

Code.No: 09A1BS04

R09

SET-4

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**I B.TECH – REGULAR EXAMINATIONS, JUNE - 2010**  
**MATHEMATICAL METHODS**

**(COMMON TO EEE, ECE, CSE, EIE, BME, IT, ETE, E.COMP.E, ICE)**

**Time: 3hours**

**Max.Marks:80**

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

---

- 1.a) Find the Rank of the Matrix, by reducing it to the normal form  $\begin{bmatrix} 1 & 3 & 4 & 5 \\ 1 & 2 & 6 & 7 \\ 1 & 5 & 0 & 10 \end{bmatrix}$
- b) Find whether the following system of equations are consistent. If so solve them.  
 $x + 2y + 2z = 2, 3x - 2y - z = 5, 2x - 5y + 3z = -4, x + 4y + 6z = 0.$  [7+8]

2. Find the eigen values and the corresponding eigen vectors of  $\begin{bmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{bmatrix}$  [15]

3. Reduce the quadratic form to the canonical form  $3x^2 + 2y^2 + 3z^2 - 2xy - 2yz$  [15]

- 4.a) Prove that the newton's method has quadratic convergence.  
 b) Find  $y(5)$  given that  $y(0)=1, y(1)=3, y(3)=13,$  and  $y(8) = 123$  using Lagrange's formula. [8+7]

- 5.a) Find  $\frac{dy}{dx}$  at  $x=7.5$  from the following table.

x	7.47	7.48	7.49	7.5	7.51	7.52	7.53
y	.193	.195	.198	.201	.203	.206	.208

- b) Find the first two derivative at  $x=1.4$  from the following data: [8+7]

x	1.0	1.2	1.4	1.6	1.8	2.0
y	0	.128	.544	1.296	2.432	4.0

6. Using Euler's method, solve for  $y$  at  $x=2$  from  $\frac{dy}{dx} = 3x^2 + 1, y(1) = 2$  taking step size:  
 a)  $h = 0.5$   
 b)  $h = 0.25.$  [8+7]

- 7.a) Expand  $f(x)= \cos x$  for  $0 < x < \Pi$  in half range sine series.  
 b) Find cosine and sine series for  $f(x) = \Pi - x$  in  $[0, \Pi].$  [7+8]

- 8.a) Solve  $(mz - ny) p + (nx - lz)q = (ly - mx).$   
 b) Solve  $(x^2 - y^2 - yz) p + (x^2 - y^2 - zx) q = z(x - y).$  [7+8]

-oOo-