R13

Code: 13A54102

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 $\left((-\pi, \pi)\right)$.

UNIT - IV

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

OR

9   Solve $U_{n+2} + 2U_{n+1} + U_n = n$ with $U_0 = U_1 = 0$ 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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