Code No: **R19BS1202** **R19** **SET - 1**

I B. Tech II Semester Supplementary Examinations, January/February - 2023

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

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UNIT - I

1. a) Define the rank of the matrix and find the rank of the matrix using Echelon form [8M]

$$\begin{bmatrix} 1 & 1 & 3 & 5 \\ 2 & 2 & 1 & 3 \\ 4 & 4 & 7 & 3 \\ 2 & 4 & 3 & 1 \end{bmatrix}$$

b) Solve the equations $25x + 2y + 2z = 69, 2x + 10y + z = 63, x + y + z = 43$ by Gauss-Elimination method. [7M]

(OR)

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

b) Prove that the Eigen values of diagonal matrix are its diagonal elements. [7M]

UNIT - II

3. a) Verify Cayley -Hamilton theorem for the matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ also find A^{-1} [8M]

b) Find the nature, rank, index and signature of the quadratic from by reduce in to canonical form $x^2 + 3y^2 + 3z^2 - 2yz$. [7M]

(OR)

4. Reduce the quadratic form $2x^2 + 4y^2 + 4z^2 + 2xy - 2xz + 6yz$ into a sum of squares by orthogonal transformation. [15M]

UNIT - III

5. a) Find the real root of the equation x^3-5x-7=0 using Iteration method. [8M]

b) Find the real root of the equation xtanx+1=0 using bisection method. [7M]

(OR)

6. a) Find the real root of the equation x^3-8x+ 4 = 0 using Newton Raphson method [8M]

b) Solve the following system of equations using Gauss-Jacobi method [7M]
$10x + y - 2z = 7, 3x + 10y - z = 8, 2x + y + 10z = 10.$

UNIT - IV

7. a) Find f(1.5) using Newton's Forward formula for the following table [8M]

X	1	2	3	4	5	6
Y	1	6	8	15	25	36

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

8. a) Find f(2.5) using Newton's forward formula for the following table [8M]

X	1	2	3	4	5
Y	3	4	10	13	24

b) Find the polynomial for the following data using Newton divided difference formula. [7M]

X	5	6	9	11
Y	12	13	14	16

UNIT - V

9. a) Find y(0.1) using RK method of second order If $\frac{dy}{dx} = \log(x + y)$,y(0) = 1. [8M]

b) By modified Euler's formula find y(0.2) given that $\frac{dy}{dx} = y - \frac{2x}{y}, y(0) = 1.$ [7M]

(OR)

10 a) Evaluate $\int_0^{\pi} sin2x\, dx$ using Simpson's 1/3rd rule. [8M]

b) By Picard's method find y(0.1) given that $\frac{dy}{dx} = 1 + xy, y(0) = 1.$ [7M]

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