Code: 13A54102 **R13**

B.Tech I Year (R13) Supplementary Examinations December/January 2015/2016

MATHEMATICS – II

(Common to EEE, ECE, EIE, CSE and IT)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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

(a) Define Rank.

(b) Find the Eigen values of $\begin{pmatrix} 1 & 2 & 1 \\ 0 & -5 & 0 \\ 1 & 8 & 1 \end{pmatrix}$.

(c) $\int_0^3 \frac{x}{2+x} dx$ by using Simpson's 3/8 rule.

(d) Use Newton's Method to find the only real root of the equation $x^3 - x - 1 = 0$ in two approximations.

(e) What is the example of the Hermitian matrix?

(f) $Solve \ \frac{dy}{dx} = y\cos x$, $y(0) = 1$ using Taylor series method.

(g) What is the formula for half range cosine series?

(h) Inverse Z transform of $\frac{1}{(z-2)(z-3)}$, $|z| > 3$.

(i) Form the partial differential equation from $z = f(x^2 - y^2)$.

(j) Eliminate arbitrary constants in $(x - a)^2 + (y - b)^2 = k^2$, where a, b are constants.

PART – B

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

UNIT - I

2 Find P and Q such that the Normal form of $A=\begin{bmatrix} 1 & -1 & -1 \\ 3 & 1 & 0 \\ 1 & -2 & 1 \end{bmatrix}$ then find Rank of A.

OR

3 Verify Cayley Hamilton theorem for the matrix $A=\begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$. And also find the A^4.

UNIT - II

4 Finding the root of $f(x) = e^{-x}(3.2\sin(x) - 0.5\cos(x))$ that lies between x = 3 and x = 4, by using Bisection method.

OR

5 Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using:

(a) Trapezoidal rule.

(b) Simpson's 1/3 rule.

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UNIT - III

6 Using Euler's method, find an approximate value of y corresponding to x=0.1, given $\frac{dy}{dx} = \frac{y-x}{y+x}$, $y = 1\ at\ x = 0$.

OR

7 Find the Fourier series of $f(x) = x^3$ in $((-\pi, \pi))$.

UNIT - IV

8 Find the Fourier transform of f(x) $= \begin{cases} \frac{1}{2a} & if\ |x| \le a \\ 0 & if\ |x| > a \end{cases}$

OR

9 Solve $U_{n+2} + 2U_{n+1} + U_n = n \quad with \quad U_0 = U_1 = 0$ using Z-Transforms.

UNIT - V

10 Find the Partial differential equation of all sphere whose centre lie on Z-axis and given by equation $x^2 + y^2 + (z - a)^2 = b^2$, and b being constant.

OR

11 By using method of separation of variables solve the partial differential equation $\frac{\partial u}{\partial t} = c^2 \frac{\partial u^2}{\partial x^2}$.

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