No. of Printed Pages : 3

BICS-033

DIPLOMA – VIEP – COMPUTER SCIENCE AND ENGINEERING (DCSVI)

Term-End Examination

00557

June, 2014

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. Each question carries equal marks.*

1. (a) The Regula-Falsi method never fails. (True/False) *7×2=14*

(b) Gauss-Jordan method is used to solve a homogeneous system of linear equations. (True/False)

(c) Numerical differentiation is assumed as a weak concept in numerical analysis. (True/False)

(d) Write the order of convergence of secant method.

(e) Define backward difference operator.

(f) What is the advantage of Newton's interpolation over Lagrange's interpolation ?

(g) Write Trapezoidal rule for solving a definite integral.

2. Solve $xe^x - 1 = 0$ correct to three decimal places using *7+7=14*

(a) Bisection method.

(b) Newton-Raphson method.

3. Solve $20x + y - 2z = 17$, $3x + 2y - z = -18$, $2x - 3y + 20z = 25$, using *7+7=14*

(a) Gauss elimination method.

(b) Gauss-Seidel iteration method.

4. Find the Lagrange's and Newton's interpolating polynomials passing through (0, 2), (1, 3), (2, 12) and (5, 147). *7+7*

5. Derive Simpson's $3/8^{th}$ rule to solve the integral $\int_0^1 \frac{dx}{1+x^2}$. *14*

6. Find the least square fit $y = a + bx + cx^2$ for the data *14*

x	– 3	– 1	1	3
y	15	5	1	5

7. Using Runge-Kutta method of order 4, find y for $x = 0{\cdot}3$, given that $\frac{dy}{dx} = xy + y^2$, $y(0) = 1$ (Take step size $h = 0{\cdot}1$). *14*

8. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Golden section search

(b) Minimization using derivatives

(c) Numerical differentiation

(d) Taylor's series method

(e) Round-off error

(f) Truncation error