Sir Syed University of Engineering & Technology
Faculty of Basic & Applied Sciences
Department: Computer Science

End Semester Examinations (Spring 2020)

Course Title with Code	CS-319**:** Numerical Analysis		**Program**	CS
Instructors	**M. Etezaz Ibrahim and Dr. Jabran**		**Semester**	5th
Start date & Time	June 28, 2020 at 11: 30 AM	**Submission Deadline**	June 28, 2020 at 03: 30PM	
Maximum Marks	50			

IMPORTANT INSTRUCTIONS:

Read the following Instructions carefully

- All trigonometric functions should be calculated in radian.
- Calculation up to 4 decimal places is required.
- 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.

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

This paper has a total of _03__ pages including this title page

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Write last three Numeric digit of your roll no.

First	Second	Last

For example if your roll is 2018-CS-001 hence digits are

0	0	1

For example if your roll No is 2018-CS-123, hence digits are

1	2	3

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Q.1. (a) Perform the following calculation using (i) 3 digit rounding, (ii) 3 digit chopping. **(05)**

$(3.2145)\times b + 0.001456$

(Where b is the last digit of your roll number)

Q.1. (b) Calculate Absolute Error, Relative Error and Percentage Error for the following data. **(05)**

$x = 2.236067977, \overline{x} = (2.23606) \times b$

(Where b is the last digit of your roll number)

Q.2. (a) Estimate $f(a + 1.1)$ from the following data using Newton's Forward formula. **(05)**

x	1	4	8	12
$f(x)$	3	66	514	1730

(Where a is the first digit of your roll number)

Q.2. (b) Estimate $f(a + 6.1)$ from the following data using Newton's Divided Difference formula. **(05)**

x	1	2	3	5	6	9
$f(x)$	2	5	10	26	37	82

(Where a is the first digit of your roll number)

Q.3. let $f(x) = x^4, C$ompute the Numerical differentiation to find approximation for $f'(2 + b)$

(i) Use formula $\frac{f(x+h)-f(x-h)}{2h}$ with h = 0.05 **(05+05=10)**

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(ii) Use formula $\frac{-f(x+2h)+8f(x+h)-8f(x+h)+f(x-2h)}{12h}$ with h = 0.05

(Where b is the second digit of your roll number)

Q.4. Let $f(x) = a + e^{-x}sin4x, Com$pute the Numerical integration by following methods with step size [0, 1]

(05+05 = 10)

(i) Apply Trapezoidal rule
(ii) Apply Simpson's 1/3 rule

(Where a is the first digit of your roll number)

Q.5. Apply LU method to solve the system of linear equations. **(10)**

$$1x + 2y + 3z = a$$
$$4x + 5y + 6z = b$$
$$7x + 8y + 9z = 0$$

(Where $a\ and$ b are the first and last digit of your roll number)
