

Roll No. ....

Total Pages : 03

GSM/D-22

1172

COMPUTER ORIENTED NUMERICAL  
METHODS  
BCA-236

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

**(Compulsory Question)**

1. Attempt the following questions in short :  $8 \times 2 = 16$
- (a) Explain Bairstow's method.
  - (b) Define interpolation and approximation.
  - (c) Discuss pitfalls in differentiation.
  - (d) Discuss order of convergence of Newton-Raphson method.
  - (e) Write the Taylor series formula.
  - (f) Explain orthogonal properties of Chebyshev polynomial.
  - (g) Explain the types of errors that occur in numerical computations.
  - (h) Discuss Predictor Corrector method.

## Unit I

2. (a) How are floating point numbers represented in computer ? 8  
(b) Discuss Arithmetic operations with normalised floating point numbers. 8
3. Explain the following Iterative methods :

- (a) Newton-Raphson method 8  
(b) Bisection method. 8

## Unit II

4. (a) Explain algorithms of Gauss-Elimination methods for three equations. 8  
(b) Solve the following equations by Gauss elimination method : 8

$$4x_1 + x_2 + 3x_3 = 11$$

$$3x_1 + 4x_2 + 2x_3 = 11$$

$$2x_1 + 3x_2 + x_3 = 7.$$

5. Find  $y$  for  $x = 0.1$  by using Euler's method : 16

$$\frac{dy}{dx} = \frac{y-x}{y+x}, y = 1 \text{ at } x = 0 \text{ with initial condition.}$$

## Unit III

6. Use Newton's formula for interpolation to find the net premium at age 25 from the table given ahead : 16

|                    |         |         |         |         |
|--------------------|---------|---------|---------|---------|
| Age                | 20      | 24      | 28      | 32      |
| Annual Net Premium | 0.01427 | 0.01581 | 0.01772 | 0.01996 |

7. Explain Chebyshev polynomials. Prove the recursion relation  $T_{n+1}(x) = 2xT_n(x) - T_{n-1}(x)$ . Also find the first six Chebyshev polynomials. 16

#### Unit IV

8. Evaluate  $\int_0^6 \frac{1}{1+x^2} dx$  by using :
- (i) Simpson's  $\frac{1}{3}$  rule 8
- (ii) Simpson's  $\frac{3}{8}$  rule. 8
9. Explain the following :
- (i) Numerical differentiation and integration 8
- (ii) Gaussian quadrature. 8