Chem 1A Review

1. a. Salt is sodium chloride, NaCl. What type of element is sodium? What type of element is chlorine?

b. What type of compound is salt (NaCl)? What type of compound is sugar (C₁₂H₂₂O₁₁)?

c. You need an electrolyte for a battery. Would you use sugar or salt? Draw a picture to support your answer.

2. One way to make sodium ion is to add sodium metal to water. In other words, sodium metal reacts with water to form sodium hydroxide and hydrogen gas.

a. Write a balanced chemical equation and net ionic equation that represents this reaction.

b. Why do chemical equations need to be balanced?

3. You can test the amount of salt in water by adding silver nitrate (AgNO₃). Silver chloride precipitate forms. In other words, silver nitrate reacts with salt to form silver chloride and sodium nitrate.

a. Write a balanced chemical equation and net ionic equation that represents this reaction.

b. You measure the mass of silver chloride precipitate that forms. How can you separate the silver chloride precipitate from the other substances?

c. How can you determine the mass of NaCl from the mass of AgCl? Set up a calculation to support your answer.

4. You are making pancakes and you used 0.5 tsp of salt (3 g of NaCl) and 1 Tbsp of sugar (36 g of $C_{12}H_{22}O_{11}$) in your recipe. Are there more particles (atoms or ions or molecules) of salt or sugar? Support your answer with a calculation.

5. Approximately 200 billion tons of carbon from CO_2 enter the earth's atmosphere each year from all sources (1/2 from oceans, $\frac{1}{2}$ from volancoes and decaying plants). About 6 billion tons of carbon from CO_2 come from human activity. The CO_2 that enters the atmosphere is recycled by terrestrial plant life and oceans. What is the mass in tons of CO_2 that enter the earth's atmosphere each year from all sources?

6. a. Write a chemical equation that represents the combustion of gasoline (octane (C_8H_{18})). How much CO_2 is produced when 1 gallon (3800 liters) of octane (C_8H_{18}) burns? b. Calculate the theoretical yield of CO_2 .

7. a. CO_2 absorbs IR radiation and re-emits IR, which makes it a greenhouse gas. Draw an energy level diagram that shows how CO_2 produces IR radiation.

b. Draw the Lewis structure of CO₂. Is polar or non-polar?

c. Is CO_2 soluble in water? Are the oceans a good CO_2 sink?