Worksheet for Redox and Organic Reactions

Name__________________________  Partner’s Name__________________________

1. On the periodic table below, draw an arrow in the direction of increasing reactivity of the elements (Li, Na, and K) with water. Does the direction of reactivity change for Mg and Ca? The reaction for this demo is a redox. Write out the reaction. Chemically, explain what happened to the Mg in hydrochloric acid.

2. On the periodic table above, draw an arrow in the direction of increasing reactivity of the elements (Na and Mg or K and Ca) with water.

3. A chemical equation is written for the reaction of calcium with the water. Explain what you saw and tell me what it was due to based on the equation.

\[
\text{Ca} + 2 \text{H}_2\text{O} \rightarrow \text{H}_2 + \text{Ca(OH)}_2
\]

4. Normally when you write a combustion reaction, you react the material with oxygen gas. Magnesium has such an overwhelming propensity for oxygen that it steals it from the very stable CO\textsubscript{2} molecule. Write a reaction for what happened in the burning of the Mg ribbon. Was there any evidence of your products?
5. Sucrose is C\textsubscript{12}H\textsubscript{22}O\textsubscript{11}. How many water molecules are contained in each molecule of sucrose? Why do you suppose they call sucrose a carbohydrate?

6. Sulfuric acid is well known for its ability to suck water out of things. Write a reaction for what happened to the sucrose.

7. The reaction taking place is as follows:
   \[ \text{H}^+ + \text{Cr}_2\text{O}_7^{2-} + \text{C}_2\text{H}_5\text{OH} \rightarrow \text{Cr}^{3+} + \text{C}_2\text{H}_4\text{O} + \text{H}_2\text{O} \]
   Break the reaction down into two half reactions and balance the reaction.

8. The alcohol that you are using is 95%. A typical “hard” (whiskey, vodka, gin, etc.) liquor is 90 - 100 proof (i.e., 47.5%). If you used 2 drops of 95% alcohol, how many drops of hard liquor would be required? How many drops of beer that is 5% alcohol or wine that is 12% would be required? Show your calculations.