

T1

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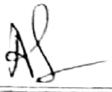
MANAV RACHNA
UNIVERSITY

DEPARTMENT OF MATHEMATICS

"T1 Examination, AUG-2018"

Semester: 3rd
Subject: Statistical & Numerical Techniques
Branch: CSE
Course Type: Core
Time: 90 Minutes
Program: B.Tech

Date of Exam: 27/08/18
Subject Code: MAH208-T
Session: II
Course Nature: Hard
Max. Marks: 30

Signature: HOD/Associate HOD: 

Note: Part A: All questions are compulsory. Each Question carries 2 marks. Part B: Attempt any two questions. Each Question carries (5+5) marks.

PART-A

- Q1. (a) Define interpolation.
(b) What do you understand by intermediate value property of a continuous function. Demonstrate it graphically.
(c) Give Sterling's formula for interpolation.
(d) Using bisection method, Find a real root of the equation $x^3 - x - 4 = 0$. Perform two iterations only.
(e) Form Backward difference table for the following data:

| | | | | |
|---|----|-----|-----|-----|
| X | 4 | 6 | 8 | 10 |
| y | 48 | 100 | 294 | 900 |

PART-B

- Q2. (a) Use Lagrange's interpolation formula to find the form of $f(x)$ from the following data:

| | | | | |
|------|-----|-----|-----|-----|
| X | 0 | 2 | 3 | 6 |
| f(x) | 648 | 704 | 729 | 792 |

- (b) Using Newton's forward interpolation formula, find $f(22)$ from the following data:

| | | | | | | |
|------|-----|-----|-----|-----|-----|-----|
| x | 20 | 25 | 30 | 35 | 40 | 45 |
| f(x) | 354 | 332 | 291 | 260 | 231 | 204 |

- Q3. (a) Find an approximate root of $x^4 - x - 10 = 0$ using Newton Raphson method correct to three decimal places.
(b) Using Regula Falsi method, find the approximate root of the equation $xe^x = \cos x$, upto three decimal places by performing four iterations only.

Q4(a). Find the 1st and 2nd derivatives of $f(x)$ at $x=1.5$ using the following data:

| | | | | | | |
|------|-------|-------|--------|--------|--------|--------|
| x | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| f(x) | 3.375 | 7.000 | 13.625 | 24.000 | 38.875 | 59.000 |

(b). Using Newton's divided difference formula, find $f(9)$ from the following table:

| | | | | | |
|------|-----|-----|------|------|------|
| x | 5 | 7 | 11 | 13 | 17 |
| f(x) | 150 | 392 | 1452 | 2366 | 5202 |

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