3E2014

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3E2014

B. Tech. (Sem. III) (Main & Back) Examination, January - 2013
Civil Engg.
3CE4 Computer Application in Civil Engg.

Time : **3** Hours] [Total Marks : **80**
[Min. Passing Marks : **24**

*Attempt any **five** questions, selecting **one** question from each unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. NIL 2. NIL

UNIT - I

1 (a) What is error ? Explain absolute and relative error in detail also explain the meaning of approximations and round of errors in detail. **12**

(b) Write short note on truncation errors. **4**

OR

1 (a) If we want to approximate $e^{10.5}$ with an error less than 10^{-12} using the Taylor series for $f(x)=e^x$ at 10, at least how many terms are needed. **8**

(b) Explain how truncation errors can be estimated by geometry series. **8**

UNIT - II

2 Solve the system of equations

$$3x_1 - 2x_2 + 3x_3 = 4$$

$$x_1 + 3x_2 + 3x_3 = -1$$

$$2x_1 + 4x_2 + 10x_3 = 2$$

Iterate two times using the Gauss-Seidel method, stating with the initial approximations as $x_1 = 0.3$, $x_2 = -0.8$ and $x_3 = 0.3$. **16**

OR

2 (a) Explain successive substitution method with its derivation and algorithm. **8**

(b) Derive formula for decomposition methods also write down its algorithm. **8**

UNIT - III

3 (a) Fit a second degree parabola to the following data : **8**

x :	1.0	2.0	3.0	4.0	5.0	6.0	7.0
y :	1.1	1.6	2.7	4.1	5.8	6.9	8.2

(b) Explain various applications of difference relations in the solution of differential equations with an example. **8**

OR

3 (a) Given data is

A	1.0	1.1	1.2	1.3	1.4	1.5	1.6
B	7.989	8.403	8.781	9.129	9.451	9.750	10.031

find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 1.6$. **11**

(b) Write short note on non-liner Regression analysis. 5

UNIT - IV

4 (a) Write an algorithm for Simpson's $\frac{3}{8}$ rule for a known function. 8

(b) State the assumptions made and derive the expression for numerical integration using Simpson $\frac{3}{8}$ rule. 8

OR

4 Evaluate $\int_0^6 \frac{dx}{1+x}$ by using Newton's method for integration. Trapezoidal method, Simpson $\frac{1}{3}$ method and simpson $\frac{3}{8}$ method. **16**

UNIT - V

5 (a) Give Algorithm and explain Range-Kutta fourth order method for solution of differential equation of first order and first degree. 8

(b) Derive equations for Numerical solution of ordinary differential equations by Euler method. 8

OR