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
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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 diagonilazation 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
$8x - 3y + 2z = 20; 4x + 11y - z = 33 ; 6x + 3y + 12z = 35$　(8M)

　　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
$28x + 4y - z = 32; x + 3y + 10z = 24; 2x + 17y + 4z = 35$　(8M)

　　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
x	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 $\Delta^3\left[(1-ax)(1-bx^2)\right]$ (7M)

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

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

Or

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

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