

**D-10/2110**

**5554/NJ**

Computer Oriented Numerical Methods  
Paper – CSM-354 Semester -V

Note: Students need to attempt any four questions in all. All questions will carry equal marks

Time: 02:00 hours

Marks: 30

**Section – A**

- I.
  - a. Make the Conversion Table of decimal, binary, octal and hexadecimal numbers
  - b. Convert the binary number 100100001.1101 to Hexadecimal System.
- II.

Explain Floating point representation. Also discuss in detail the arithmetic operations of Floating Point Mode
- III. Find the rate of convergence of Newton-Raphson method and represent it graphically.
- IV. Find the rate of convergence of Regula-Falsi Method, also represent it graphically.

**Section – B**

- V. Prove that the nth order forward differences of a polynomial in x of degree n are constant.
- VI.
  - a. Explain 'partial pivoting' and 'complete pivoting'
  - b. Explain the procedure of Gauss-Seidel Method to find the solution of equations.
- VII.
  - a. Explain the procedure of propagation of error in a difference table.
  - b. The values of cubic polynomial are given below, if one entry is incorrect, then by using the difference table, locate and correct the error:

X	0	1	2	3	4	5	6	7
y	21	17	14	14	23	41	72	119

- VIII. Find the truncation error in i) Newton's forward formula, ii) Newton's backward formula iii) Newton's divided difference formula.

**Section – C**

IX.

- a. Write Lagrange's Interpolation Formula.  
b. Prove that the following identity holds,

$$E = e^{hD}$$

- c. Prove that  $\Delta + \nabla = \frac{\Delta}{\nabla} - \frac{\nabla}{\Delta}$   
d. Explain the term 'significant figures'.  
e. Define absolute, relative and percentage errors.

(1+2+2+1+1.5)

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