Sir Syed University of Engineering & Technology
Faculty of Computing & Applied Sciences
Department of COMPUTER SCIENCE and IT

Online End Semester Examinations (Spring 2021)

Course Code with Title	**CS-319: Numerical Analysis**	**Program**	BS (Computer Science)
Instructor	**Ovais Siraj Siddiqui** **Noman uddin Kahn**	**Semester**	5th
Start date & Time	June 07, 2021 at 11:30 AM	**Submission Deadline**	June 07, 2021 at 4:30PM
Maximum Marks	50		
Students must meet their submission deadline as there is no re-take or re-attempt after the deadline.			

IMPORTANT INSTRUCTIONS:

Read the following Instructions carefully:

- Attempt all (4) questions.
- Show decimal values at least 4 decimal places. Fix your calculator up 5 decimal places.
- Attempt All Questions on MS-Word. Font theme and size must be Times New Roman and 12 points respectively. Use line spacing 1.5. Convert file to PDF format before submitting.
- You may provide answers HANDWRITTEN. The scanned solution must be submitted in PDF file format (Use any suitable Mobile Application for Scanning)
- For Diagrams, you can use paper and share a clear visible snapshot in the same Answer Sheet.
- Arrange questions and their subsequent parts in sequence.
- Make sure that your answers are not plagiarized or copied from any other sources. In case of plagiarism, **ZERO** marks will be awarded.
- Provide relevant, original and conceptual answers, as this exam aims to test your ability to examine, explain, modify or develop concepts discussed during the course.
- Recheck your answer before the submission on **VLE** to correct any content or language related errors.
- You must upload your answers via the VLE platform ONLY.
- In questions,

You must follow general guideline for students before online examination and during online examination which had already shared by email and What Sapp.

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NOTE:
R **Represents your roll number, Let suppose your roll number is 2019-CS-013, then** ***R*** **=13 will be taken.**

Q.1. (a) **(5 Marks)**

Perform five iteration Using Bisection method of the equation f(x) = $x-(R+10)^{-x}$ [0,1]

Q.1. (b) **(5 Marks)**

Perform five iteration Using Newton-Raphson Method, $x^3-4x^2+x-10=0$
Start from $x_0 = R-10$.

Q.2. **(12 Marks)**

Consider the following function.

i). cos(x) [2+R 3+R.]

ii).Ln(x+2) [1.1+R 2+R.]

Integrate by Apply Quadrature formulas (using all four Formulae).

Q.3. (a) **(6 Marks)**

Find a polynomial whose values coincide with values of $y=\sqrt{x}$ at $x = R, R+1, R+2$.

Using Newton's divided difference formula.

Q.3. (b) **(6 Marks)**

Use Lagrange's formula to find $f(1.5)$ from the given table.

x	0	1	2	3
y	0	5+R	12+R	15+R

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Q.4. (a) **(10 Marks)**

Consider $y' = x + y$, $y(0) = 1$.find y_1 and y_2 by using

(i) Euler's method and by (ii) Heun's method.

Take step size $h = \frac{R+5}{10}$ .Also, compare the results with the exact value, if $y(x) = 2e^x - x - 1$ is the exact solution of the given equation.

Q.4. (b) **(6 Marks)**

Apply R.K. method of order 4 to find y_1 for $y' = y - xy; y(1) = 1$ with step size $h = \frac{R}{100}$,