

Subject Code: R10107/R10

Set No - 1

I B.Tech I Semester Supplementary Examinations Nov./Dec. - 2015

MATHEMATICAL METHODS

(Common to CSE, EEE, CE, EIE, AE, BT & MM)

Time: 3 hours

Max. Marks: 75

**Answer any FIVE Questions
All Questions carry equal marks**

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1. (a) Solve the system of equations $x+3y+2z=0$, $2x-y+z=0$, $3x-5y+4z=0$, $x+17y+4z=0$

(b) Find the Rank of the matrix $\begin{bmatrix} 0 & 1 & 2 & 2 \\ 1 & 1 & 2 & 3 \\ 2 & 2 & 2 & 3 \\ 2 & 3 & 3 & 3 \end{bmatrix}$ using Normal form.

[8+7]

2. (a) Find the Eigen values and Eigen vectors of the Matrix $\begin{bmatrix} 1 & 2 & -2 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{bmatrix}$

(b) Verify Cayley- Hamilton Theorem for the matrix $\begin{bmatrix} 1 & -2 & 2 \\ 1 & -2 & 3 \\ 0 & -1 & 2 \end{bmatrix}$ Hence find A^4 and A^{-1}

[7+8]

3. Find the Rank, signature and index of the quadratic form $2x^2 + y^2 - 3z^2 + 12xy - 4xz - 8yz$ by reducing into canonical form

[15]

4. (a) Solve the equation $x - \cos x = 0$ using Bisection Method
(b) Solve the equation $x^3 - 8x - 4 = 0$ using Iteration Method

[8+7]

5. (a) Find $y(1.6)$ from the following table

x	1	1.4	1.8	2.2
y	3.49	4.82	5.96	6.5

(b) Find $y(10)$ if $y(5) = 12, y(6)=13, y(9)=14, y(11)=16$

[7+8]

6. (a) Compute the first derivative for the following data at $x = -3$ and $x = 0$

X	-3	-2	-1	0	1	2	3
Y	-33	-12	-3	0	3	12	33

(b) Evaluate $\int_4^{5.2} \log x dx$ using (i) Trapezoidal rule (ii) Simpson 1/3 rule

[7+8]



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7. (a) Evaluate $y(0.1)$, $y(0.2)$ by Taylor's Series method given that $y^1 = x + y^2$, $y(0)=1$
 (b) Evaluate $y(0.25)$, $y(0.5)$ by RK method given that $y^1 = x^2 + y^2$, $y(0)=1$

[7+8]

8. (a) Derive Normal Equations to fit the straight line $y = ax + b$
 (b) Fit the curve $y = a + bx + cx^2$ for the following data

X	1	2	3	4	5	6
Y	2.98	4.26	5.21	6.10	6.80	7.50

[7+8]

