June - July 2008
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) Explain arithmetic operations for normalized floating point numbers giving examples. Solve the following :
   (i) Subtract 0.9354E-5 from 0.4525E-3.
   (ii) Add 0.3452E3 to 0.1248E2.

   (b) Find the real root of the equation $x = e^x$ using the Newtoh-raphson method, correct to four decimal places.

   (c) Define order of convergence. Prove that rate of convergence for the second method is $p = 1.G18$.

2. (a) An approximate solution of the system :
   $2x + 2y - z = 6$ $x + y + 2z = 8$, $x + 3y + 2z = 4$ is given by x = 2.8, y = I, z = 1.8. Using the iterative method improve this solution.

   (b) Write an algorithm for Pivotal Condensation.

   (c) Explain Least Square Method. Determine the constants a and b by the method of Least square such that $y = ae$ fits the following data : x : 2 4 G 8 10 y = f (x) : 4.077 11.084 30.128 81.897 222.62

3. (a) Evaluate the following :

   (i) $D(e^{ax} 106bx)$ (ii) $\Delta^2 \left[\dfrac{5x + 12}{x^2 + 5x + 6} \right]$

   (b) Derive the formula for Lagrange's Interpolation.

   (c) The following table gives the population of a town during the last six censuses. Estimate the increase in population during 1946 to 1948 :

Year :	1911	1921	1931	1941	1951	1961
Population in Thousand :	12	15	20	27	39	52

4. (a) Derive the formula for Numerical differentiation by using Newton's forward interpolation formula.

   (b) Write a 'C' program to solve integration by Trapezoidal rule.

(c) A solid of revolution is formed by rotating about the x-axis the area between the x-axis, the lines $x = 0$ and $x = 1$ and a curve through the points with the; following co-ordinates :

x :	0.00	0.25	0.50	0.75	1.00
y :	1.0000	0.9896	0.9589	0.9089	0.8415

Estimate the volume of the solid formed, giving the answer correct to three decimal places

5. (a) Write a code for Runge-Kutta fourth order method to the equation:

$$\frac{dy}{dx} = x + y \text{ with } y(0).$$

(b) Using modified Euler's method, determine the value of y when $= x - 0 1$ given that $y(0) = 1$ and $y^1 = x^2 \ y.$

(c) Use; Picard's method to approximate y, when x = 0.1. given that

$$y = I \text{ whenx} = 0 \text{ and } \frac{dy}{dx} = \frac{y - x}{y + x}$$

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