Introduction Digital Computing
Homework 2 – Logic Gates and Waveforms

Student's Name: _____

Instructions:
- You have to show all work in order to receive full credit


1. The number of output combinations for a 6-input logic gate is: _____

2. A owner of a house wants to design a lamp that works with the following specifications:
   - A lamp in a room is operated from two switches, one at the *front* and one at the *back* of the room.

   - The lamp is to be ON if both of the switches are ON.

   - The lamp is to be OFF if one of the switches is OFF.

   According to the description:

   a) Create a truth table, with all possible inputs combination, that represents the description above

Input		Output
Front switch	**Back switch**	**Lamp**

   b) According to the truth table in question a), the best logic gate to perform the operation is: _____

3. If four NOT gates are connected in series and the input to the first gate is a **HIGH** (1), the output of the **third** gate is: _____ and the **forth** gate is: _____
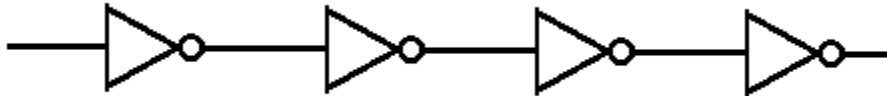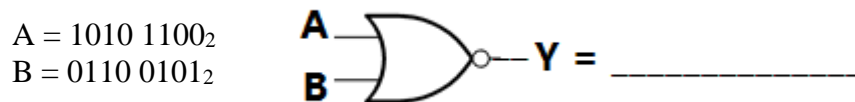

4. What is the truth table for an **NAND** gate is:

Truth Table 2-input NAND gate		
Inputs		**Output**
A	**B**	**Y**
0	0	
0	1	
1	0	
1	1	

5. Given the input A, find the output Y of the given gate:

A = 1001110_2 Y = _____

6. Given the input A and B, find the output Y of the given gate:

A = $0100\ 1011_2$
B = $1110\ 1101_2$

  Y = _____

A = $1010\ 1100_2$
B = $0110\ 0101_2$

  Y = _____

A = $1100\ 1100_2$
B = $1010\ 0011_2$

  Y = _____

A = $1010\ 1100_2$
B = $0110\ 0101_2$

  Y = _____

A = $0100\ 1011_2$
B = $1110\ 1101_2$

  Y = _____

A = $1010\ 1100_2$
B = $0110\ 1101_2$

  Y = _____

7. Given the input waveform A and B, find the output Y of the given logic gate
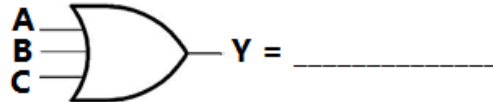
  Y = _____
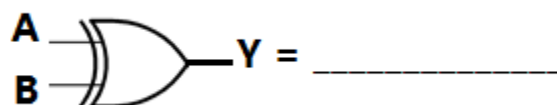
A

B

Y

8. Given the input waveform A, B, and C, find the output Y of the given logic gate
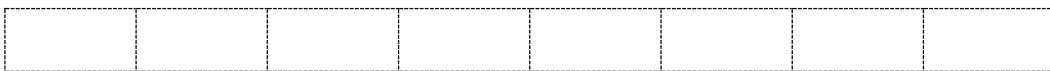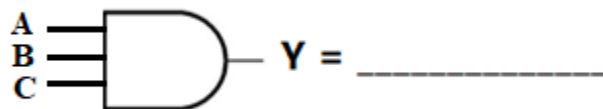
A
B ⟫— Y = _____
C

A

B

C

Y

9. Given the input waveform A, B, and C, find the output Y of the given logic gate
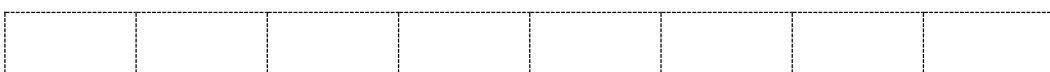
A
B ⊐— Y = _____
C

A

B

C

Y

------------------------- Homework 2 Ends Here -------------------------