R

# 11774/NJ

### D–3/2111

## COMPUTER ORIENTED

## NUMERICAL METHODS

Paper–354

Semester–V

Time Allowed : 3 Hours]        [Maximum Marks : 30

**Note :** The candidates are required to attempt **two** questions each from Sections A and B carrying 4 marks each and the entire Section C consisting of 7 short answer type questions carrying 2 marks each.

## SECTION—A

1. Perform four iterations of the method of iteration to find the positive root between 0 and 1 of the equation $xe^x = 1$.                    4

2. Find a root of the equation $x \log_{10} x = 1.2$ by Newton – Raphson's method.                    4

3. Find the smallest root equation $x^2 - 400x + 1 = 0$ using four digit arithmetic.                    4

4. Find the root of the equation $xe^x = \cos x$ in the interval $(0, 1)$ using Regula-Falsi method correct to four decimal places.                    4

## SECTION—B

5. Solve the following system by Gauss elimination method :                    4

$2x + 4y + z = 3$ ; $3x + 2y - 2z = 2$ ; $x - y + z = 6$.

6. Find the value of sin 52º from the given table using Netwon's forward interpolation formula : 4

| x | : | 45° | 50° | 55° | 60° |
|---|---|-----|-----|-----|-----|
| sin x | : | 0.7071 | 0.7660 | 0.8192 | 0.8660 |

7. Find the unique polynomial P(x) of degree 2 such that P(1) = 1, P(3) = 27, P(4) = 64 using Lagrange's interpolation method. 4

8. Prepare a divided difference table for the following Data : 4

| x | : | 1 | 3 | 6 | 10 | 11 |
|---|---|---|---|---|----|----|
| y | : | 3 | 31 | 223 | 1011 | 1343 |

## SECTION—C

9. Write short notes on the following : 2×7=14

(i) Add $0.1234 \times 10^{-3}$ and $0.5678 \times 10^{-3}$ using the concept of normalized floating point.

(ii) Derive the iterative formula to find $N^{1/k}$.

(iii) Derive the order of the convergence of the iteration method.

(iv) Write the formula of the Regula-falsi and secant methods.

(v) Define ill-conditioned equation.

(vi) Write the difference between the Gauss Seidel and Gauss elimination method.

(vii) Convert $(0.8176)_{10}$ to binary number system.