

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
 ~~~~~

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)
- $$\begin{aligned} 20x + y - 2z &= 17 \\ 3x + 20y - z &= -18 \\ 2x - 3y + 20z &= 25 \end{aligned}$$

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)

Code No: R10207

**R10****SET-1**

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  $y' = 3x + \frac{y}{2}$ ,  $y(0)=1$ . (7M)
- b) Using Milne's method, find  $y(4.5)$  given  $5xy' + y^2 - 2 = 0$  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)

|   |     |     |     |     |     |      |
|---|-----|-----|-----|-----|-----|------|
| 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 |