00815

DIPLOMA IN COMPUTER SCIENCE AND ENGINEERING (BTCSVI)

Term-End Examination

June, 2012

BICS-033 : NUMERICAL METHODS AND COMPUTATION

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt **Any Five** Questions. Question No. **1** is **Compulsory**. Calculator is allowed.*

1. (a) Data Errors is also known as representation error (True / False) **7x2=14**

(b) A Non-Algebraic equation is called a transcendental equation (True / False)

(c) Divided difference are symmetric function of their arguments (True / False)

(d) Prove that $\nabla - \Delta = -\nabla\Delta$

(e) The Relation between E and ∇ is :

(i) $E = 1 + \nabla$ (ii) $E = 1 - \nabla$

(iii) $E\nabla = 1$ (iv) All of above

(f) Shift operator E is defined as $Ef(x) =$

(i) $f(x)$ (ii) $f(x+h)$

(iii) $f(x-h)$ (iv) $f(x+xh)$

(g) The quantity true value approximate value is called :

(i) Algorithms

(ii) Percentage Error

(iii) Error

(iv) None of these

2. (a) Perform four iterations of bisection method to obtain the smallest positive root of equation $f(x) = x^3 - 5x + 1 = 0$ 7

(b) Evaluate $\sqrt{12}$ to four decimal places by Newton's Raphson method. 7

3. (a) By Gauss's elimination method solve 7

$x + 2y + z = 3$

$2x + 3y + 3z = 10$

$3x - y + 2z = 13$

(b) Apply Gauss - seidal iteration method 7

$20x + y - 2z = 10$

$3x + 20y - z = -18$

$2x - 3y + 20z = 25$

4. Using Lagrange's Interpolation formula find $y(10)$ from the following table. 14

x	5	6	9	11
y	12	13	14	16

5. Evaluate $\int_0^{10} \frac{dx}{1+x^2}$ by using **7x2=14**

(a) Trapezoidal rule

(b) Simpson's 1/3 rule

6. (a) What are the merits and demerits of Finite Difference methods of Interpolation. 7

(b) By means of Newton's Divided difference formula, find the value of $f(8)$. 7

x	4	5	7	10	11	13
$f(x)$	48	100	294	900	1210	2028

7. Using Taylor's series methods **14**

Solve $\frac{dy}{dx} = x^2 - y$

$y(0) = 1$ at $x = 0.1, 0.2, 0.3$

8. Attempt ***any four*** of the following : **3.5x4=14**

(a) Secant method

(b) Linear regression

(c) Golden Section Search

(d) Linear programming

(e) Typex of Error

(f) Runge Kutta method for 2nd order