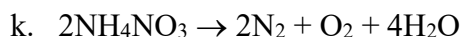
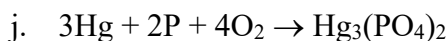
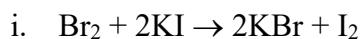
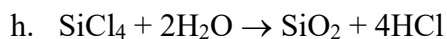
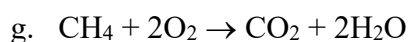
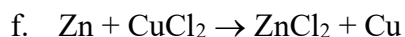
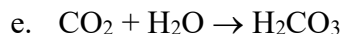
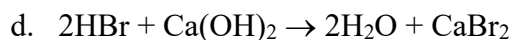
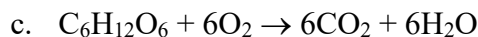
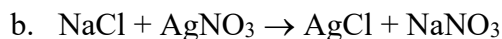


## Chemistry Module 5 Homework

### Assignment #1

Read the first 15 pages of Module 5.

1. Classify the following reactions as decomposition, formation, single replacement, double replacement, or complete combustion or neither:



2. Write the balanced chemical equation for the decomposition of  $\text{NaHCO}_3$ .
3. Write the balanced chemical equation for the formation of  $\text{K}_2\text{CrO}_4$ .
4. Write the balanced chemical equation for the complete combustion of decane,  $\text{C}_{10}\text{H}_{22}$ .
5. Find the mass in amu of:
- 50 lithium atoms
  - 3 silver atoms
  - one uranium atom?
6. What is the mass of an iron atom:
- in amu?
  - in grams?
7. What is the mass of a  $\text{NaHSO}_4$  molecule in
- amu?
  - grams?
8. Honors: Determine the formula weights of the following compounds:
- $\text{NH}_4\text{NO}_3$
  - $\text{FeSO}_3$
  - $\text{Al}(\text{C}_2\text{H}_3\text{O}_2)_3$
- a. Honors – Calculate the percentage mass of carbon in acetylene,  $\text{C}_2\text{H}_2$ , a gas used in welding.
9. Honors - Which of the following compounds has the highest iron content?
- $\text{Fe}_2\text{O}_3$
  - $\text{FeCl}_3$
  - $\text{FeO}$

## Chemistry Module 5 Homework

### Assignment #2

Read the rest of Module 5.

10. What is Avogadro's number (the actual number)?
11. What does Avogadro's number represent?
12. Multiply the number of moles by Avogadro's Number to find the number of atoms or molecule.

|    | Substance                      | Number of moles | Avogadro's Number | Number of Atoms or Molecules |
|----|--------------------------------|-----------------|-------------------|------------------------------|
| a. | Ag                             | 2.0 moles       | x                 | =                            |
| b. | CaF <sub>2</sub>               | 15.3 moles      | x                 | =                            |
| c. | H <sub>2</sub> SO <sub>4</sub> | 23.0 moles      | x                 | =                            |

13. Find the molar mass of the substance by adding up the masses from the periodic table. Convert from moles of a substance to grams by multiplying by its molecular mass.

### Moles to Grams → Multiply!

|    | Substance                         | Moles of the Substance                          | Molar Mass | Grams of the Substance |
|----|-----------------------------------|-------------------------------------------------|------------|------------------------|
| a. | MgCl <sub>2</sub>                 | 3.0 moles of MgCl <sub>2</sub>                  | x          | =                      |
| b. | Al <sub>2</sub> O <sub>3</sub>    | 1.8 moles of Al <sub>2</sub> O <sub>3</sub>     | x          | =                      |
| c. | Ca(NO <sub>3</sub> ) <sub>2</sub> | 49.0 moles of Ca(NO <sub>3</sub> ) <sub>2</sub> | x          | =                      |

14. Find the molar mass of the substance by adding up the masses from the periodic table. Convert from grams of a substance to moles by dividing by its molecular mass.

### Grams to Moles → Divide

|    | Substance                                     | Grams of the Substance                                      | Molar Mass | Moles of the Substance |
|----|-----------------------------------------------|-------------------------------------------------------------|------------|------------------------|
| a. | NaCl                                          | 42.0 grams of NaCl                                          | ÷          | =                      |
| b. | SO <sub>2</sub>                               | 31.5 grams of SO <sub>2</sub>                               | ÷          | =                      |
| c. | C <sub>4</sub> H <sub>10</sub> O <sub>6</sub> | 18.0 grams of C <sub>4</sub> H <sub>10</sub> O <sub>6</sub> | ÷          | =                      |

15. Divide the number of atoms or molecules by Avogadro's number to calculate the number of moles. Find the molar mass of the substance by using the periodic table. Calculate the mass by multiplying the number of moles by the molar mass.

|    | Substance         | Number of atoms or molecules    | Number of moles | Molar mass | Mass in grams |
|----|-------------------|---------------------------------|-----------------|------------|---------------|
| a. | Ca                | $8.51 \times 10^{24}$ atoms     |                 |            |               |
| b. | RbNO <sub>3</sub> | $3.74 \times 10^{21}$ molecules |                 |            |               |
| c. | AgCl <sub>2</sub> | $4.7 \times 10^{18}$ molecules  |                 |            |               |

16. What do the large numbers in front of the molecules in a chemical equation stand for: (Choose one)

- the number of grams of each substance, or
- the number of moles of each substance, or
- the number of amu's of each substance.

17. Barium oxide, BaO, decomposes.

- Write the balance equation for the reaction.
- If 2 moles of barium oxide decompose, how many moles of oxygen are produced?
- If 10 moles of barium oxide decompose, how many moles of oxygen are produced?
- If 3.8 moles of barium oxide decompose, how many moles of oxygen are produced?

18. Rust (Fe<sub>2</sub>O<sub>3</sub>) is made up of iron and oxygen (O<sub>2</sub>).

- Write the balanced equation for the formation of rust.
- How many moles of oxygen are needed to make 2 moles of rust?
- How many moles of oxygen are needed to make 8 moles of rust?
- How many moles of oxygen are needed to make 11.5 moles of rust?

19. Honors: A sample of Fe<sub>2</sub>O<sub>3</sub> weighs 560.0 kg. When the ore is heated, it decomposes into pure iron and oxygen gas. What mass of pure iron (in kilograms) will this sample produce?