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BICS-033

01492

DIPLOMA IN COMPUTER SCIENCE AND ENGINEERING (BTCSVI)

Term-End Examination

December, 2011

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) Newton-Raphson Method is Suitable in cases where. **7x2=14**

(i) $f'(x)$ is Small

(ii) $f'(x)$ is Large

(iii) $f'(x)$ is Negative

(iv) $f'(x)$ is Positive

(b) Shift operator E is defined As $Ef(x)$ =

(i) $f(x)$

(ii) $f(x+h)$

(iii) $f(x-h)$

(iv) $f(x+nh)$

(c) The Relation between E and ∇ is :

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

(iii) $E\nabla=1$ (iv) None of these

(d) The Quantity true value Approximate value is called

(i) Algorithm

(ii) Percentage Error

(iii) Error

(iv) None of these

(e) A graphical representation of a specific Number of sequence of steps is known as _____.

(f) The Method of Least Square gives _____ Values in case of linear equation.

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

2. (a) Perform four iterations of the real root of the equation $f(x) = x^3 - x - 1 = 0$ by bisection method. 7

(b) Solve $x^3 - 5x + 3 = 0$ by Regula-falsi Method. 7

3. (a) Using Newton's Method find the real root of the equation $3x = \cos x + 1$ 7

(b) Explain the limitations of using Newton - Raphson Method. 7

4. (a) Solve the following by Gauss-elimination Method. 7

$$x + 4y - z = -5$$

$$x + y - 6z = -12$$

$$3x - y - z = 4$$

(b) Solve by Gauss-Seidal Method, the equations are : 7

$$28x + 4y - z = 32$$

$$x + 3y + 10z = 24$$

$$2x + 17y + 4z = 35$$

5. (a) What are the Merits and Demerits of Finite Differences Methods of Interpolation. 7

(b) Find the cubic Polynomial which takes the following Values. 7

x :	0	1	2	3
$f(x)$:	1	2	1	10

6. (a) Find $f(5)$ by Lagrange's formula for the following data. 7

x :	1	3	4	6	10
$f(x)$:	0	18	48	180	900

(b) What are the Merits and Demerits of Lagrange's Formula. 7

7. (a) Evaluate $\int_0^{10} \frac{dx}{1+x^2}$ by using Simpson's $\frac{1}{3}$ rule. 7

(b) Using Runge Kutta method solve $\frac{dx}{dy}=x+y$ where $y=1$ at $x=0$ find solution for $x=0.1$. 7

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

(a) Brents Methods.

(b) Types of Error

(c) Method of Regula - Falsi.

(d) Relation between Divided Differences and Forward Differences.

(e) Finite Difference Operators.

(f) Linear Programming.