Code.No: 09A1BS04 | R09 | SET-2

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

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1.a) Find the Rank of the Matrix, $\begin{bmatrix} 2 & 3 & 7 \\ 3 & -2 & 4 \\ 1 & -3 & -1 \end{bmatrix}$ by reducing it to the normal form.

b) Find all the non-trivial solutions of $2x - y + 3z = 0$, $3x + 2y + z = 0$, $x - 4y + 5z = 0$. [7+8]

2. Find the eigen values and the corresponding eigen vectors of $\begin{bmatrix} 1 & 3 & 7 \\ 1 & 2 & 3 \\ 1 & 2 & 1 \end{bmatrix}$. [15]

3.a) Prove that $\frac{1}{2}\begin{bmatrix} 1+i & -1+i \\ 1+i & 1-i \end{bmatrix}$ is unitary.

b) Prove that the eigen values of a real skew symmetric matrix are either zero or purely imaginary. [8+7]

4.a) Find a real root of the equation $3x = e^x$ by bisection method.

b) Using Lagrange's formula find y(6) given: [7+8]

x	3	5	7	9	11
y	6	24	58	108	74

5.a) Fit a straight line y = a + bx from the following data:

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.3

b) Fit a straight line to the form y = a + bx for the following data:

x	0	5	10	15	20	25
y	12	15	17	22	24	30

[7+8]

6. Find y(0.1), y(0.2),z(0.1), z(0.2) given $\frac{dy}{dx} = x + z$, $\frac{dz}{dx} = x - y^2$ and $y(0) = 2$, $z(0) = 1$ by using Taylor's series method. [15]

7.a) Express f(x)=x as a Fourier Series in $(-\Pi, \Pi)$.

b) Expand the function $f(x) = x^2$ as a Fourier series in $(-\Pi, \Pi)$. [8+7]

8.a) Form the partial differential equation by eliminating a and b from $\log(az-1) = x + ay + b$

b) Find the differential equation of all spheres whose centres lie on z-axis with a given radius r. [7+8]

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