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[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 iterations 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]

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

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

$$X_0 = \begin{bmatrix} 0 \\ 1 \end{bmatrix}. \quad [7]$$

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]