Code.No: 09A1BS04 | R09 | SET-3

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, by reducing it to the normal form $\begin{bmatrix} 2 & 1 & 3 & 5 \\ 4 & 2 & 1 & 3 \\ 8 & 4 & 7 & 13 \\ 8 & 4 & -3 & -1 \end{bmatrix}$

b) Find whether the following system of equations are consistent. If so solve them.
x + y + 2z = 9, x - 2y + 2z = 3, 2x - y + z = 3, 3x - y + z = 4. [8+7]

2. Verify Cayley Hamilton theorem and find the inverse of $\begin{bmatrix} 1 & 3 & 7 \\ 1 & 2 & 3 \\ 1 & 2 & 1 \end{bmatrix}$ [15]

3. Reduce the quadratic form to the canonical form $x^2 + y^2 + 2z^2 - 2xy + 4zx + 4yz$ [15]

4.a) Find a real root of the equation $e^x \sin x = 1$ using Newton Raphson method.
b) Find y(10), Given that y(5) = 12, y(6) = 13, y(9)=14, y(11) = 16 using Lagrange's formula. [8+7]

5.a) Using the method of least squares find the constants a and b such that $y = ae^{bx}$ fits the following data:

x	0	0.5	1	1.5	2	2.5
y	0.10	0.45	2.15	9.15	40.35	180.75

b) Obtain a relation of the form $y=ab^x$ for the following data by the method of least squares. [7+8]

x	2	3	4	5	6
y	8.3	15.4	33.1	65.2	127.4

6. Solve $\frac{dy}{dx} = xy + 1$ and $y(0) = 1$ using Taylor's series method and compute y(0.1). [15]

7.a) If f(x)=cosh ax expand f(x) as a Fourier Series in $(-\Pi, \Pi)$.
b) Expand the Function $f(x) = x^3$ as a Fourier Series in $-\Pi < x \le \Pi$. [7+8]

8.a) Solve $(z^2-2yz-y^2)p + (xy + zx)q = xy - zx$.
b) Find the integral surface of $x(y^2 + z)p - y(x^2 + z)q = (x^2 + y^2)z$. [7+8]

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