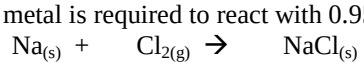
Name: _____ **20 Pts.**

Honors Chemistry Practice: Stoichiometry

All given equations are unbalanced!/ You may need to write a balanced equation to solve

1. What mass of sodium metal is required to react with 0.950L of chlorine gas at STP?



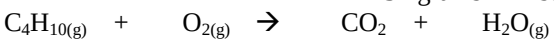
$Na_{(s)} + Cl_{2(g)} \rightarrow NaCl_{(s)}$

2. How many grams of lead could be produced from 30.0 grams of aluminum?

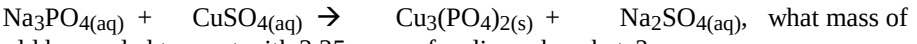
$Al_{(s)} + Pb(NO_3)_{2(aq)} \rightarrow Pb_{(s)} + Al(NO_3)_{3(aq)}$

3. Determine the volume of CO_2 gas produced when 25 lbs. Of butane (C_4H_{10}) gas combusts at STP.

454 grams = 1 lbs.



$C_4H_{10(g)} + O_{2(g)} \rightarrow CO_2 + H_2O_{(g)}$

4. For the reaction: 

$Na_3PO_{4(aq)} + CuSO_{4(aq)} \rightarrow Cu_3(PO_4)_{2(s)} + Na_2SO_{4(aq)}$, what mass of copper(II) sulfate would be needed to react with 3.35 gram of sodium phosphate?

5. Potassium chlorate decomposes into potassium chloride and oxygen gas upon strong heating. If 2.00 grams of potassium chlorate is completely decomposed, what volume of oxygen gas would be produced at STP?

6. Heated iron fillings are added to a flask of chlorine gas. After a burst of light iron(III) chloride is formed on the bottom of the flask. How many grams of ferric chloride could be produced from 0.855 liters of chlorine gas at STP?

7. According to the reaction: $Fe^{2+}_{(aq} + 2\ OH^{-}_{(aq)} \rightarrow Fe(OH)_{2(s)}$, what mass of sodium hydroxide would completely react with a solution that contains 0.224 grams of iron(II) chloride?

8. A solution of HNO_3 is prepared to be 0.03356 g/ml. How many ml of this nitric acid mixture is needed to completely react with 5.000 grams of magnesium hydroxide?

9. Chloride ions, Cl^-, are found in all natural water systems. Ag^+ ions will readily precipitate the chloride ion out as silver chloride as $Ag^{+}_{(aq)} + Cl^{-}_{(aq)} \rightarrow AgCl_{(s)}$. If a 500.0 liter sample of water is known to be 0.335% Cl- by mass, what mass of silver nitrate would be required to precipitate all of this chloride? What mass of silver chloride would be produced? (Assume same density as water, 1 g/ml and that 1L = 1000 ml)

10. Combustion fuels often contain sulfur which contribute to air pollution as: $S + O_2 \rightarrow SO_2$. Suppose such a fuel is 0.0225% S by mass and ha a density of 0.88 g/ml. What mass of SO2 is released when 100.0 gallons of this fuel is burned? (1 gallon = 3.785 liters)

11. A 6.28 gram sample of a mixture containing only NaCl and $BaCl_2$ is added to water and allowed to dissolve. To this solution an excess amount of sulfuric acid is added. A white precipitate is formed. This precipitate is filtered, dried and massed to be 2.60 grams. Write a balanced equation for the reaction that produced a precipitate and determine the percent composition of this mixture. *(No it is not 2.60/6.28x100= <u>41.4%</u>!)*

12. Potassium metal reacts violently with all of the halogens illustrated as: $2K + X_2 \rightarrow 2KX$, where "X" is the halogen. If 0.513 grams of potassium produces 1.564 grams of KX, what is the identity of "X"?