FAST

National University of Computer & Emerging Sciences, Karachi
Department of Computer Science
Mid 1 Exam , Spring-2021
17th March 2021, 9:00 am – 10:00 am

Course Code: CS-325 / MT-207	Course Name: Numerical Computing /Numerical Methods
Instructor Name: M. Jamil Usmani , Dr.Khusro , Nadeem Arif Khan	
Student Roll No: FA-0207	Section: C

Instructions:

- Solve all the question. Return the question paper.
- Read each question completely before answering it. There are 3 questions and 2 pages.
- All the answers must be solved according to the sequence given in the question paper.
- Display your result in tabular form with necessary column.
- Scientific calculator is allowed.

Time: 60 minutes **Max Marks:** 30 points

Question 1: Estimated Time:15 min [5+5]

a) Define the following.
   I. Normalized decimal floating point form
   II. Accuracy and Precision.
   III. Estimated error and True error.

b) Rewrite the function $f(x) = x^3 - 7x^2 + 8x - 0.35$ in term of nested manner then evaluate $f(x)$ at $x = 1.37$
Use three-digit arithmetic with chopping and find relative error.

Question 2: Estimated Time:20 min [5+5]

a) Find a solution of $x^4 + 2x^2 - x - 3 = 0$, on the interval [1,2] to obtain approximation accurate to within 10^{-4} use (any one) of the following .
   I. Bisection method
   II. Fixed point iteration

b) Use Newton method to solve nonlinear equation accurate to within $\epsilon = 10^{-5}$
$ln(x-1) + cos(x-1) = 0$, If the starting value $P_0 = \frac{6}{5}$

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Question 3: Estimated Time:25 min [3+5+2]

Compute $f(0.43)$ from the given data points

$$f(0) = 1, \quad f(0.25) = 1.64872, \quad f(0.5) = 2.71828, \quad f(0.75) = 4.48169,$$

a) Use Lagrange interpolating polynomials of degree two.

b) Construct divided difference table and use Newton polynomial formula to find $f(0.43)$

c) If data were generated by $f(x) = e^{2x}$ then calculate bound error or absolute error for approximation.

Wish you all the best