I B. Tech I Semester Supplementary Examinations, May - 2017
MATHEMATICAL METHODS
(Com. to CE, EEE, CSE, Bio-T E, EIE, AE, AME)

Time: 3 hours   Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Test the consistency of the system   x+ y+ z = 6, x-y+2z=5, 3x+y+z=-8, hence solve.   (7M)
   b) Solve the system of equations by Gauss –Seidel method   (8M)
   8x-3y+2z = 20; 4x+11y-z = 33 ; 6x+3y+12z =36.

2. a) Determine the characteristic roots and the corresponding characteristic vectors of   (7M)
   the matrix A=$\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$

   b) Verify Cayley-Hamilton theorem for A=$\begin{bmatrix} 1 & 1 & 1 \\ 0 & 2 & 1 \\ -4 & 4 & 3 \end{bmatrix}$ and hence find A^{-1} & A^4 (8M)

3. Reduce the quadratic form $3x^2 + 5y^2 + 3z^2 - 2yz + 2zx - 2xy$ in to canonical form by orthogonal reduction hence find rank, index and signature.   (15M)

4. a) Find the Real root of the equation x = e^{-x} using False position method.   (7M)
   b) Find the Real root of the equation $x^2 - \log_e^x = 12$ using Newton Raphson method.   (8M)

5. a) Find f(1.75) if f(1.7) = 5.474 , f(1.8) = 6.050 , f(1.9) = 6.686 , f(2) = 7.389.   (7M)
   b) Using Lagrange's formula calculate f(3) from the following table.   (8M)

x	0	1	2	4	5	6
f(x)	1	14	15	5	6	19

6. a) Find y(0.1) by Picard's method given that $\dfrac{dy}{dx} = \dfrac{y-x}{y+x}, y(0) = 1$ (7M)

   b) By Runge kutta method of fourth order find y(0.1) ,y(0.2) given that   (8M)

   $\dfrac{dy}{dx} = 3x + y^2, y(0) = 1$

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7. a) For the following table find $y^1(2.2)$, $y^{11}(2.2)$ (7M)

x	1.0	1.2	1.4	1.6	1.8	2.0	2.2
y	2.7183	3.3201	4.0552	4.9530	6.0496	7.3891	9.0250

b) Evaluate $\int\limits_{4}^{5.2} \log x \, dx$ using (i) Trapezoidal rule (ii) Simpson's 1/3 rule.   (8M)

8. a) Fit the $y=ax^b$ to the following data: (8M)

x	0	1	2	3	4
y	1	5	10	22	38

b) Fit a curve $y = a + bx$ degree curve to the following data: (7M)

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

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