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

I B. Tech II Semester Supplementary Examinations, April/May - 2018
MATHEMATICAL METHODS
(Com. to ECE,IT,ME,CHEM,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 $\begin{bmatrix} 5 & 6 & 7 & 8 \\ 6 & 7 & 8 & 9 \\ 11 & 12 & 13 & 14 \\ 16 & 17 & 18 & 19 \end{bmatrix}$ in to normal form and find the rank of the matrix. (7M)

   b) Apply Guass – Seidel method to solve the equations (8M)
   $$20x + y - 2z = 17$$
   $$3x + 20y - z = -18$$
   $$2x - 3y + 20z = 25$$

2. a) If A $= \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$, find A^{-1} using Cayley Hamilton theorem. (7M)

   b) Find eigenvalues and eigen vectors of $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$. (8M)

3. Reduce the quadratic form $2xy + 2yz + 2zx$ to canonical form and hence find index and signature. (15M)

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

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

5. a) Using Newton's interpolating formula, find f(43), given the following table. (7M)

x	40	50	60	70	80	90
y	184	204	226	250	276	304

   b) Apply Lagrange's formula inversely to obtain a root of the equation f(x)=0, given that f(30)= -30, f(34)= -13, f(38)=3 and f(42)=18. (8M)

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6. a) Compute $\int_{0.2}^{1.4}[\sin x - \log x + e^x]dx$ using Simpson's $\frac{3}{8}th$ rule. (8M)

   b) Evaluate $\int_0^6 \frac{dx}{1+x^3}$ using Trapezoidal rule with h=1. (7M)

7. a) Use Range – Kutta method of order four to find $y(0.2)$ given that $y^1 = 3x + \frac{y}{2}, y(0)=1$. (7M)

   b) Using Milne's method, find $y(4.5)$ given $5xy^1 + y^2 - 2 = 0$ given $y(4) = 1$, $y(4.1) = 1.0049$, $y(4.2) = 1.0097$, $y(4.3) = 1.0143$ and $y(4.4) = 1.0187$. (8M)

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

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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

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