Code No: R10206 **R10** **SET-1**

I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2017
MATHEMATICAL METHODS
(Com. to ECE, IT, ME, CHEM. E, BME, E COM. E, PCE, PT & MM)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Reduce the matrix $\begin{bmatrix} 2 & 3 & 4 & 5 \\ 3 & 4 & 5 & 6 \\ 4 & 5 & 6 & 7 \\ 9 & 10 & 11 & 12 \end{bmatrix}$ in to normal form and then find the rank of the matrix. (7M)

   b) Apply Guass – Seidel method to solve the equations (8M)
   $27x + 6y - z = 85$
   $x + y + 54z = 110$
   $6x + 15y + 2z = 72$

2. a) If A= $\begin{bmatrix} 4 & 6 & 6 \\ 1 & 3 & 2 \\ -1 & -4 & -3 \end{bmatrix}$, find A^{-1} using Cayley- Hamilton theorem. (7M)

   b) Find eigenvalues and eigen vectors of $\begin{bmatrix} 2 & 1 & -1 \\ 1 & 1 & -2 \\ -1 & -2 & 1 \end{bmatrix}$. (8M)

3. Reduce the quadratic form $x^2 + 3y^2 + 3z^2 - 2yz$ to canonical form and hence find index and signature. (15M)

4. a) Using the method of false position, find a real root of $x^6 - x^4 - x^3 - 1 = 0$ correct to three decimal places. (7M)

   b) Using Newton-Raphson method, find a root of $x^2 + 4\sin x = 0$ correct to three decimal places. (8M)

5. a) Using Newton's interpolating formula, find f(1.85), given the following table (7M)

X	1.7	1.8	1.9	2.0	2.1	2.2
F(x)	5.474	6.05	6.68	7.38	8.16	9.025

   b) Apply Lagrange's interpolating formula to find the value of x when f(x)=15 from the given data (8M)

x	5	6	9	11
f(x)	12	13	14	16
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6. a) Use Trapezoidal to estimate $\int_0^2 e^{x^2} dx$ taking 10 intervals. (7M)
   b) Evaluate $\int_0^9 \frac{dx}{1+x^3}$ by Simpson's $\frac{3}{8}$ th rule. (8M)

7. a) Use Range – Kutta method of order four to find $y(0.2)$ given that $10y^1 = x^2 + y^2, y(0) = 1$. (7M)
   b) Using Milne's method, find $y(0.4), given\ y^1 = 2e^x - y,\ y(0) = 2,\ y(0.1) = 2.01, y(0.2) = 2.04\ and\ y(0.3) = 2.09$. (8M)

8. Fit a least square curve of the form $y = ax^b$ for the following data. (15M)

X	0.1	0.2	0.3	0.4	0.7	1.0
y	2.4	2.9	3.7	4.1	7.8	11.2