

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

June, 2015

00126

**BICE-022 : COMPUTER APPLICATIONS IN CIVIL
ENGINEERING**

Time : 3 hours

Maximum Marks : 70

Note : Attempt any **seven** questions. All questions carry equal marks. Use of scientific calculator is allowed.

1. (a) Discuss the various sources of errors in numerical methods. 5
(b) Explain 'significant digits' and 'round off error'. 5

2. What is the importance of numerical methods in Civil Engineering ? Explain with the help of an example. 10

3. Find a real root of the equation $x^3 - 2x - 5 = 0$, correct to three decimal places, using
(a) Bisection Method, 5
(b) Method of False Position. 5

4. (a) Use Gauss Elimination Method to solve the equations, $2x + y + z = 0$, $3x + 2y + 3z = 18$ and $x + 4y + 9z = 16$. 5

- (b) Determine if the following system of equations is well-defined or ill-defined : 5

$$2x + y = 2$$

$$2x + 1.01y = 2.01$$

5. (a) Using Newton's Interpolation formulae, find the cubic polynomial which takes the following values : 5

$$y(1) = 24; y(3) = 120, y(5) = 336 \text{ and } y(7) = 720.$$

- (b) Given the values :

x	0	$\pi/4$	$\pi/2$
$y = \sin x$	0	0.70711	1.0

Use Lagrange's Interpolation formula to find the value of $\sin(\pi/6)$. 5

6. Given the following values, find X (correct to two decimal places) for which Y is maximum and also find this value of Y. 10

X	1.2	1.3	1.4	1.5	1.6
Y	0.9320	0.9636	0.9855	0.9975	0.9996

7. Explain the following :
- (a) Simpson's Rule 5
 - (b) Unimodal Function 5
8. Given the differential equation $y'' - xy' - y = 0$, with the conditions $y(0) = 1$ and $y'(0) = 0$, use Taylor's series method to determine the value of $y(0.1)$. 10
9. What are the difficulties in non-linear programming problems? 10
10. Explain one-dimensional minimization methods. 10
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