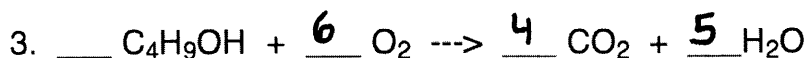
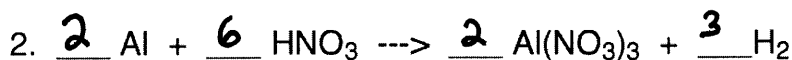


## WS 4.7 - Review

Balance these following chemical reactions:



Use dimensional analysis to determine the following:

4. How many moles are in 3.98 g of CuSO<sub>4</sub>?

$$3.98 \text{ g} \times \frac{1 \text{ mol}}{159.5 \text{ g}} =$$

Ans 0.0250 mol

5. How many molecules are in 0.1029 moles of He?

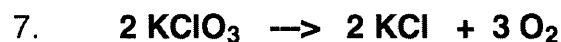
$$0.1029 \text{ mol} \times \frac{6.02 \times 10^{23} \text{ 'cules}}{1 \text{ mol}} =$$

Ans  $6.19 \times 10^{22}$  'cules

6.  $8.4 \times 10^{24}$  boron atoms weigh how many grams?

$$8.4 \times 10^{24} \text{ atoms} \times \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ atoms}} \times \frac{10.8 \text{ g}}{1 \text{ mol}} =$$

Ans 150 g



How many grams of O<sub>2</sub> will be produced from 55.4 g of KClO<sub>3</sub>?

$$55.4 \text{ g} \times \frac{1 \text{ mol KClO}_3}{122.5 \text{ g}} \times \frac{3 \text{ mol O}_2}{2 \text{ mol KClO}_3} \times \frac{32.0 \text{ g}}{1 \text{ mol O}_2} =$$

Ans 21.7 g



a. Starting with 30.1 g of Na and 22.4 g of Cl<sub>2</sub>, how many grams of NaCl can be made?

$$30.1 \text{ g Na} \times \frac{1 \text{ mol Na}}{23.0 \text{ g}} \times \frac{2 \text{ mol NaCl}}{2 \text{ mol Na}} \times \frac{58.5 \text{ g}}{1 \text{ mol NaCl}} = 76.6 \text{ g}$$

$$22.4 \text{ g Cl}_2 \times \frac{1 \text{ mol Cl}_2}{71.0 \text{ g}} \times \frac{2 \text{ mol NaCl}}{1 \text{ mol Cl}_2} \times \frac{58.5 \text{ g}}{1 \text{ mol NaCl}} = \boxed{36.9 \text{ g}}$$

Smaller

Ans 36.9 g

b. Afterwards, 17.1 grams of NaCl are produced by the reaction. What is the % yield?

$$\left( \frac{17.1 \text{ g}}{36.9 \text{ g}} \right) \times 100 =$$

Ans 46.3 %

9a. A compound is 38.7% C, 16.1% H, and rest is N. What is its empirical formula?

$$100 - 38.7 - 16.1 = 45.2\% \text{ N}$$

$$38.7 \text{ g C} \times \frac{1 \text{ mol}}{12.0 \text{ g}} = 3.23 \text{ mol C}$$

$$16.1 \text{ g H} \times \frac{1 \text{ mol}}{1.0 \text{ g}} = 16.1 \text{ mol H}$$

$$45.2 \text{ g N} \times \frac{1 \text{ mol}}{14.0 \text{ g}} = 3.23 \text{ mol N}$$

$$\begin{array}{ccc} \text{C} & \text{H} & \text{N} \\ \frac{3.23}{3.23} & \frac{16.1}{3.23} & \frac{3.23}{3.23} \end{array} = \rightarrow$$

Ans C<sub>1</sub>H<sub>5</sub>N<sub>1</sub>

9b. The compound above has a molecular weight of 124 g/mol, determine its molecular formula.

$$\text{CH}_5\text{N} = 31.0 \text{ g/mol}$$

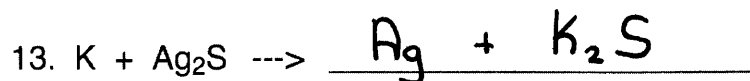
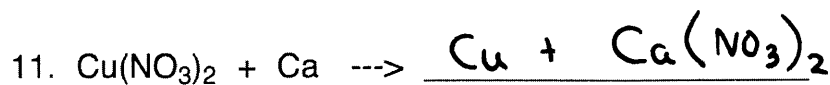
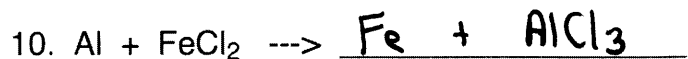
$$\frac{124 \text{ g/mol}}{31.0 \text{ g/mol}} = \boxed{4}$$

Ans C<sub>4</sub>H<sub>20</sub>N<sub>4</sub>

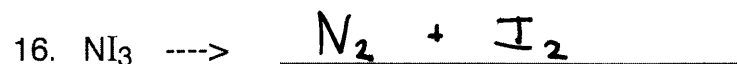
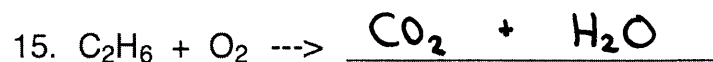
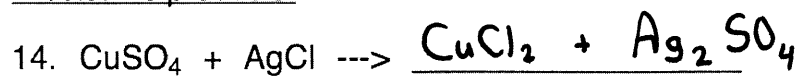
multiply empirical formula  
by 4

Use the activity series (at right) to predict whether the following reactions will occur...

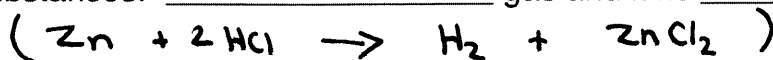
If **YES**, then write the products -- If **NO**, then write 'N. R.' (no reaction)



Predict the products:



17. In the penny lab, you used an acid called HCl to react with a metal called Zn which was inside the penny. This single replacement reaction produced two substances: H<sub>2</sub> gas and zinc chloride.



18. Suppose you made a Micro-Rocket with butane (C<sub>4</sub>H<sub>10</sub>) as the fuel.

What is the correct ratio of fuel to 2 C<sub>4</sub>H<sub>10</sub> + 13 O<sub>2</sub> → 8 CO<sub>2</sub> + 10 H<sub>2</sub>O

the correct ratio of butane to O<sub>2</sub> is: 2:13

|    |
|----|
| Li |
| K  |
| Ca |
| Na |
| Mg |
| Al |
| Mn |
| Zn |
| Cr |
| Fe |
| Cd |
| Co |
| Ni |
| Sn |
| Pb |
| H  |
| Cu |
| Hg |
| Ag |
| Pt |
| Au |