DEPARTMENT OF MATHEMATICS, VSSUT
MID SEMESTER EXAMIATION
B.Tech 4th Semester
MATHEMATICS-IV

Full Marks: 20 Time-2 hours

Answer Q.No.1 and any three questions out of the rest questions.
The figures in right hand margin indicate marks.

1.Answer all parts of this question. [1 x 5]

a) Find the relative error if π is approximated as 3.14.

b) Write 301.867 and 0.00529 in floating point form.

c) Write the Lagrange's interpolation formula.

d) Write the condition of convergence of fixed point iteration method.

e) Using Trapezoidal rule, evaluate $\int_1^2 \frac{dx}{x}$ taking h = 0.5

2. (a) Solve $x^4 - x - 1.2 = 0$ starting from $x_0 = 1$ by fixed point iteration method correct to three decimal places. [2.5]

(b) Design a Newton iteration for cube roots and compute $(7)^{1/3}$ correct to 4 decimal places. [2.5]

3. (a) Solve $x^3 - x - 1 = 0$ by bisection method correct to two decimal places. [2.5]

(b) Solve $e^{-x} - \tan x = 0$ by Secant method correct to three decimal places taking $x_0 = 1, x_1 = 0.7$ [2.5]

4. (a)

x:	0	1	2	3	4
y:	5	14	32	60	98

Find the Newton's forward interpolating polynomial and hence find the value of y at x = 0.5 from the above data. [2.5]

(b)

x:	1	3	6	11
y:	5	9	22	46

Find the value of y at x = 2 using Lagrange's interpolation from the above data. [2.5]

5. (a) Find the value of y at x = 3 using Newton's Divided difference interpolation from the following data.

x:	1	4	6	13
y:	5	8	32	46

[2.5]

(b) Using Simpsons $1/3^{rd}$ rule, evaluate $\int_0^{\pi/2} \frac{dx}{1+x^2}$ taking h =1. Also by direct integration get the result and find the error. [2.5]

6. (a) Apply Gauss-seidal iteration to the following equations starting from 1, 1, 1

$10x_1 + x_2 + x_3 = 6$
$x_1 + 10x_2 + x_3 = 6$
$x_1 + x_2 + 10x_3 = 6$ [2.5]

(b) Choosing $x_0 = [1\ 1\ 1]^T$ apply the power method (3 steps) to find the dominated eigen value and eigen vector of the matrix

$$A = \begin{pmatrix} 3.6 & -1.8 & -1.8 \\ -1.8 & 2.8 & -2.6 \\ 1.8 & -2.6 & 2.8 \end{pmatrix}$$ [2.5]

****