Code No: **R201201** **R20** **SET - 1**

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

MATHEMATICS-II

(Common to All Branches)

Time: 3 hours Max. Marks: 70

Answer any FIVE Questions ONE Question from Each Unit
All Questions Carry Equal Marks

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UNIT-I

1 a) Find the rank of the matrix $A = \begin{bmatrix} 2 & -2 & 0 & 6 \\ 4 & 2 & 0 & 2 \\ 1 & -1 & 0 & 3 \\ 1 & -2 & 1 & 2 \end{bmatrix}$ by reduce in to Normal form. [7M]

b) Test for consistency and solve $x + y + z = 6, x + 2y + 3z = 14, x + 4y + 9z = 36$. [7M]

(OR)

2 a) Solve the system of equations $5x + y + z + w = 4, x + 7y + z + w = 12, x + y + 6z + w = -5, x + y + z + 4w = -6$. by Gauss- elimination method. [7M]

b) Find the Eigen values and Eigen vectors of $\begin{bmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{bmatrix}$ [7M]

UNIT-II

3 a) Verify Cayley -Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$ also find A^{-1} [7M]

b) Reduce the quadratic $2xy + 2xz + 2yz$ to the canonical form. [7M]

(OR)

4 a) Diagonalize the matrix A where A = $\begin{bmatrix} 3 & -1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{bmatrix}$ and also find A^4 [7M]

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

UNIT-III

5 a) Find the real root of the equation using $xe^x = 1$ bisection method [7M]

b) Find the real root of the equation x = cosx using iteration method [7M]

(OR)

6 a) Find the real root of the equation $x \log_{10} x - 1.2 = 0$ using False-position method [7M]

b) Solve the following system of equations using Gauss-seidel method [7M]
$10x + y + z = 12,\ 2x + 10y + z = 13,\ 2x + 2y + 10z = 14$

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UNIT-IV

7 a) Find the Missing terms in the following data [7M]

x	45	50	55	60	65
y	3	--	2	--	-2.4

b) Find y(25), Given that $y_{20}=24, y_{24}=32, y_{28}=35, y_{32}=40$ using Gauss forward difference formula [7M]

(OR)

8 a) Given that $\text{Sin}45^0 = 0.7077$, $\text{Sin}50^0 = 0.766$, $\text{Sin}55^0 = 0.8192$, $\text{Sin}60^0 = 0.866$ find $\text{Sin}52^0$ using Newton's forward difference formula. [7M]

b) Find the unique polynomial p(x) such that p(1)=1,p(3)=27,p(4)=64 [7M]

UNIT-V

9 a) Evaluate $\int_1^3 x^2\,dx$ using Simpson's 1/3rd and Simpson's 3/8th Rules [7M]

b) Evaluate y (0.1) by Euler's method for $\frac{dy}{dx} = \frac{x+y}{y-x}$, $y(0)=1$ by taking h = 0.01 [7M]

(OR)

10 a) Find y(0.1) using RK method of fourth order . If $\frac{dy}{dx} = 2e^x y$,y(0) = 2 [7M]

b) By Taylor's method find y(0.1) given that $\frac{dy}{dx} = 3x + y^2$, $y(0)=1$ [7M]

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