Name: KEY Id#

COE 202, Term 131

Digital Logic Design

Quiz# 1

Date: Thursday, Sep. 19

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# **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 **5** different values. Determine these values and the maximum quantization error. How many bits are needed to transmit one of these 5 values?

# Step = 10/5 = 2 Maximum quantization error = step/2=1

Values: 1, 3, 5, 9

Since we have 5 values, it is sufficient to have 3 bits to encode them.

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

## (11111100.101)2

## = 252.625

## (2A.4)16

# 

= 42.25

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

## (160.1875)10

## =(10100000.0011)2 = (A0.3)16

## (57.33)8

## =(101 111.011011)2 = (2F.6C)16

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

## (01101111)2 + (00111111)2

= (1010 1110)2

## (A0)16 - (99)16

=(07)16

## (5A)16 \* (12)16

=(654)16

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

1. In **binary** system, the largest decimal value that can be expressed using **4** integral digits and **2** fractional digits is =(1111.11)2=(15.75)10.
2. Representing the number **95** in **BCD** requires a minimum of \_\_\_\_\_8\_\_\_\_\_\_\_\_(how many) bits.
3. 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 **C6** representing a character, the character stored in the register is \_\_\_F\_\_\_ 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.