

TCS-302/TCS-305

8,9

Printed Pages : 4

Paper Code & Roll No. to be filled in your Answer Book

Roll No.

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B. Tech. II Year (III Sem.)

Odd Semester Examination-2015

**Computer Based Numerical & Statistical
Techniques**

Time : 3 Hours]

[Maximum Marks :100

Unit I

Attempt any Four

(4x5=20)

1. Convert the following base-2 numbers to base-10: 1011001 and 110.00101
2. An approximation value of π is given by 3.1428571 and its true value is 3.1415926. Find absolute and relative errors.
3. The error in the measurement of the area of a circle is not allowed to exceed 0.1%. How accurately should the diameter be measured?
4. A root of the equation $f(x) = x^3 - 5x + 1$ lies in the interval (0,1). Perform two iterations of the secant method.
5. Find the approximate value of a root of the equation $f(x) = 0$ by using Newton Raphson method.

Unit II

Attempt any Four

(4x5=20)

1. To show that $\Delta \log f(x) = \log \left[1 + \frac{\Delta f(x)}{f(x)} \right]$

2. Find the missing entry in the following table.

x	0	1	2	3	4	5
y=f(x)	1	3	11	-	189	491

3. A second degree polynomial passes through the points (1, -1), (2, -2), (3, -1) and (4, 2). Find the polynomial.

4. Prepare the divided difference table for the following data

x	1	3	4	6	10
f(x)	0	18	58	190	920

5. Use Gauss forward formula to find y at x = 30 given the following table of values:

x	21	25	29	33	37
y	18.4708	17.8144	17.1070	16.3432	15.5154

Unit III

Attempt any Two

(2 x 10 = 20)

1. Find one root of $e^x - 3x = 0$ correct to two decimal places using the method of Bisection.

2. Apply Bessel's interpolation formula to obtain y_{25} , given that $y_{20} = 2860$, $y_{24} = 3167$, $y_{28} = 3555$ and $y_{32} = 4112$.
3. The equation

$$2e^{-x} = \frac{1}{x+2} + \frac{1}{x+1}$$

has two roots greater than -1 . Calculate these roots correct to five decimal places.

Unit IV

Attempt any Two

(2 x 10 = 20)

1. Find

$$\frac{dy}{dx} \text{ and } \frac{d^2y}{dx^2} \text{ for } x = 0.2$$

for the data given in the following table

x	0	0.1	0.2	0.3	0.4	0.5
y	0	0.10017	0.20134	0.30452	0.41076	0.52115

2. Evaluate the integral

$$\int_0^{1.2} e^x dx$$

taking $n = 6$ using Simpson's 1/3 rule.

3. Use Picard's method of successive approximation to find the value of y for the following:

$$\frac{dy}{dt} = 2y, y(0) = 1$$

Unit V

Attempt any Two

(2 x 10 = 20)

1. Determine the equation to the best fitting exponential curve of the form $y = ae^{bx}$ for the data given in Table

x	1	3	5	7	9
y	115	105	95	85	80

2. Calculate line of regression coefficient from the following

X	1	2	3	4	5	6	7	8
Y	3	7	10	12	14	17	20	24

3. Write the advantages of statistical quality control.