3E2014

Roll No. : _____ Total Printed Pages : 4

3E2014

B. Tech. (Sem. III) (Main/Back) Examination, January - 2012
Civil Engg.
3CE4 Computer Applications Civil Engg.

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

Instructions to Candidates :

*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 (i) Find the relative maximum error in the function $u = \frac{7xy}{z^3}$, where $\Delta x = \Delta y = \Delta z = 0.001$ and $x = y = z = 1$.

(ii) Using the Secant method, find the root of the equation $xe^x = \cos x$ correct to four decimal places.

8+8

OR

1 (i) Find the real root of the equation $x^2 + 4\sin x = 0$ correct to four places of decimals by using Newton-Raphson method.

(ii) Write the algorithm for finding the roots of a non-linear equation using successive substitution method.

8+8

UNIT – II

2 (i) Why pivoting required in Gauss-Elimination method ? Differentiate between partial and full pivoting.

(ii) Solve the system of equations

$2x_1 - x_2 + 2x_3 = 3$

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

$x_1 + 2x_2 + 5x_3 = 1$

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

4+12

OR

2 (i) Write the alogrithm for solving the linear simultaneous equations using LU method.

(ii) Solve the system of equations

$x_1 + 2x_2 + 3x_3 = 14$,

$2x_1 + 5x_2 + 2x_3 = 18$,

$3x_1 + x_2 + 5x_3 = 20$,

by using Factorization method.

8+8

UNIT – III

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

x	1.0	1.5	2.0	2.5	3.0	3.5	4.0
y	1.1	1.3	1.6	2.0	2.7	3.4	4.1

(ii) The table gives the distance in nautical miles of the visible horizon for the given heights in feet above the earth's surface:

x = height	100	150	200	250	300	350	400
y = distance	10.63	13.03	15.04	16.81	18.42	19.90	21.27

Find the value of y when $x = 218$ ft. by using suitable interpolation formula.

8+8

OR

3 (i) Given that

x	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y	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 $x=1.6$.

(ii) Solve $y_{n+2}-4y_n=n^2+n-1$.

10+6

UNIT – IV

4 (i) Write short note on numerical integration.

(ii) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using Trapazoidal rule, Simpson's $\frac{1}{3}$ rule and Simpson's $\frac{3}{8}$ rule.

4+12

OR

4 (i) State the assumptions made and derive the expression for numerical integration using Simpson's $\frac{1}{3}$ rule.

(ii) Write the algorithm of Simpson's $\frac{1}{3}$ rule for a known function.

8+8

UNIT – V

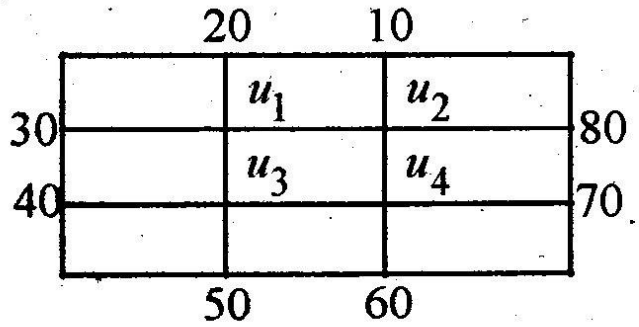
5 (i) Apply Milne's Predictor-Corrector method to find $y(0.8)$ for the differential equation $\frac{dy}{dx}=x-y^2$, given $y(0)=0$, $y(0.2)=0.02$, $y(0.4)=0.0795$, $y(0.6)=0.1762$.

(ii) Explain Range-Kutta fourth order method for solution of differential equation of first order and first degree. Also write the algorithm for the same.

8+8

OR

5 Solve $u_{xx} + u_{yy} = 0$ for the following square meshses with boundary conditions as exhibited in given figure.



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