June 2013

Bachelor of Computer Application (BCA) Examination

VI Semester

Computer Oriented Numerical Methods

Time : 3 Hours] [Max. Marks : 50

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

1. (a) Write a program for Newton-Raphson Method.

   (b) Using Secant Method find the roots of polynomial equation $x^2 - x - 1 = 0$.

   (c) Define order of convergence. Apply Graffes Root Squaring Method to solve the equation $x^3 - 8x^2 + 17x - 10 = 0$.

2. (a) Write an algorithm for Gauss Elimination with pivoting.

   (b) Solve the following set of equations using Gauss-Seidel Iteration Method :

   $$2x + y + z = 5$$
   $$3x + 5y + 2z = 15$$
   $$2x + y + 4z = 18$$

   (c) Find the curve of best fit of the type $y = ae^{bx}$ to the following data by the method of Least Square :

X	:	1	5	7	9	12
Y	:	10	15	12	15	21

3. (a) Prove that the sum of Lagrange's Coefficients is unity.

   (b) Evaluate the following :

   (i) $\Delta (e^{ax} \log bx)$ (ii) $\left(\frac{\Delta^2}{E}\right) x^2$.

   (c) Write an algorithm for Newton's Forward Interpolation Formula.

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

   (b) Define Cote's Number. Prove that :

   $C_k^n = C_{n-k}^n$ where $0 \le k \le n$.

(c) Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ from following data at x = 1.5 :

X	:	1	2	3	4	5
Y	:	1	4	9	16	25

5. (a) Solve the equation by Euler's Method :

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

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

(b) Write an algorithm for Runga Kutta Fourth Order Method.

(c) Using Taylor's Series Method solve :

$y' = x^2y - 1$, y(0) = 1 at x = 0. 1 , 0.2, 0.3.

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