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[5352]-549

S.E. (Electrical) EXAMINATION, 2018
NUMERICAL METHODS 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) List different types of operators used in 'C'. Give 2-3 examples
of each type. [6]
(b) State the rules for identifying significant digits in a number
and determine the same for : [6]
(i) 124.06
(ii) 0.02406

Or

2. (a) Explain the following terms with suitable example : [6]
(i) Truncation error
(ii) Round off error
(iii) Chopping error
(iv) Relative error.

P.T.O.

- (b) Using Birge Vieta method find the root of the equation $x^4 - 2x^3 - 4x + 4 = 0$ with initial approximation 0.5. Perform two iterations. [6]
3. (a) Using N-R method find the real root of the equation $x^3 - \sin x + 1$ with $x_0 = -2$. Perform 4 iterations. [6]
- (b) The following table gives the population of a town during last 6 census. Using Newton's backward interpolation formula determine the population in the area 1954 : [7]

Year	Population in Thousands
1911	12
1921	15
1931	20
1941	27
1951	39
1961	52

Or

4. (a) Explain with neat figure Regula Falsi method for solution of transcendental equation. [6]

- (b) Find equation of a straight line to be fit into the following data using least square approximation : [7]

x	y
0	10
2	12
4	18
6	22
8	20
12	30
20	30

5. (a) Explain modified Euler's method for solution of ordinary differential equation. Draw suitable diagram. [6]

- (b) Evaluate $\int_1^{1.8} \frac{e^x + e^{-x}}{2} dx$ using Simpson's $\left(\frac{1}{3}\right)^{\text{rd}}$ rule taking $h = 0.2$. [7]

Or

6. (a) Using 4th order RK method solve $\frac{dy}{dx} = \sqrt{x^2 + y}$ at $x = 0.2$ with $x(0) = 0.8$ and $h = 0.2$. [7]

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

7. (a) Using Jacobi iterative method, obtain solution of the following system. Perform 5 iterations : [6]

$$27x + 6y - z = 85$$

$$6x + 15y + 2z = 72$$

$$x + y + 54z = 110$$

take

$$X^{(0)} = Y^{(0)} = Z^{(0)} = 0.$$

- (b) Explain Gauss Seidal iterative method of solution of system of linear simultaneous equation. [6]

Or

8. (a) Solve the following system of equation using Gauss elimination method : [6]

$$\begin{bmatrix} 8 & -4 & 0 \\ -4 & 8 & -4 \\ 0 & -4 & 8 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 4 \\ 0 \\ 4 \end{bmatrix}.$$

- (b) Explain Gauss Jordan method to solve the system to linear simultaneous equation. [6]