(DEE 211)

B. Tech. DEGREE EXAMINATION, MAY - 2015

(Examination at the of Second Year)

Electricals and Electronics

Paper - I : MATHEMATICS - III

Time : 3 Hours **Maximum Marks : 75**

Answer question No.1 compulsory ***(15 × 1 = 15)***

Answer ONE question from each unit ***(4 × 15 = 60)***

1) a) Define period sin2x

b) Define odd function.

c) Define fourier complex of the fourier series.

d) Define Inverse fourier transform.

e) State the fourier cosine Integral.

f) Write linear property of fourier transform.

g) Define Integral transform.

h) Write Gauss forward interpolation formula.

i) Write Newton forward interpolation formula.

j) Prove that $\Delta = E - 1$.

k) Prove that $\delta = \in^{1/2} - \in^{1/2}$

l) State simpson's $\frac{1}{3}rd$ rule

m) State picard's method.

n) Write formula of taylor's series method.

o) Define numerical differentiation.

UNIT - I

2) a) Express $f(x) = x^2$ as a fourier series for all values of x from $x = 0$ to $x = 2\pi$

b) Obtain the half – range sine series for e^x in $(0, \pi)$.

OR

3) a) Find the fourier expansion of
$f(x) = x + x^2$ for $-\pi < x < \pi$
and deduce that $\frac{\pi^2}{6} = 1 + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \cdots$

b) Expand $f(x) = x^2$ as half-range cosine series $0<x<2$

UNIT – II

4) a) Find the fourier sin transform of e^{-5x}

b) Find the fourier cosine transform of $\frac{1}{a^2+x^2}$.

OR

5) a) If f(p) is the complex fourier transform of f(x) then the complex fourier transform of f(x) cosax is $\frac{1}{2}[f(p+a) + f(p-a)]$.

b) Using faurier integral show that $\int_0^\infty \frac{\cos px}{1+p^2} dp = \frac{\pi}{2} e^{-x}, x \geq 0$.

UNIT – III

6) a) For $x = 0, 1, 2, 4, 5$ the values of $f(x)$ are 1, 14, 15, 5, 6 respectively find f(3) using Newton's forward interpolation formula.

b) Find the first derivative at $f(10)$ form the following :

x	0	1	2	3	4
y	4	8	15	7	6

OR

7) a) Apply Bessel's formula to obtain. y_{25} given
$y_{20} = 2854$, $y_{24} = 3162$, $y_{28} = 3564$, $y_{32} = 3992$

b) Given $f(x) = 168, 192, 336$ at $x = 1, 7, 15$ respectively use Lagrange's formula and find the value of $f(10)$.

UNIT – IV

8) a) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using simpson's $\frac{1}{3}rd$ rule taking h = $\frac{1}{6}$.

b) Find an approximate value of y for x = 0.1 by taylor's series method. Given that $\frac{dy}{dx} = x + y$ and y = 1 when x = 0.

OR

9) a) Apply the taylor's series method to find the value y(1.1), y(1.2) and y(1.3) correct to the three decimal places given that $\frac{dy}{dx} = xy^{1/3}, y(1) = 1$.

b) Apply R-K Method of 4th order to find an approximate value of y when x = 0.2 given that $\frac{dy}{dx} = y + x$ and y = 1 when x = 0 take h = 0.2

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