June-July 2007

Bachelor of Computer Application (BCA) Examination

VI Semester

Computer Oriented Numerical Methods

Time : 3 Hours]   [Max. Marks : 40

Note : *Solve any two parts from each question. All questions carry equal marks.*

1. (a) Derive the formula for Newton-Raphson Method giving Geometrical Interpretation.

    (b) Explain Secant Method, find the root of the equation $x^2 - 4x - 10 = 0$ with, the initial estimates of $x_1 = 4$ and $x_2 = 2$

    (c) Write a program for Bisection Method.

2. (a) What is III Conditioned Equation ? How they are refined ?

    (b) Solve the following set of equation using Gauss-Seidel iteration method :

    $$2x_1 + x_2 + x_3 = 5$$
    $$3x_1 + 5x_2 + 2x_3 = 15$$
    $$2x_1 + x_2 + 4x_3 = 8$$

    (c) Write a program for Gauss Elimination Method.

3. (a) Define the following operators :

    (i) Forward Operator

    (ii) Backward Operator

    (iii) Divided Difference Operator

    (iv) Central Operator

    (v) Averaging Operator.

    (b) From the following data evaluate f(9) using Newton's divided difference formula :

x :	5	7	11	13	17
f (x) :	150	392	1452	2366	5202

    (c) Write a program for Lagranges Interpolation.

4. (a) Derive the formula for Newtons forward difference interpolation.

    (b) Evaluate the following integral by using Simpson's one- third rule with six equal intervals :

    $$\int_0^{1.2} e^{-x^2} dx.$$

(c) Write a program for Simpson's Three- Eight Rule.

5. (a) Solve the equation :

$$\frac{dy}{dx} = -2xy^2$$

where $y(0) = 1$ with $h = 0.2$ on the interval $[0, 1]$ by Eulers method.

(b) Using Taylor's series method solve :

$y' = x^2y - 1$, $y(O) = 1$ at $x = 0.1, 0.2, 0.3$.

(c) Write an algorithm for Runga Kutta fourth order method and

solve $\frac{dy}{dx} = x + y$, $y(O) = 1$

at $x = 0.2$.

* * *