3E2014

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CE-11

3E2014

B. Tech. IIIrd Semester (Main/Back) Examination, Feb. - 2011

Civil Engineering

3CE4 Computer Applications in Civil Engineering

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

Instructions to Candidates:

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

Unit - I

1. a) Find the roots of equation $x^3 - x - 4 = 0$ correct to three decimal places using Newton-Raphson Method.

b) Write the algorithm for finding. roots of a non linear equation using Bisection Method. **(8+8)**

OR

a) Find the truncation error for e^x at $x = 1/5$ and $x = -1/5$ when we use

i) First three terms

ii) First four terms.

b) Find the real root of $f(x) \equiv x^3 - 2x - 5 = 0$

by Bisection Method. **(6+10)**

Unit - II

2. a) Solve the following system of equations by Gauss-Seidal Method

$27x + 6y - z = 85$

$6x + 15y + 2z = 72$

$x + y + 54z = 110$

b) Write the algorithms for solving the Linear simultaneous equations using triangularizing method. **(10+6)**

OR

a) What do you mean by Linear independent simultaneous equations?

b) Solve the following equations :

$x + 2y + 3z = 1$

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

$3x + 3y + 4z = 1$

by Gauss Elimination Method. **(6+10)**

Unit - III

3. a) Write a short note on "Regression Analysis".

b) Fit a second degree parabola to the following data taking x as the independent variable.

x:	1	2	3	4	5	6	7	8	9
y:	2	6	7	8	10	11	11	10	9

(6+10)

OR

a) Write a short note on "Numerical Analysis".

b) The ordinates of the normal curve are given by the following table.

x:	0.0	0.2	0.4	0.6	0.8
y:	.3989	.3910	.3683	.3332	.2897

Evaluate

(i) $y(0.25)$

(ii) $y(0.62)$ **(6+10)**

Unit - IV

4. a) Compute the values of $\int_0^6 \frac{dx}{1+x^2}$ by the

i) Trapezoidal rule

ii) Simpson's $\frac{1}{3}$ rule and compare your result with the true value.

b) What is the use of "Numerical Integration" to find area of a curve. **(12+4)**

OR

a) Evaluate $\int_{-1.6}^{-1} e^x \, dx$ by Simpson's rule with six intervals.

b) A curve is drawn to pass through the points given by the following table

x:	1	1.5	2	2.5	3	3.5	4
y:	2	2.4	2.7	2.8	3	2.6	2.1

Estimate the area bounded by the curve, x - axis and the lines $x = 1$ and $x = 4$.

(8+8)

Unit - V

5. a) Use Euler's modified method with one step to obtain the value of y at $x = 0.1$ when $\frac{dy}{dx} = x^2 + y$ with $x = 0$, $y = 0.94$.

b) Explain any one method used for numerical solution of partial differential equation. **(10+6)**

OR

Use Runge-Kutta fourth order method to solve

$\frac{dy}{dx} = -2xy^2$ with $x_0 = 0, y_0 = 1$

$h = 0.2$ for $x = 0.2$ and 0.4 **(16)**
