AS–1499

B.C.A. (Part—I) Semester—I Examination

NUMERICAL METHODS

Paper—1 ST 4

Time : Three Hours] [Maximum Marks : 60

Note :— (1) **ALL** questions are compulsory.

(2) All questions carry equal marks.

1. (a) What is numerical computing ? Explain to which type of problems numerical computing is dealing ? 4

(b) Describe with the help of block diagram the process of numerical computing. 4

(c) Distinguish between analog computing and digital computing. 4

OR

2. (a) What do you mean by mathematical model ? How will you formulate it ? 4

(b) Explain discrete data and continuous data involved in numerical computing with example. 4

(c) Explain the concept of numerical instability and accuracy in numerical computing. 4

3. (a) Differentiate inherent error and numerical error in numerical computing. 4

(b) Explain the concept of significant digit with example. 4

(c) Find the truncation error in the result of the following function for x = 1/5 when we use :

(i) First 3 terms

(ii) First 4 terms

(iii) First 5 terms. 4

OR

4. (a) Round off the following numbers correct upto significant digits :

(1) 5.2056 (2) 0.24062

(3) 0.0055678 (4) 0.98769 4

(b) Explain Absolute and Relative error. 4

(c) What is the accuracy of the following numbers ?

(1) 0.008472 (2) 3600

(3) 12.345 (4) 750.5 4

5. (a) What are steps to be followed in evaluating root of the nonlinear equation by using Bisection method ? 6

(b) Find the cube root of 18 by using false position method. 6

OR

6. (a) Solve the equation $2x - 3 \sin x - 5 = 0$ by using bisection method. 6

(b) Explain how you will obtain root of equation $f(x) = 0$ by using false position method. 6

7. (a) Obtain root of the equation $f(x) = x - 1.5 \sin x - 2.5 = 0$ by using Newton Raphson method. 4

(b) Find the root of equation $x^4 - x - 10 = 0$ by fixed point iteration method considering algebraic transformations as $x = (x + 10)^{1/4}$ with initial gauss $x_0 = 2$. 4

(c) State comparison between Secant and Newton-Raphson method. 4

OR

8. (a) Limitations of Newton-Raphson method. 3

(b) Explain fixed point iteration method to find root of nonlinear equation. 3

(c) By using secant method find a root of the equation $f(x) = x \sin x - 1$. 6

9. (a) Solve the system of equations by Gauss Elimination method :

$$2x + y + 4z = 12$$

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

$$4x - 11y - z = 33$$ 8

(b) Explain the Gauss Elimination by partial pivoting method. 4

OR

10. (a) Solve using Gauss Jordan method :

$$3x_1 + 4x_2 + 4x_3 = 15$$

$$5x_1 + 2x_2 + x_3 = 18$$

$$2x_1 + 3x_2 + 2x_3 = 10$$ 8

(b) Explain the difference between simple Gauss Elimination method and Gauss Jordan method. 4