Code: IUT 9ABS105

IUT

B. Tech II Year I Semester (R09) Supplementary Examinations, May 2013

MATHEMATICAL METHODS

(Computer Science & Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 Find the Eigen values and Eigen vectors of $A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$.

2 Find the rank, index, signature of the quadratic form $10x^2 + 2y^2 + 5z^2 - 4xy + 6yz - 10xz$ reducing it to canonical form.

3 (a) Find a root near 3.8 of the equation $2x - \log_{10} x = 7$ correct to four decimal places by the iteration method.

(b) The population of certain town is shown in the following table:

Year:	1921	1931	1941	1951	1961
Population in thousands	19.96	39.65	58.81	77.21	94.61

Estimate the population in the years 1936 and 1963 also find the rate of growth of population in 1951.

4 A curve is drawn to pass through the points given by the following table.

x:	1	1.5	2	2.5	3	3.5	4
y :	2	2.4	2.7	2.8	3	2.6	2.1

Estimate the area bounded by the curve, x – axis and lines x = 1, x = 4 also find the volume of solid of revolution generated by revolving this area about the x – axis.

5 Solve by the Taylor's series method of third order problem $\frac{dy}{dx} = (x^3 + xy^2)e^{-x}$, $y(0)\ 1\ for\ x = 0.1, 0.2, 0.3$.

6 (a) Express $f(x) = x$ as a half-range cosine series in the interval $0 < x < 2$.

(b) Find the Fourier cosine transform of $\frac{e^{-ax}}{x}$, (a>0).

7 A string of length l is initially at rest in equilibrium position and each of its points is given the velocity $(\frac{\partial y}{\partial t})_{t=0} = bsin^3\left(\frac{\pi x}{l}\right)$. Find displacement $y(x,t)$.

8 (a) State and prove final value theorem for z-transform.

(b) Find: $Z^{-1}\left\{\frac{2z^2+3z}{(z+2)(z-4)}\right\}$.

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