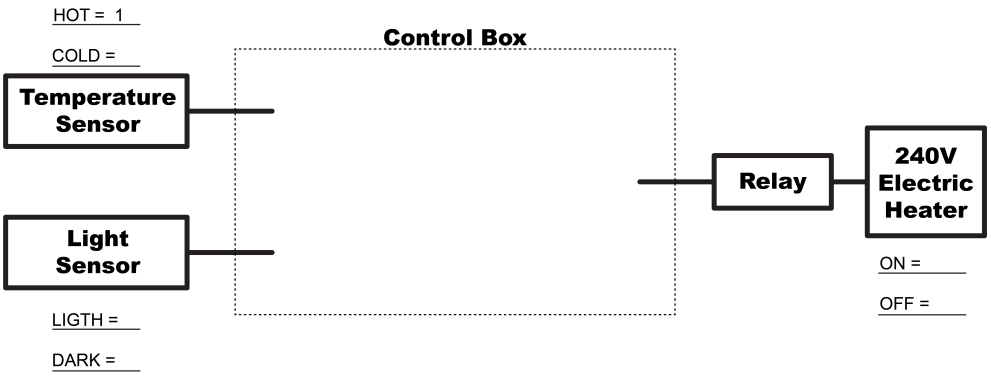
Name:
Teacher:
Class:
Date:

Logic Gate Applications - Practice Problems Set 5:

1. A public pool installs an automatic heater to keep the swimming pool at a comfortable temperature at all times. The micro control has 2 seasons, a temperature sensor and a light sensor. The temperature sensor has an output of **1** when it is **HOT** and **0** when **COLD**, and the light sensor has an output of **1** when it is **LIGHT** out and **0** when it is **DARK**. An output value of **1** with turn the heater **ON**.



a) Underline the two types of logic gates that should be used inside the control box.

AND NOT OR

b) Complete the diagram to show how the two logic gates are used to connect the input sensors to the relay. Use the correct symbol for each logic gate.

c) What type of electrical device or component could be used as an input sensor that would respond to temperature?

   i. Component Name: _____

   ii. Draw the symbol for the component:

d) What type of electrical device or component could be used as an input sensor that would respond to light?

   i. Component Name: _____

   ii. Draw the symbol for the component:

e) Complete the truth table for the control system.

Temperature Sensor	Light Sensor	Heater
0	**0**	
0	**1**	
1	**0**	
1	**1**	

f) Why must a really be used to operate the heater?

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g) Modify the design of this circuit to add a manual override switch. The modified circuit still needs to turn the heater on automatically based on the original conditions, but also needs to allow an operator to turn on heater manually.

Draw the circuit here:

h) Explain how this circuit works.

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