

Subject Code: R10206/R10

Set No - 1

I B.Tech II Semester Supplementary Examinations Dec./Jan. – 2015/2016

MATHEMATICAL METHODS

(Common to ECE,IT,ME,CHEM,BME,EComE,PCE,PT & 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 $2x+y+z=10$, $3x+2y+3z=18$, $x+4y+9z=16$ using Gauss elimination method

(b) Find the Rank of the matrix
$$\begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 3 & 4 & 6 \\ 3 & 5 & 6 & 10 \\ -1 & 1 & -2 & -2 \end{bmatrix}$$
 using Echelon form

[8+7]

2. (a) Find the Eigen values and Eigen vectors of the Matrix
$$\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$$

(b) Verify Cayley- Hamilton Theorem for the matrix
$$\begin{bmatrix} 3 & 1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 5 \end{bmatrix}$$
 Hence find A^4 and A^{-1}

[7+8]

3. Find the Rank, signature and index of the quadratic form $x^2 - y^2 + 4z^2 + 4xy + 6xz + 2yz$ by reducing into canonical form

[15]

4. (a) Solve the equation $3x = 1 + \cos x$ using Iteration Method
(b) Solve the equation $xe^x = 2$ using False-position Method

[7+8]

5. (a) Find $y(2.5)$ from the following table

x	1	1.4	1.8	2.2
y	3.49	4.82	5.96	6.5

- (b) Find $y(x)$ if $y(0) = 5, y(1)=6, y(3)=50, y(4)=105$

[7+8]

6. (a) Compute the first derivative for the following data at $x = 3$ and $x = 1$

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

- (b) Evaluate $\int_0^{\frac{\pi}{2}} \sqrt{\cos \theta} d\theta$ using (i) Trapezoidal rule (ii) Simpson 3/8 rule

[7+8]

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

[7+8]

8. (a) Derive Normal Equations to fit the straight line $y = ax^2 + bx + c$
(b) Fit the curve $y = ae^{bx}$ 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]
