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

Seat No.	

[5252]-549

S.E. (Electrical) (Second Semester) EXAMINATION, 2017
NUMERICAL METHOD AND COMPUTER PROGRAMMING
(2015 PATTERN)

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

N.B. **:—** (*i*) Attempt 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 round off error and truncation error with example. [6]

(*b*) Give syntax of :

(*i*) for loop

(*ii*) while loop

(*iii*) do-while loop [6]

Or

2. (*a*) Write short note on decision-making statements in 'C' language. [6]

(*b*) Perform two interations of Birge Vieta method to find root of the following equation with initial approximation $P_0 = 0.5$. [6]

$$f(x) = x^3 - 2x^2 - 5x + 6$$

3. (*a*) The current in a particular circuit is given by $I^3 - 5I - 7 = 0$. Find current value using Regula-Falsi method correct upto 3 decimal places. Take $I_0 = 2$ and $T_1 = 3$. [7]

P.T.O.

(*b*) Derive the formula of Newton's forward interpolation for equally spaced data points. [6]

Or

4. (*a*) Explain with neat diagram bisection method of solution of transcendental equation. Comment on its rate of convergence as compared to other methods. [6]

(*b*) For the following data points, find $f(1.1)$ using Lagrange's interpolation : [7]

x	$f(x)$
1	1
1.2	1.095
1.3	1.140
1.4	1.183

5. (*a*) Explain Taylor series method for solution of ordinary differential equation. [6]

(*b*) Evaluate the given integral using trapezoidal rule. Take $h = 0.5$, $k = 0.5$. [6]

$$I = \int_1^2 \int_1^2 \frac{dxdy}{x+y}$$

Or

6. (*a*) Derive Simpson's $\frac{1}{8}$th formula as a special case of Newton Cote's quadrature formula for Numerical Integration. [6]

(*b*) Apply Runge-Kutta fourth order method to find an appropriate value of y when $x = 0.2$, given that $\frac{dy}{dx} = x + y$ and $y = 1$ when $x = 0$. [6]

7. (*a*) Using Jacobi iterative method solve the following system of linear simultaneous equations. [6]

Take $x^{(0)} = y^{(0)} = z^{(0)} = 0$

perform 4 iterations.

$$3x + y + z = 2$$
$$x + 4y + 2z = -5$$
$$x + 2y + 5z = 2$$

(*b*) Using power method, find the largest eigen value of the matrix $A = \begin{bmatrix} 3 & -5 \\ -2 & 4 \end{bmatrix}$ by power method taking initial vector as $X_0 = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$. [7]

Or

8. (*a*) Explain Gauss-Elimination method for solution of system of linear simultaneous equations. [6]

(*b*) Find inverse of matrix $A = \begin{bmatrix} 8 & -4 & 0 \\ -4 & 8 & -4 \\ 0 & -4 & 8 \end{bmatrix}$ using Gauss-Jordan method. [7]