TCS-302

Roll No.

B.Tech

SEMESTER-III, UTU EXAMINATION, 2013-14

Computer Based Numerical & Statistical

Time: 2 Hours]   [Total Marks: 75

Note: Attempt all questions.

1. Attempt any three parts of the following:

    (5X3=15)

    (a) What are the differences between the bisection method and the regula falsi method?

    (b) Evaluate $\int_{4}^{5.2} \log_e x \, dx$ by Trapezoidal rule

    (c) Find sum of cube of first N natural numbers using interpolation technique

    (d) Derive the Gauss Backward formula?

    (e) Derive Boole's rule for numerical integration.

2. Attempt any two parts of the following: **(10X2=20)**

    (a) Apply Bessel's formula to find the value of f (27.4) from the table:

x:	25	26	27	28	29	30
f(x):	4.000	3.846	3.704	3.571	3.448	3.333

(b) By means of Lagrange's formula, prove that

$$Y_0 = \frac{1}{2}(Y_1 + Y_{-1}) - \frac{1}{8}\left[\frac{1}{2}(Y_2 - Y_1) - \frac{1}{2}(Y_{-1} - Y_{-2})\right]$$

(c) Use Picard's method to approximate the value of y when x=0.2 given:

$$\frac{dy}{dx} = x - y \quad \text{With initial condition y=1 when x=0.}$$

3. Attempt any two parts of the following: (10X2=20)

(a) If $\mathbf{U} = \dfrac{4 x^2 y^3}{z^4}$ and error in x, y, z be 0.001, compute the relative max error in u when x=y=z=1.

(b) The pressure of the gas corresponding to various volumes V is measured, given by the following data:

V (cm3)	50	60	70	90	100
P (kg cm-2)	64.7	51.3	40.5	25.9	78

Fit the data to the equation P V^γ = C

(c) Use Taylor's series method to solve

$$\frac{dy}{dx} = x + y \quad ; \quad Y(1) = 0 \text{ numerically up to x = 1.2 with h = 0.1.}$$

4. Attempt any two parts of the following: (10X2=20)

(a) Derive Boole's rule for numerical integration.

Find f'(1.1) and f''(1.1) from the following table:

x:	1.0	1.2	1.4	1.6	1.8	2.0
f(x):	0.0	0.1280	0.5540	1.2960	2.4320	4.000

(b)) If $Y_0 + Y_6 = 10$, $Y_1 + Y_5 = 25$ and $Y_2 + Y_4 = 40$ then find the value of Y_3, where $Y_0, Y_1, Y_2, \dots Y_6$ denotes the value of dependent variable for a distribution

(c) Apply Gauss elimination method to solve the equations

x+2y+z=3

2x+3y+3z=10

3x-y+2z=13