June 2016

Bachelor of Computer Application (BCA) Examination

VI Semester

Computer Orlented Numerical Methods

Time 3 Hours] [Max. Marks 50

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

1. (a) How a floating point number is stored in the memory of a computer? Discuss with examples the procedures of four basic arithmetic operations using normalized floating point numbers.
   (b) What do you mean by roots of an equation ? Discuss the successive bisection method of evaluating roots of a non-linear equation in one variable.
   (c) By using Newton-Raphson's method find the root of $x^4 - x - 10 = 0$, which is near to $x = 2$, correct to three places of decimal ?
2. (a) Discuss the Gauss Seidel method for the solution of simultaneous equations. What is Pivoting? Explain pivoting use in Gauss Seidel method. Give a comparison of direct iterative methods.
   (b) Solve the following system by Gauss-Elimination methods, correct to three decimal places, $3x_1 + x_2 - x_3 = 3$; $2x_1 - 8x_2 + x_3 = -5$; $x_1 - 2x_2 + 9x_3 = 8$.
   (c) Find the curve of best 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) Find the value of f (0.35), using Lagrange's Interpolation formula :

x	:	0.0	0.1	0.2	0.3	0.4
f(x)	:	1.000	1.1052	1.2214	1.3499	1.4918

   (b) Write an algorithm For Newton's Backward Interpolation formula.
   (c) Prove that the sum of Lagrange's Coefficient is unity.
4. (a) Write a 'C' program for Simpson's Three-Eight rule.
   (b) Evaluate $y = f(x) = x/(1 - x^2)$ and $a = 0$, $b = 6$ by using Trapezoidal rule.
   (c) Define Cote's Number with suitable example.

5. (a) Write a 'C' program to find the solution of ordinary differential equations using Euler's method.

   (b) Given $dy/dx = \{(3x) + (y/2)\}$ with $y(1) = 1$. Find the solution of differential equation using Runge-Kutta second order methods, correct to three decimal position in the interval [1, 1.4], using step size h - 0.1.

   (c) Using Taylor's series method solve :

   $$y' = x^2y - 1,\ y(0) = 1 \text{ at } x = 0.1, 0.2, 0.3.$$

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