

I B. Tech I Semester Supplementary Examinations, April - 2022
MATHEMATICS-II

(Com. to CE, ME, Chem E, Auto E, Min E, Pet E, Agri E)

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) (7M)

Find the rank of the matrix $\begin{bmatrix} 1 & 1 & 3 & 5 \\ 1 & 1 & 1 & 3 \\ 2 & 4 & 2 & 4 \\ 2 & 4 & 1 & 2 \end{bmatrix}$ using Echelon form

Or

2. a) Solve the equations $3x + 4y + 5z = 18, 2x - y + 8z = 13, 5x - 2y + 7z = 20$ using Gauss-elimination method. (8M)

b) Solve the system of equations $x + 3y + 2z = 0, 2x - y + 3z = 0, 3x - 5y + 4z = 0, x + 17y + 4z = 0$ (7M)

UNIT-II

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

b) Find the transformation which will transform $2x^2 + 2y^2 + 2z^2 + 2yz$ into a sum of squares hence find the rank index signature. (7M)

Or

4. a) Diagonalizable the matrix if possible if $A = \begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$ (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)
 $27x + 6y - z = 85, 6x + 15y + 2z = 72, x + y + 54z = 110$

b) Find the Real root of the equation by $x \sin x = 1$ false position method (7M)

Or

6. a) Solve the system of following equations using Gauss-seidal iteration method (8M)
 $8x - 3y + 2z = 20, 4x + 11y - z = 33, 6x + 3y + 12z = 36$

b) Find the $\sqrt{30}$ by Newton Raphson method. (7M)

UNIT-IV

7. a) Using Newton's backward difference formula find $y(4.5)$ from the following table. (8M)

X	0	1	2	3	4	5
Y	1	3	5	8	12	15

- b) Use Lagrange's formula to calculate $f(4)$ from the following table (7M)

X	0	1	2	3	5
Y	1	2	5	9	12

Or

8. a) Fit a cubic polynomial for $y(0) = 1, y(1) = 2, y(2) = 1, y(3) = 10$ (8M)
- b) Find $f(2)$ from the table using Newton's divided differences (7M)

X	0	1	3	6
f(x)	14	24	32	48

UNIT-V

9. a) Find $y(1.1), y(1.2), y(1.3)$ using Taylor's series method If $\frac{dy}{dx} = xy + e^x, y(1)=2$ (8M)

- b) Using Trapezoidal rule Evaluate $\int_0^2 (xe^x) dx$ (7M)

Or

10. a) Given that $\frac{dy}{dx} = 1 + xy$ and $y(1) = 1$, Compute $y(1.1)$ & $y(1.2)$ using Picard's method (8M)

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