

Name: KEY

Id#

COE 202, Term 112
Digital Logic Design

Quiz# 1

Date: Saturday, Feb. 11

Q1. Assume that a signal has a range of 0 to 10 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.

$$\text{Step} = 10/4 = 2.5$$

$$\text{Maximum quantization error: } 10/8 = 1.25$$

The four values are: 1.25, 3.75, 6.25, 8.75

Q2. Determine the decimal value of the following numbers:

i. $(11110101.011)_2$
 $= 245.375$

ii. $(3E.8C)_{16}$
 $= 62.546875$

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

i. $(500.6)_{10}$
 $= (111110100.1001)_2$
 $= (1F4.9)_{16}$

$$\begin{aligned}
 \text{ii. } & (654.37)_8 \\
 & = (110101100.011111)_2 \\
 & = (1AC.7C)_{16}
 \end{aligned}$$

Q4. Perform the following arithmetic operations:

i. $(11001111)_2 + (00111011)_2$

$$\begin{array}{r}
 11001111 \\
 + 00111011 \\
 \hline
 00001010 \quad \text{there will be a carry out}
 \end{array}$$

ii. $(E1)_{16} - (5F)_{16}$

$$\begin{array}{r}
 E1 \\
 - 5F \\
 \hline
 82
 \end{array}$$

Q5. Determine, in binary, hexadecimal and decimal, the *smallest* number and the *largest* number that can be stored in a 12-bit register.

	Decimal	Binary	Hexadecimal
Largest	2095	111111111111	FFF
Smallest	0	000000000000	000

Q6. Assuming that an 8-bit register contains the hexadecimal value E3 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.

1110 0011 \Rightarrow Parity is odd and ASCII code of character is 0110 0011='c'