

Code No: R10107

R10

SET - 1

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

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 (15M)
by orthogonal reduction hence find rank, index and signature.
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 $\frac{dy}{dx} = \frac{y-x}{y+x}$, $y(0) = 1$ (7M)
- b) By Runge kutta method of fourth order find $y(0.1)$, $y(0.2)$ given that (8M)
 $\frac{dy}{dx} = 3x + y^2$, $y(0) = 1$

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7. a) For the following table find $y'(2.2)$, $y''(2.2)$ (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 $\int_4^{5.2} \log x dx$ 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
