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

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

Time: 3 hours

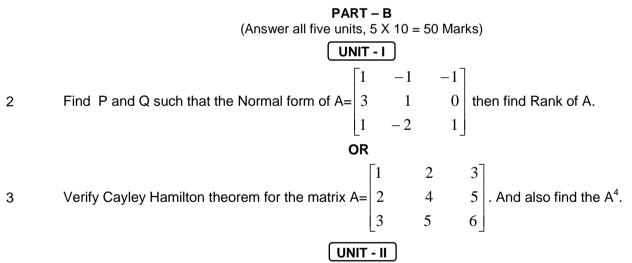
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PART – A

Max. Marks: 70

(Compulsory Question)

- Answer the following: $(10 \times 02 = 20 \text{ Marks})$
 - (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.



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

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

UNIT - IV

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

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

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

UNIT - V

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

OR

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

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