Total No. of Questions—**8**] [Total No. of Printed Pages—**3**

Seat No.	

[4857]-1039

S.E. (Electrical) (II Sem.) EXAMINATION, 2015

NUMERICAL METHODS AND COMPUTER PROGRAMMING

(2012 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Answer Q. No. **1** *or* Q. No. **2**, Q. No. **3** *or* Q. No. **4**, Q. No. **5** *or* Q. No. **6**, Q. No. **7** *or* Q. No. **8**.

(*ii*) Neat diagrams must be drawn wherever necessary.

(*iii*) Figures to the right indicate full marks.

(*iv*) Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

(*v*) Assume suitable data, if necessary.

1. (*a*) Explain the following instructions used in C languages : [6]

(*i*) printf

(*ii*) scanf

(*iii*) getch.

(*b*) Using synthetic division for $f(x) = 2x^3 - 6x + 13$, find $f(3)$, $f'(3)$, $f''(3)$, $f'''(3)$. [7]

Or

2. (*a*) Write short notes on : [6]

(*i*) functions call by value

(*ii*) functions call by reference.

(*b*) Explain truncation error and round off errors with example. [7]

P.T.O.

3. (*a*) Find root of $f(x) = x^3 - 5x - 7$ at the end of fifth iteration using secant method. Use interval (1, 2). [6]

(*b*) Explain the Lagrange's interpolation for unequally spaced data. [6]

Or

4. (*a*) For the following data calculate forward differences and obtain the forward difference polynomial. Interpolate polynomial at $x = 0.25$. [6]

x	$y = f(x)$
0.1	1.40
0.2	1.56
0.3	1.76
0.4	2.00
0.5	2.28

(*b*) Explain least square approximation method for fitting of curve as a parabola. [6]

5. (*a*) Find the values of x_1, x_2 and x_3, using Gauss Jordan method : [6]

$$\begin{bmatrix} 1 & 1 & 1 \\ 4 & 3 & -1 \\ 3 & 5 & 3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 1 \\ 6 \\ 4 \end{bmatrix}$$

(*b*) Explain Gauss elimination method for solving simultaneous equations. [6]

Or

6. (*a*) Solve the following system of equation using Gauss Seidel method upto 5th iteration, assuming $x = 3$, $y = 2$, $z = 1$ [6]

$$8x - 3y + 2z = 20$$

$$4x + 11y - z = 33$$

$$6x + 3y + 12z = 35$$

(*b*) Explain Gauss-Jacobi method for solution of simultaneous equation. [6]

7. (*a*) Derive Trapezoidal rule for numerical integration as a special case of Newton's Cote formula. [6]

(*b*) Use 4th order RK method to estimate $y(0.4)$ when $y' = x^2 + y^2$ with $y(0) = 0$. [7]

Or

8. (*a*) Explain Taylor's series method for the solution of ordinary differential equation. [6]

(*b*) Evaluate :

$$\int_1^{1.8} \frac{e^x + e^{-x}}{2}\, dx$$

using Simpson's $\left(\frac{1}{3}\right)$rd rule taking $h = 0.2$. [7]