COE 202, Term 141
Digital Logic Design

Quiz# 1

Date: Tuesday, Sep. 16

Q1. Assume that an analogue signal has a range of **0 to 10 volts**. Suppose that we need to quantize the analogue signal into a digital signal using only **4** different values. Determine these values and the maximum <u>quantization error</u>.

Step $= 10/4 = 5/2$; Maximum quantization error $= 5/4$

Values: 5/4, 15/4, 25/4, 35/4

Q2. Determine the **decimal** value of the following numbers:

i. $(11110011.111)_2$

$= 243.875$

ii. $(4A.C)_{16}$

$= 74.75$

Q3. Represent the following numbers in **binary**. Use as many bits as needed, and approximate the fraction to **4 <u>binary</u> digits**:

i. $(250.6)_{10}$

$= (11111010.1001)_2$

ii. (EF.2)₁₆

= (1110 1111.0010)₂

Q4. Perform the following arithmetic operations:

   i.   **(01101111)$_2$ + (00100111)$_2$**

   = (10010110)₂

   ii.   **(8A)$_{16}$ - (2B)$_{16}$**

   = (5F)₁₆

   iii.   **(2F)$_{16}$ * (15)$_{16}$**

   = (3DB)₁₆

Q5. Fill in the Spaces: (Show all work needed to obtain your answer)

   a. The largest decimal value that can be expressed using 4 binary integer digits and 4 binary fractional digits is $=2^4-2^{-4}=15.9375.$

   b. The number **59** is represented in **BCD** as 0101 1001.

   c. Given that an 8-bit register stores the ASCII code of a character in the least significant 7 bits and a parity bit in the most significant bit. Assuming that the register contains the hexadecimal value **C5** representing a character, the character stored in the register is E and the parity used is even i.e. even or odd parity). Note that the ASCII code of character 'A' is 41h and the ASCII code of character 'a' is 61h.