

TCS/TIT-302

1025/1026

Odd Semester Examination 2018-19

B.TECH.(CS/IT)(SEMESTER-III)

**COMPUTER BASED NUMERICAL STATISTICAL
TECHNIQUES**

Time: 03:00 Hours

Max Marks :50

1. Attempt any four questions:

[4×2.5=10]

- Derive Lagrange's Interpolation Formulae.
- Find the real root of the equation $2x - \log x - 7 = 0$ using iteration method.
- Find the rate of convergence for Regular-Falsi method.
- Find the absolute, relative and percentage errors if x is rounded-off to three decimal digits. Given $x = 0.005998$.
- Find a real root of $x^3 - x = 1$ between 1 and 2 by bisection method. Compute five iterations.
- Evaluate $\int_0^1 dx/(1+x^2)$ using Simpson's 3/8 rule taking $h = 1/6$.

2. Attempt any four questions:

[4×2.5=10]

- Using the method of false position, find the root of equation $x^8 - x^4 - x^3 - 1 = 0$ up to four decimal places.
- Three approximate values of number $1/3$ are given as 0.30, 0.33 and 0.34. Which of these three is the best approximation?

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(1)

[P.T.O.]

- (c) Solve by iteration method: $\sin x = (x+1)/(x-1)$
- (d) What are the statistical quality control techniques? Discuss the objectives and advantages of statistical quality control
- (e) Find the most plausible values of x and y from the following equations.
 $X+y=4, x - y=2, x+2y=4, x-2y=1$
- (f) Prove that bisection method is always converges.

3. Attempt any two questions: [2×5=10]

- (a) Find the root of the equation $x.e^x - \cos x = 0$ in the interval (0,1), correct to the three decimal places using Regular-Falsi method.
- (b) 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

- (c) Prove the Newton's Divided Difference Interpolation formula.

4. Attempt any two questions. [2×5=10]

- (a) Use Gauss's forward formula to find a polynomial of degree four which takes the following values of the function $f(x)$.

x	1	2	3	4	5
F(x)	1	-1	1	-1	1

- (b) The velocities of a car running on a straight road at intervals of 2 minutes are given below:

Time (in minutes)	0	2	4	6	8	10	12
Velocity(in km/hr)	0	22	30	27	18	7	0

Apply Simpson's rule to find the distance covered by the car.

(c) Find the missing figures in the following table:

x	2	2.1	2.2	2.3	2.4	2.5	2.6
y	0.135	-	0.111	0.100	-	0.082	0.074

5. Attempt any two questions.

[2×5=10]

(a) Assuming that the following values of y belong to a polynomial of degree 4, compute the next three values:

X	0	1	2	3	4	5	6	7
Y	1	-1	1	-1	1	-	-	-

(b) Given the following table. Find $f(x)$ as a polynomial in powers of $(x-5)$ using Newton's divided difference formula.

X	0	2	3	4	7	9
F(x)	4	26	58	112	466	922

(c) What do you understand by Stirling's formula? Discuss Stirling's formula along with its complete derivation.

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