

R15

Code No: 121AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May - 2016

MATHEMATICS-I

(Common to CE, EEE, ME, ECE, CSE, EIE, IT, MCT, ETM, MMT, AE, AME, MIE, PTE, CEE, MSNT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) Define an Unitary matrix. [2]
- b) Find the Eigen values of the matrix $\begin{bmatrix} 1 & -2 \\ -5 & 4 \end{bmatrix}$ [3]
- c) If $f(x) = x^3 - 3x^2 + 2$ in $[2, 4]$, then find the value of C of Lagranges mean value theorem. [2]
- d) State Rolle's mean value theorem. [3]
- e) Evaluate $\int_{x=0}^1 \int_{y=0}^2 y^2 dy dx$ [2]
- f) Evaluate $\int_0^{\infty} x^{1/2} e^{-x/5} dx$ in terms of Gamma functions. [3]
- g) State Newtons Law of cooling. [2]
- h) Find the solution of the differential equation is $(D^2 + 4)y = 0$. [3]
- i) Find $L[te']$. [2]
- j) Find $L^{-1}\left(\frac{1}{s^3}\right)$. [3]

PART-B**(50 Marks)**

- 2.a) Prove that the Eigen values of a skew-Hermitian matrix are zero or purely imaginary.
- b) If A and B are square symmetric matrices of same order then prove that
 - i) $AB + BA$ is symmetric
 - ii) $AB - BA$ is Skew symmetric. [5+5]

OR

3. Using Cayley Hamilton theorem find the inverse of the matrix

$$\begin{bmatrix} 7 & 2 & -2 \\ -6 & -1 & 2 \\ 6 & 2 & -1 \end{bmatrix}$$

[10]