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

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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.

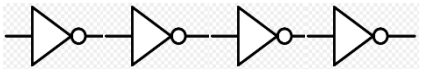
   According to the description:

   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: _____

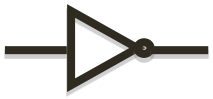
3. If four NOT gates are connected in series and the input to the first gate is a **HIGH** (1), the output of the **third** gate is: _____ and the **forth** gate is: _____



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

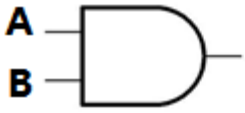
Truth Table 2-input NAND gate		
Inputs		**Output**
A	**B**	**Y**
0	**0**	
0	**1**	
1	**0**	
1	**1**	

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:

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



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

_____

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

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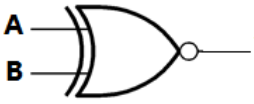
$A = 1010\ 1100_2$
$B = 0110\ 0101_2$

_____

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



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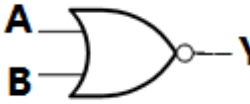
$A = 1010\ 1100_2$
$B = 0110\ 1101_2$

_____

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



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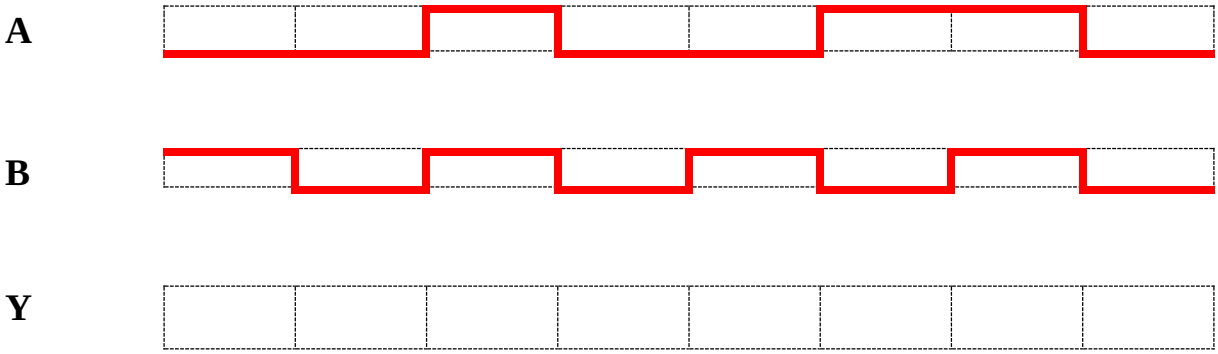
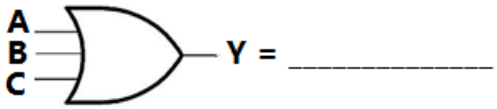
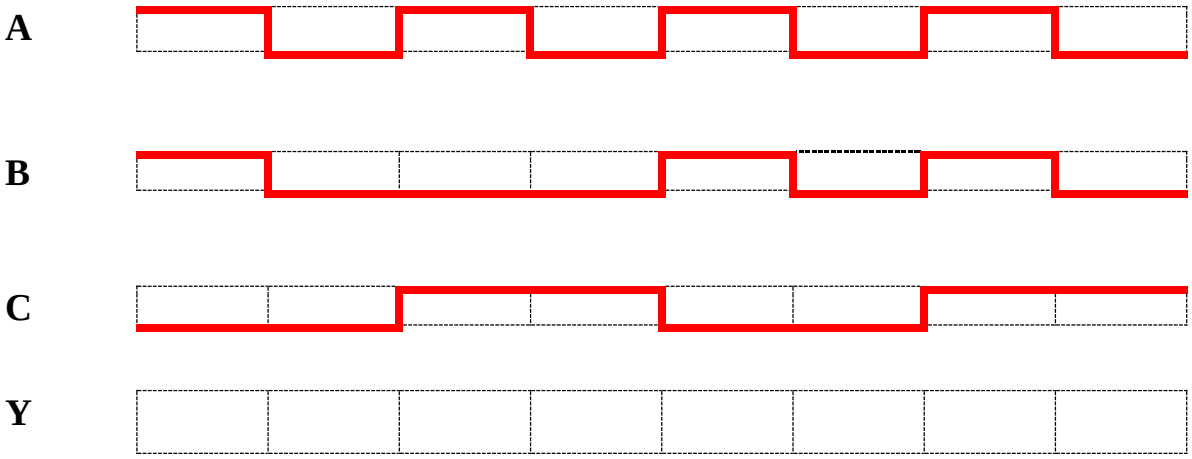
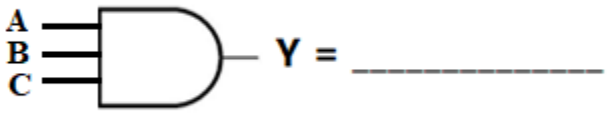


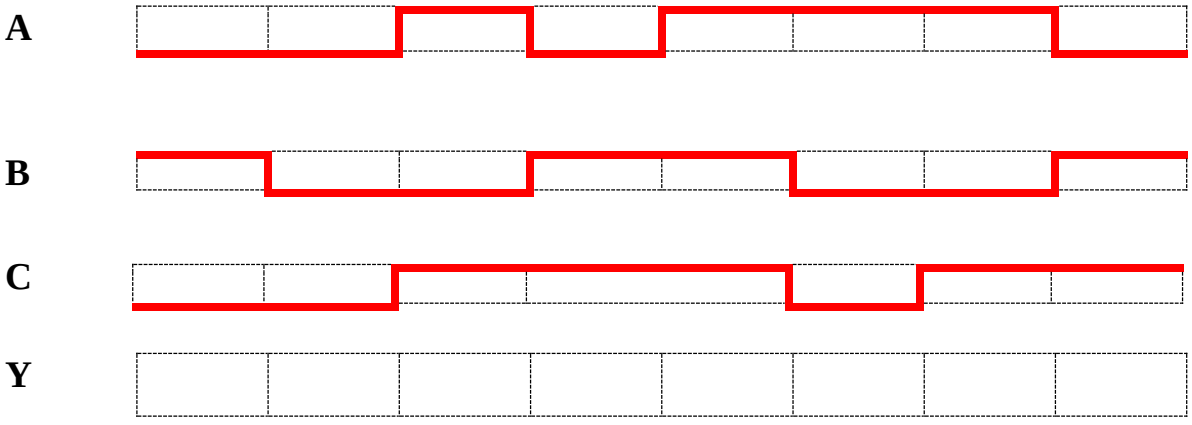
8. Given the input waveform A, B, and C, find the output Y of the given logic gate





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





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