

(DEC 211)

**B. Tech. DEGREE EXAMINATION, MAY - 2015**

**(Examination at the end of Second Year)**

**ELECTRONICS & COMMUNICATIONS**

**Paper - I : Mathematics - III**

**Time : 3 Hours**

**Maximum Marks : 75**

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*Answer question No.1 compulsory*

*(15 × 1 = 15)*

*Answer ONE question from each unit*

*(4 × 15 = 60)*

- 1) a) Write the Euler's notations.
- b) Define odd function
- c) Define fourier integral theorem.
- d) Define cosine series of  $f(x)$
- e) Define inverse fourier transform.
- f) Show that  $E\Delta = \Delta E$ .
- g) Define differential operator.
- h) Newton forward interpolation formula
- i) Write Gauss Interpolation formula.
- j) Write striling Interpolation formula.
- k) Write taylor's series method.
- l) Write the formula for trapezoidal rule.
- m) Write formula's 4<sup>th</sup> order R-k method.

- n) Write Euler's method formulas.
- o) Write divided difference formula.

### UNIT - I

- 2) a) Find the fourier series of the function.

$$f(x) = x^2, -\pi < x < \pi$$

Hence deduce that :

i)  $\frac{\pi^2}{6} = \frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \dots$

ii)  $\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots$

iii)  $\frac{\pi^2}{8} = \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots$

OR

- b) Find the fourier series to represent  $x - x^2, -\pi < x < \pi$ . Hence deduce that

$$\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots = \frac{\pi^2}{8}$$

- c) Find the fourier series to represent the  $f(x)$

$$f(x) = 1 \text{ for } 0 < x < \pi$$

$$= 2 \text{ for } \pi < x < 2\pi$$

and Hence deduce that  $\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \dots$

### UNIT - II

- 3) a) Write a modulation property of fourier transform.

- b) Find the fourier transform of  $f(x)$  where  $f(x)$  is defined by

$$f(x) = \begin{cases} 1 & |x| < a \\ 0 & |x| > a \end{cases} \text{ and equation } \int_0^{\infty} \frac{\sin p}{p} dp$$

OR

- c) Find the root of the equation  $e^x \sin x = 1$  by regula – falsi method.
- d) Write procedure to solve system of linear equations by Gauss – elimination method.

**UNIT – III**

- 4) a) Find a cubic polynomial for the data given below.

1. $x$	2. 0	3. 1	4. 2	5. 3
6. $f(x)$	7. 1	8. 3	9. 7	10. 13

- b) Using lagrange's formula find  $Y_{35}$  given that

$$Y_{20} = 512, Y_{30} = 439, Y_{40} = 346, Y_{50} = 243.$$

OR

- c) Given  $\sqrt{5} = 2.236, \sqrt{6} = 2.449, \sqrt{7} = 2.646, \sqrt{8} = 2.828$  Find  $\sqrt{5.5}$  using interpolation formula.

- d) Give the values :

11. $x$	12. 5	13. 7	14. 11	15. 13	16. 17
17. $f(x)$	18. 150	19. 392	20. 1452	21. 2366	22. 5202

Find  $f(9)$  using Newton divided difference formula.

**UNIT - IV**

- 5) a) Find the value  $\int_0^1 \frac{dx}{1+x^2}$  taking 5 subinterval by trapezoidal, simpson's  $\frac{1}{3}$  simpson's  $3/8^{\text{th}}$  rules correct to five significant figures.

OR

- b) Find an approximate value of  $y$  for  $x = 0.1, 0.2, 0.3$  by Picard's method given

$$\text{that } \frac{dy}{dx} = \frac{y-x}{y+x}, y(0) = 1$$

