Code No: R7100204 **R7**

B.Tech I Year(R07) Supplementary Examinations, December 2010
MATHEMATICAL METHODS
(Common to Electrical & Electronic Engineering, Mechanical Engineering, Electronics & Communication Engineering, Computer Science & Engineering, Electronics & Instrumentation Engineering, Information Technology, Electronics & Control Engineering, Computer Science & Systems Engineering and Electronics & Computer Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Express the following system in matrix form and solve by Gauss elimination method.
$2x_1 + x_2 + 2x_3 + x_4 = 6$; $6x_1 - 6x_2 + 6x_3 + 12x_4 = 36$,
$4x_1 + 3x_2 + 3x_3 - 3x_4 = -1$; $2x_1 + 2x_2 - x_3 + x_4 = 10$.
(b) Show that the system of equations $3x + 3y + 2z = 1$; $x + 2y = 4$; $10y + 3z = -2$; $2x - 3y - z = 5$ is consistent and hence solve it. [8+8]

2. (a) Determine the eigen values and eigen vectors of the matrix $A = \begin{pmatrix} 5 & 4 \\ 1 & 2 \end{pmatrix}$
(b) If $A = \begin{pmatrix} 2 & 0 \\ 0 & 1 \end{pmatrix}$, find A^{100} [8+8]

3. Reduce the quadratic form to canonical form by an orthogonal reduction and state the nature of the quadratic form. $6x_1^2+3x_2^2+3x_3^2-4x_1x_2+4x_1x_3-2x_2x_3$ [16]

4. (a) Find the positive root $x^3 - x = 1$ correct to four decimal places by bisection method.
(b) Find the parabola of the form $y = ax^2 + bx + c$ passing through the points (0, 0), (1, 1) and (2, 20). [8+8]

5. (a) Fit a curve $y=ae^{bx}$ to the data:

x:	0	2	4
y:	5.1	10	31.1

(b) Find f ' (5) if

x:	0	2	3	4	5	9
f(x):	5	25	55	100	460	900

[8+8]

6. Determine the value of y(0.4) using Milne's method given $y' = xy+y^2$, $y(0)=1$; use Taylor series to get the values of y at x=0.1, 0.2, 0.3 and 0.4. [16]

7. (a) Show that the Fourier transforms of $\frac{1}{\sqrt{|x|}}$ is self reciprocal.
(b) Find the finite fourier sine and cosine transform of $f(x) = x$ in $0 < x < L$. [8+8]

8. (a) Solve $(D^3 - 2D^2D')z = 2e^{2x} + 3x^2y$.
(b) Solve the difference equation, using Z-transform $y(k+2)-2\cos\alpha.y(k+1)+y(k)=0$, given $y(0)=1$, $y(1)= 1$. [8+8]

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