

Code No: R10107

R10
SET - 1
I B. Tech I Semester Supplementary Examinations, Oct/Nov - 2018
MATHEMATICAL METHODS

(Com. to CE, CSE, EEE, EIE, AE, BT & AME)

Time: 3 hours

Max. Marks: 75

 Answer any **FIVE** Questions
 All Questions carry **Equal** Marks

1. a) Find the rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$ by Echelon form. (7M)
- b) 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-Jordan method. (8M)

2. a) Verify Cayley Hamilton theorem for $A = \begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{bmatrix}$, hence compute A^{-1} (8M)

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

3. a) Reduce the Q.F $2x^2 + 2y^2 + 2z^2 - 2xy + 2xz - 2yz$ to the canonical form. (8M)

- b) Find the rank, index, signature and nature of the quadratic form $2yz + 2zx + 2xy$ (7M)

4. a) Find the positive root of $x^3 - 5x + 3 = 0$ using False position Method. (8M)

- b) Find the positive root of $xe^x = 1$ using Newton Raphson Method. (7M)

5. a) Find $f(5.5)$ using Newton's Backward formula for the following table. (8M)

X	0	1	2	3	4	5	6
Y	0	1	16	81	256	625	1296

- b) Use Lagrange's formula to calculate $f(8)$ from the following table. (7M)

X	0	2	3	6	7	9
Y	1	14	15	5	6	19

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6. a) Find the $f'(1.4)$ from the following table. (7M)

X	1	1.1	1.2	1.3	1.4
Y	43.1	47.7	52.1	56.4	60.8

- b) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using (i) Simpson's $3/8^{\text{th}}$ Rule (ii) Simpson's $1/3^{\text{rd}}$ Rule. (8M)

7. a) Fit the straight line for the following data. (7M)

X	0	4	8	12	16	20
Y	6	12	18	24	30	36

- b) Fit the t line $y = ae^{bx}$ for the following data. (8M)

X	1.5	2.5	3.5	4.5
Y	10	15	20	25

8. a) By using Runge kutta method of fourth order find $y(0.1)$ given that (8M)

$$\frac{dy}{dx} = 3x + y^2, y(0) = 1$$

- b) By using Picard's method find $y(0.4)$ given that $\frac{dy}{dx} = x^2 + y^2, y(0) = 0$ (7M)