No. of Printed Pages : 4

BICS-033

DIPLOMA – VIEP – COMPUTER SCIENCE AND ENGINEERING (DCSVI)

00395

Term-End Examination

December, 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.*

1. (a) In Newton-Rapshon method, the process will evidently fail, if $f'(x) = 0$ is in the neighbourhood of the root. In such cases the _____ method should be used.

(b) Higher degree or transcendental equations can be solved by approximate methods. (True/False)

(c) Bisection method is also known as Bolzano method. (True/False)

(d) The negative root of $f(x) = 0$ is the positive root of $f(-x) \neq 0$. (True/False)

(e) Method of Iteration is particularly useful for finding the real roots of an equation given in the terms of an _____ series.

(f) The real root of an equation $\cos x = 3x - 1$ correct to seven decimal places may be _____ .

(i) 1·6071016

(ii) 0·6071016

(iii) 3·6071016

(iv) 2·6071016

(g) Regula-Falsi method is the oldest method of finding the real root of an equation $f(x) = 0$. (True/False) *7×2=14*

2. Find a real root of the equation $x^3 - 2x - 5 = 0$ by the method of Regula-Falsi, correct to three decimal places. *14*

3. (a) Solve the system of equations $28x + 4y - z = 32$, $x + 3y + 10z = 24$ and $2x + 17y + 4z = 35$ by Gauss elimination method. *7*

(b) Solve the following system by the method of factorization : 7

$x + 3y + 8z = 4$, $x + 4y + 3z = -2$ and $x + 3y + 4z = 1$

4. Solve the following equations by Gauss-Seidel iteration method : *14*

$8x - 3y + 2z = 20$, $4x + 11y - z = 33$ and $6x + 3y + 12z = 35$

5. Given $\sum_{1}^{10} f(x) = 500426$, $\sum_{4}^{10} f(x) = 329240$, $\sum_{7}^{10} f(x) = 175212$ and $f(10) = 40365$, find $f(1)$. *14*

6. The velocity V of a particle at distance S from a point on its path is given by the following table :

S(ft)	0	10	20	30	40	50	60
V[ft/s]	47	58	64	65	61	52	38

Estimate the time taken to travel 60 ft using Simpson's 1/3 rule. Compare the result with Simpson's 3/8 rule. *14*

7. Use Picard's method to approximate y, when $x = 0{\cdot}1$ given that $\frac{d^2y}{dx^2} + 2x\frac{dy}{dx} + y = 0$ and $y = 0{\cdot}5$, $\frac{dy}{dx} = 0{\cdot}1$, when $x = 0$. *14*

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

(a) Numerical instabilities in computation

(b) Brent's method

(c) Linear regression

(d) Minimization using derivatives

(e) Runge – Kutta method for 2^{nd} order

(f) Triangularization methods