BANGLADESH UNIVERSITY OF BUSINESS AND TECHNOLOGY (BUBT)
Faculty of Engineering and Applied Sciences
Department of Electrical and Electronic Engineering
Program: B.Sc. in EEE
EEE 314: Digital Signal Processing I Lab
(Section: 1; Shift: Day; Intake: 26)

Lab Final	**Fall 2021-22**	**Total Marks: 30**	**Time: 25 min.**

Course Instructor: Sk. Hasibul Alam

Q1. If $y[n] = x[n] * h[n]$, determine Y(z) using convolution property of z-transform. Here, $x[n] = [4 \quad \underline{3} \quad -7 \quad 9]$ and $h[n] = [-6 \quad 9 \quad \underline{1} \quad 4]$. **[10]**

Q2. If $y[n] = x_1[n] - x_2[n]$, plot $y[n]$ using stem function. Here, $x_1[n] = [4 \quad -7 \quad 3 \quad \underline{2} \quad -9]$ and $x_2[n] = [2 \quad \underline{-5} \quad 4 \quad 3 \quad -4]$. **[10]**

Q3. If $x(t) = \sin(6200t) + 0.5\sin(12500t)$ is sampled at 8 kHz, plot (using stem function) the magnitude spectrum of 300-point DFT of the sampled version. **[10]**

<u>Lab Final</u>
EEE 314: DSP 1 Lab

Total Marks: **30**   Date: **19 November, 2020**

*Answer all the questions. Each question has 3 marks.
*Write your name & student ID clearly on answer script, so that it's visible when taking photos by your camera.
*After converting to single PDF on your mobile, open Google Classroom & upload it.

Read the 'Note' section at the end of this page. Now write a code snippet (MATLAB) for each of the following questions:

1) Sample an analog $(k + 30)$ Hz sine wave using $(k + 250)$ Hz sampling frequency.

2) Plot a ramp sequence that is delayed by $(k + 4)$.

3) Decompose a unit-step sequence in odd & even part.

4) Find the cross-correlation between [9 $\underline{2}$ 3 4] and [7 9 $\underline{(k + 1)}$ $(k + 2)$ 3].

5) Find the z-transform of [4 6 2 $(k + 1)$ $\underline{(k + 2)}$ 4 5 4].

6) Find the inverse z-transform of $X(z) = 2z/\big((k + 2)z^2 - (k + 4)z + 9\big)$.

7) Decompose the following using partial-fraction expansion:
$$X(z) = (k + 1)z/\big((k + 2)z^2 - (k + 7)z + (k + 1)\big)$$

8) Find the impulse response of an LTI system described by the following:
$$H(z) = (1 + (k + 1)z^{-1})/(1 + (k + 4)z^{-1} + (k + 2)z^{-2})$$

9) Draw the pole-zero plot of an LTI system described by the following LCCDE:
$$y[n] = (k + 1)y[n - 1] + x[n] + (k + 3)x[n - 1]$$

10) Plot the following sequence: $sinc\left(\pi n / (k + 6)\right)$.

Note: 'k' is the last digit of your student ID. You do not have to write or predict any output of your code. You also do not have to draw any figure or shape. Only the code snippet will suffice.