August 2011

Bachelor of Computer Application (BCA) Examination

VI Semester

Computer Oriented Numerical Methods

Time : 3 Hours] [Max. Marks : 50

1. (a) Find cube root of 12 upto four places of decimal.

   (b) Write a C program for Bisection method.

   (c) Find real root of equation $x \log_{10} x - 1.2 = 0$ using False Position Method.

2. (a) Write an algorithm for Pivotal Condensation.

   (b) Solve the following system of equations by Gauss-Jordan's Method :

   $x + 2y + z = 8$

   $2x + 3y + 4z = 20$

   $4x + 3y + 2z = 16.$

   (c) Determine the constants a and b by the method of Least Square such that $y = ae^{bx}$ fits the following data :

x	:	2	4	6	6	10
y = f(x)	:	4.077	11.084	30.128	81.897	222.62

3. (a) Write algorithm for Newton's forward interpolation formula.

   (b) Define forward, backward and divided difference operator. Prove that :

   (i) $E \nabla = \nabla E.$

   (ii) $(1 + \Delta)(1 - \nabla) = 1.$

   (c) Prove that the sum of Lagrange's Coefficient is unity.

4. (a) Write a C program to solve integration by Trapezoidal Rule.

   (b) Evaluate $\int_0^1 \frac{1}{1+x^2}\, dx$ using Simpson's One-Third Rule, where the interval of integration is subdivided into six equal parts.

(c) Define Cote's Numbers. Prove that :

$$C_k^n = C_{n-k}^n \qquad \text{where } 0 \leq k \leq n.$$

5. (a) Using Runge-Kutta fourth order method, solve the differential equation $\frac{dy}{dx}$ for x = 1.6 in step of h = 0.2 with initial condition y(1) = 2.

(b) Write a C program for Taylor's Series Method.

(c) Use Piard's Method to approximate y when x = 0.2, given that y = 1, when x = 0 and $\frac{dy}{dx} = x - y$.

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