KFUPM - COMPUTER ENGINEERING DEPARTMENT

EE-200 – Digital Logic Circuit Design (section 05)

SOLUTION for Assignment # 1: Due Sunday Sept 13th, 2015 – in class.

Problem	Points	Score
1	10	
2	10	
3	10	
4	10	
5	10	
6	20	
7	10	
8	20	
9	20	
10	20	
Total	140	

Problem 1 (10 points): The solutions to the quadratic equation $x^2 - 13x + 32 = 0$ are $x = 5$ and $x = 4$. What is the base for the numbers?

Problem 2 (10 points): Convert the following numbers into decimals:

a) $(324)_5$, and
b) $(89A)_{12}$

Problem 3 (10 points): Computer the exact number of BITS in a system that contains:

a) 32 Kbytes
b) 16 Mbytes
c) 4 Gbytes

Problem 4 (10 points): Determine the base of the number system in each case for the following operations to be correct:

a) 30 x 3 + 2 = 142
b) 80/8 = 10

Problem 5 (10 points): Convert the following unsigned binary numbers to decimal: (a) 11.1001, and (b) 1110.01. Explain why the decimal value for the number (b) is 4 times that of the decimal value for the number (a).

Problem 6 (20 points): Answer the following questions:

a) Find the 16's complement of the number C80A
b) Convert the hex number C80A to binary
c) Compute the 1's complement for binary number in (b)
d) Compute the 2's complement for the binary number (b)
e) State your observations – Does this work for octal system too? Give an example.

Problem 7 (10 points): The following decimal numbers are shown in sign-magnitude form: +9150 and +1258. Convert them to 10's complement form and perform the following operations. Assume a minimum number of digits such that all answers are valid:

a) (+9150) + (+1258)
b) (+9150) + (-1258)
c) (-9150) + (+1258)
d) (-9150) + (-1258)

Problem 8 (20 points): Consider the decimal number 76351.

a) Represent the number in BCD code
b) Represent the number in excess-3 code
c) Represent the number in 2421 code – Is the code unique?
d) Represent the number in 6311 code - Is the code unique?
e) Find the 9's complement of the number and express in 2421 code?
f) Compare results of parts (c) and (e) – state your observation regarding code 2421.

Problem 9 (20 points): Consider the two decimal numbers (+51) and (+37). Using r = 2, n = 8, and **2's complement** perform the binary equivalent of the following operation – in each operation convert the numbers to decimal to verify your answer

a) (+51) + (+37)
b) (+51) + (-37)
c) (-51) + (+37)
d) (-51) + (-37)

Problem 10 (20 points): Consider the two decimal numbers (+51) and (+37). Using r = 2, n = 8, and **1's complement** perform the binary equivalent of the following operation – in each operation convert the numbers to decimal to verify your answer

a) (+51) + (+37)
b) (+51) + (-37)
c) (-51) + (+37)
d) (-51) + (-37)