) Solve the system of following equations using Gauss-Jacobi iteration method. (8M)
 $x + y + 54z = 110; 27x + 6y - z = 85; 6x + 15y + 2z = 72$.

- b) Find the Real root of the equation by $2x - \log_{10} x = 7$ Newton Raphson method. (7M)

Or

6. a) Solve the system of following equations using Gauss-seidal iteration method (8M)
 $2x - 7y - 10z = -17$; $5x + y + 3z = 14$; $x + 10y + 9z = 7$

b) Find the Real root of the equation $e^x \sin x = 1$ by second method. (7M)

UNIT-IV

7. a) Using Newton's backward difference formula find $y(22)$ from the following table. (8M)

X	0	5	10	15	20	25
Y	7	11	14	18	24	32

b) Use Lagrange's formula to calculate $f(3)$ from the following table. (7M)

X	0	1	2	4	5	6
Y	1	4	5	7	9	12

Or

8. a) Fit a cubic polynomial for $y(0) = 1$, $y(1) = 0$, $y(2) = 1$, $y(3) = 10$ (8M)

b) Find the interpolating polynomial $f(x)$ from the table using Newton's divided differences. (7M)

X	0	1	4	5
f(x)	4	3	24	39

UNIT-V

9. a) Find $y(0.1), y(0.2), y(0.3)$ using Taylor's series method If $\frac{dy}{dx} = 2e^x y$, $y(0) = 2$ (8M)

b) Using Trapezoidal rule Evaluate $\int_0^2 (1 + 2x + e^x) dx$ (7M)

Or

10. a) Given that $\frac{dy}{dx} = 1 + xy$ and $y(0) = 1$, Compute $y(0.1)$ & $y(0.2)$ using Picard's method. (8M)

b) Using Simpson's 1/3rd rule Evaluate $\int_0^\pi \frac{1}{1+2x} dx$ (7M)