

I B.Tech II Semester Supplementary Examinations May - 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) Find the values of λ for which the system of equations
 $(\lambda-1)x + (3\lambda+1)y + 2\lambda z = 0, (\lambda-1)x + (4\lambda-2)y + (\lambda+3)z = 0, 2x + (3\lambda+1)y + 3(\lambda-1)z = 0$
 is consistent.
 (b) Solve the system of equations $10x+y+z=12, x+10y-z=10, x-2y+10z=9$ by Gauss-Jordan method.

[7+8]

2. (a) Express $2A^5 - 3A^4 + A^2 - 4I$ as a linear polynomial in A if $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$

- (b) Find the Eigen values and Eigen vectors of $A = \begin{bmatrix} 1 & 1 & 2 \\ 3 & 1 & 1 \\ 2 & 3 & 1 \end{bmatrix}$

[7+8]

3. Reduce the quadratic form $x^2 + 3y^2 + 3z^2 - 2yz$ to the canonical form by orthogonal reduction hence find rank index and signature

[15]

4. (a) Find the root of the equation $x^4 - x - 9 = 0$ by Bisection method.
 (b) Find the root of the equation $2x = 3\sin x + 5$ by Newton Raphson method.

[7+8]

5. (a) Evaluate the $y(1.2)$ from the following table using Newton forward interpolation formula

X	1	1.4	1.8	2.2
Y	3.49	4.82	5.96	6.5

- (b) If $h = 1$ then find $\Delta(x(x+1)(x+2)(x+3))$

- (c) Fit the polynomial for the following data

X	0	-1	1
Y	1	2	3

[6+4+5]

6. (a) Evaluate $y^1(1.2)$ and $y^{11}(1.2)$ from the following table

X	1	1.2	1.4	1.6	1.8	2.0
Y	2.7183	3.3201	4.0552	4.9530	6.0496	7.3891

- (b) Evaluate $\int_1^2 (1+x^3)dx$ by (i) Trapezoidal rule (ii) Simpson's 1/3 rd rule.

[7+8]



7. (a) By Taylor's method find $y(1.1)$ & $y(1.2)$ given that $\frac{dy}{dx} = x + y, y(1) = 0$
(b) By Milne's Thomson method find $y(0.4)$ given that $\frac{dy}{dx} = 3x + y^2, y(0) = 1$

[5+10]

8. (a) Derive the normal equations for $y = a + b/x$
(b) Fit the curve $y = ax^2 + bx + c$ for the following data

X	0	1	2	3
Y	1.05	2.10	3.85	8.30

[7+8]

