Name: _____

Date: _____ Per: _____

Chemistry
Conservation of Mass WS

I. *Using the Law of Conservation of Mass, write out each of the following reactions using chemical symbols and then complete the calculations, showing all work and circling your answers:*

1. A reaction is carried out where 12.1 g of magnesium (Mg) is burned in the presence of oxygen (O_2) to form 20.1 g of magnesium oxide (MgO). How much oxygen was reacted?

2. You perform a reaction in which 60.0 g of calcium (Ca) is reacted with carbonic acid (H_2CO_3) to form 150.2 g of calcium carbonate ($CaCO_3$) and some hydrogen gas (H_2). If you only want to produce 45.0 g of calcium carbonate, how much calcium will you need?

3. Octane (C_8H_{18}), a major component of gasoline, combines with oxygen (O_2) in air to form carbon dioxide (CO_2) and water (H_2O). Your calculations show that 106. g of octane will burn to produce 44 g of carbon dioxide. If your car burns 4000. g (4 kg) of octane, how much carbon dioxide will be formed?

4. When fuel is burned, the carbon (C) in the fuel reacts with oxygen (O_2) in the air to form, among other things, carbon monoxide (CO). If 2.4 g of carbon reacts to form 5.6 g of carbon monoxide, how many grams of oxygen are reacted?

5. Hydrogen (H_2) reacts with oxygen (O_2) to form water (H_2O) and a large amount of energy. If 48 g of oxygen can form 54 g of water, how many grams of hydrogen are necessary to complete this reaction?

6. Cyanide ion (CN^-), a potent poison, is formed by the combination of carbon (C) with nitrogen (N_2). An experiment is done to show that 2.4 g of carbon can react with 2.8 g of nitrogen to form 5.2 g of cyanide. If you had 415 g of carbon and a large amount of nitrogen gas leaked from a container and reacted with all of the carbon, how many grams of cyanide could potentially be formed? *(Hint: write out the entire equation first and then set up a ratio between amounts of carbon.)*

7. Methane gas (CH_3), a very common organic compound, is a side-product of carbon (C) in food reacting with hydrogen (H_2) during digestion. A laboratory experiment shows that 60 g of carbon will react with 5 g of hydrogen to form 65 g of methane. If a cow eats a large amount of grass, and 3.5 kg of the carbon is turned into methane gas, how much methane is formed? *(Hint: convert kilograms into grams first!)*