

**DIPLOMA - VIEP - COMPUTER SCIENCE AND
ENGINEERING (DCSVI)**

Term-End Examination

June, 2016

00976

**BICS-033 : NUMERICAL METHODS AND
COMPUTATION**

Time : 2 hours

Maximum Marks : 70

Note : Attempt any *five* questions. Question no. 1 is *compulsory*. All questions carry equal marks.

1. Choose the correct answer from the given four alternatives : 7×2=14

(a) The forward difference operator is denoted by the symbol _____ .

- (i) delta
- (ii) omega
- (iii) nabla
- (iv) infinity

(b) In the function $y = f(x)$, the dependent variable is _____ .

- (i) y
- (ii) x
- (iii) $f(x)$
- (iv) a constant

- (c) The polynomial equation of the n^{th} degree has _____ roots.
- (i) n
 - (ii) $n + 1$
 - (iii) $n + 2$
 - (iv) $n - 1$
- (d) The order of Newton-Raphson method is _____.
- (i) 1
 - (ii) 2
 - (iii) 3
 - (iv) 4
- (e) The error in the trapezoidal rule is of the order _____.
- (i) h
 - (ii) h^2
 - (iii) h^3
 - (iv) h^4
- (f) Fourth degree equations are also called _____ equations.
- (i) quadratic
 - (ii) cubic
 - (iii) linear
 - (iv) bi-quadratic
- (g) In the function $y = f(x)$, the independent variable is _____.
- (i) y
 - (ii) x
 - (iii) $f(x)$
 - (iv) a constant

2. (a) Find the positive root of $x^3 - x = 1$ and correct to four decimal places by bisection method. 7

(b) Using Newton's method, find the root between 0 and 1 of $x^3 = 6x - 4$ and correct to five decimal places. 7

3. (a) Solve for a positive root of $x^3 - 4x + 1 = 0$ by Regula-Falsi method. 7

(b) Solve the system of equations by Gauss elimination method. 7

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

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

$$3x - y + 2z = 13$$

4. (a) Solve the system of equations by Gauss-Jordan method. 7

$$2x + y + 4z = 12$$

$$8x - 3y + 2z = 20$$

$$4x + 11y - z = 33$$

(b) Solve the system of equations by Gauss-Seidel method. 7

$$8x - 6y + z = 13.67$$

$$3x + y - 2z = 17.59$$

$$2x - 6y + 9z = 29.29$$

5. (a) What are the merits and demerits of Lagrange's formula ? Discuss. 7

(b) The following data are taken from the steam table :

Temp (°C): 140 150 160 170 180

Pressure : 3.685 4.854 6.302 8.076 10.225

Find the pressure at temperature $t = 142^\circ$. 7

6. (a) Using Lagrange's interpolation formula, find the value of y at $x = 5$ from the following table : 7

x :	1	2	3	4	7
y :	2	4	8	16	128

(b) Applying Taylor series method, find, correct to four decimal places, the values of $y(1.1)$ and $y(1.2)$, given $\frac{dy}{dx} = xy^{1/3}$ and $y(1) = 1$. 7

7. (a) Using Euler's method, find $y(0.4)$, given $y' = xy$, $y(0) = 1$. 7

(b) Evaluate $y(1.4)$, given

$$\frac{dy}{dx} = x + y, \quad y(1.2) = 2,$$

by Runge-Kutta method. 7

8. Explain any *four* of the following :

$$4 \times 3 \frac{1}{2} = 14$$

- (a) Linear Programming
 - (b) Cramer's Rule
 - (c) Types of Errors
 - (d) Golden Section Search
 - (e) Picard's Method
 - (f) Triangularization Method
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