**Name: KEY**                                                           **Id#**

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**COE 202, Term 121**
**Digital Logic Design**

**Quiz# 1**

Date: Wednesday, Sep. 19

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**Q1.** Assume that a signal has a range of 0 to 3 volts. Suppose that we need to quantize the signal into a digital signal using only 4 different values. Determine these values and the maximum quantization error.

The gap between the values is 3/4=0.75.
The maximum quantization error is 3/8=0.375.

The values are: 0.375, 1.125, 1.875, 2.625

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

    i.   $(11101110.101)_2$

       $= 238.625$

    ii.  $(2A.48)_{16}$

       $= 42.28125$

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

i. $(1010.7)_{10}$

$= (1111110010.1011)_2$

$= (3F2.B)_{16}$

ii. $(731.56)_8$

$= (111011001.101110)_2$

$= (1D9.B8)_{16}$

**Q4.** Perform the following arithmetic operations:

i. $(10011101)_2 + (01010111)_2$

$= 11110100$

ii. $(CA)_{16} - (AF)_{16}$

$= 1B$

**Q5.** Determine, in **binary, hexadecimal** and **decimal**, the *smallest* number and the *largest* number that can be stored in an **8-bit** register.

| Base | Decimal | Binary | Hexadecimal |
|---|---|---|---|
| **Smallest** | 0 | 00000000 | 00 |
| **Largest** | $2^8-1=255$ | 11111111 | FF |

**Q6.** Assuming that an 8-bit register contains the hexadecimal value C6 representing a character, determine the character stored and type of parity used (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.

C6 = **1**100 0110

Parity is even. ASCII code without parity bit is 0100 0110 = 46. Thus, character stored is 'F'.