FirstRanker.com
Firstranker's choice
www.FirstRanker.com www.FirstRanker.com

Code: 15A54301 **R15**

B.Tech II Year I Semester (R15) Regular & Supplementary Examinations November/December 2018

MATHEMATICS – III

(Common to CE, CSE, IT, ME, EEE, ECE & EIE)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

*****

1 Answer the following: (10 X 02 = 20 Marks)

(a) Obtain the rank of the matrix $A = \begin{bmatrix} 1 & 0 & 2 \\ -1 & 7 & 0 \\ 1 & 0 & 2 \end{bmatrix}$.

(b) State the Cayley-Hamilton theorem.

(c) Define Hermitian and Skew-Hermitian.

(d) Obtain the Eigen values of $A = \begin{bmatrix} 1 & -4 \\ -2 & 5 \end{bmatrix}$.

(e) Write the normal equations for a power curve.

(f) Solve the differential equation $\frac{dy}{dx} + y = e^{-x}, y(0) = 1$ by Taylor's series method.

(g) Write the formula for interpolation.

(h) Explain the Simpson's 3/8th rule.

(i) Discuss the R-K forth order method.

(j) Explain the Picard's method.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 (a) Prove that Eigen values of an orthogonal matrix are unit modulus.

(b) Test for consistency and solve:

$5x + 3y + 2z = 4,\ 3x + 5y + 2z = 9,\ 7x + 2y + 2z = 4$

OR

3 State Cayley-Hamilton theorem and if $A = \begin{bmatrix} 1 & 2 & -2 \\ 1 & -1 & 2 \\ -1 & -4 & -3 \end{bmatrix}, evaluate\ A^{-1}, A^{-2}$.

UNIT – II

4 (a) Find the positive real root of $x^3 - 2x = 8$ correct to three decimal places, using Newton-Raphson method.

(b) Solve the following equations by Gauss-Seidel iteration method:

$x + y - 2z = 7,\ 3x + 20y - 2z = -8,\ x - 3y + 20z = 25$

OR

5 (a) Obtain a root of the equation $x^3 - 5x - 6 = 0$ using the bisection method correct to three decimal places.

(b) Find the positive real root of $\cos x = xe^x$ correct to four decimal places, using Regula-Falsi method.

UNIT – III

6 The table gives the distances in nautical miles of the visible horizon for the heights in feet above the earth's surface:

X = height	50	100	150	200	250	300
Y = distance	10.63	13.03	15.04	16.81	18.42	19.90

Apply Newton's backward interpolation formula, obtain the values of y when (i) x = 120 ft. (ii) x = 310 ft.

OR

7 Apply Bessel's formula to obtain y_{25}, given y_{20} = 2854, y_{24}=3162, y_{32}=3992.

Contd. in page 2

www.FirstRanker.com

FirstRanker.com
Firstranker's choice
www.FirstRanker.com www.FirstRanker.com

R15

Code: 15A54301

UNIT – IV

8 Fit a second degree polynomial from the following data:

X	1	2	3	4	5	6	7	8
Y	32	28	39	50	42	50	44	22

OR

9 Compute the values of $\int_{0.2}^{1.4}(\sin x - lox\ x + e^x)dx$ using Simpson's 3/8th rule.

UNIT – V

10 Apply Runge-Kutta method of fourth order, solve:

$$\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2} \text{ with } y(0) = 1\ at\ x = 0.2, 0.4$$

OR

11 Solve by Taylor's series method the equation:

$$\frac{dy}{dx} = \log(xy), \text{for } y(1.1) \text{ and } y(1.2) \text{ given } y(1) = 2.$$

*****

www.FirstRanker.com

www.FirstRanker.com