***Set - A***  ***Date: 10/8/23***

**BRAC UNIVERSITY**

**Department of Computer Science Engineering**

**Quiz 3**

**Faculty: Jishnu Mahmud**

**CSE 350: Digital Electronics and Pulse Technique**

**Total Marks: 20 Time:25 minutes** 

**Question 1 [2+8+2 = 12 marks]**

A multi-tone signal is to be converted to a digital signal using a flash ADC (Analog to Digital Converter) converter. The signal consists of two sinusoidal frequencies of 400Hz and 450Hz and the amplitude varies from a minimum value of X to a maximum value of 8.45. The quantization error of the process is kept at less than 0.07 of an 8-bit ADC’s maximum quantization error.

* (a) Write down and explain the relationship between quantization error and resolution for the given ADC.
* (b) Hence or otherwise, find the minimum value of X.
* (c) Find the minimum theoretical sampling frequency needed to sample the signal without any sampling error.

*Note that the quantization error is the maximum amount of error that a sampling point suffers during the quantization process.*

**Question 2 [4x2 = 8 marks]**

For an R-2R ladder.

Rf = R = 5kΩ, VR = 5V

Find the analog value of the output of DAC for the following Binary Encoding:

1. 100
2. 111