

## Chemical Reactions Part #1 Review

### Average Atomic Mass

1. Rubidium is a soft, silvery-white metal that has two common isotopes,  $^{85}\text{Rb}$  and  $^{87}\text{Rb}$ . If the abundance of  $^{85}\text{Rb}$  is 72.2% and the abundance of  $^{87}\text{Rb}$  is 27.8%, what is the average atomic mass of rubidium?
2. Uranium is used in nuclear reactors and is a rare element on earth. Uranium has three common isotopes. If the abundance of  $^{234}\text{U}$  is 0.01%, the abundance of  $^{235}\text{U}$  is 0.71%, and the abundance of  $^{238}\text{U}$  is 99.28%, what is the average atomic mass of uranium?
3. Titanium has five common isotopes:  $^{46}\text{Ti}$  (8.0%),  $^{47}\text{Ti}$  (7.8%),  $^{48}\text{Ti}$  (73.4%),  $^{49}\text{Ti}$  (5.5%),  $^{50}\text{Ti}$  (5.3%). What is the average atomic mass of titanium?
4. Copper used in electric wires comes in two flavors (isotopes):  $^{63}\text{Cu}$  and  $^{65}\text{Cu}$ .  $^{63}\text{Cu}$  has an atomic mass of 62.9298 amu and an abundance of 69.09%. The other isotope,  $^{65}\text{Cu}$ , has an abundance of 30.91%. The average atomic mass between these two isotopes is 63.546 amu. Calculate the actual atomic mass of  $^{65}\text{Cu}$ .
5. Magnesium consists of three naturally occurring isotopes. The percent abundance of these isotopes is as follows:  $^{24}\text{Mg}$  (78.70%),  $^{25}\text{Mg}$  (10.13%), and  $^{26}\text{Mg}$  (11.7%). The average atomic mass of the three isotopes is 24.3050 amu. If the atomic mass of  $^{25}\text{Mg}$  is 24.98584 amu, and  $^{26}\text{Mg}$  is 25.98259 amu, calculate the actual atomic mass of  $^{24}\text{Mg}$ .

### Naming Compounds & Molar Masses

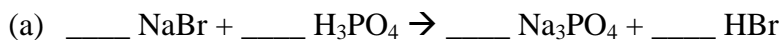
6. Name each of the following chemical compounds and list their molar masses to the nearest g/mol:
  - (a)  $\text{AgNO}_3$  \_\_\_\_\_ Mass = \_\_\_\_\_
  - (b)  $\text{PbSO}_4$  \_\_\_\_\_ Mass = \_\_\_\_\_
  - (c)  $\text{CoCl}_2$  \_\_\_\_\_ Mass = \_\_\_\_\_
  - (d)  $\text{Sn}(\text{CO}_3)_2$  \_\_\_\_\_ Mass = \_\_\_\_\_
7. Write the formulas of each of the following chemical compounds and list their molar masses to the nearest g/mol:
  - (a) copper (I) oxide \_\_\_\_\_ Mass = \_\_\_\_\_
  - (b) ammonium phosphate \_\_\_\_\_ Mass = \_\_\_\_\_

(c) vanadium (V) cyanide \_\_\_\_\_ Mass = \_\_\_\_\_

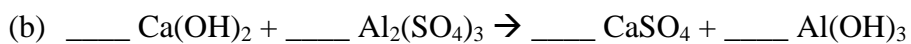
(d) platinum (IV) hydroxide \_\_\_\_\_ Mass = \_\_\_\_\_

### Balancing Equations and Type of Reaction

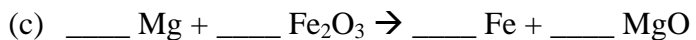
8. Balance the following equations and indicate the type of reaction taking place:



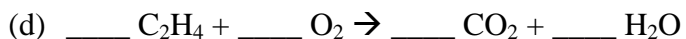
Type of reaction: \_\_\_\_\_



Type of reaction: \_\_\_\_\_



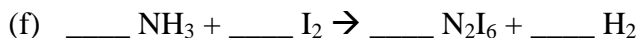
Type of reaction: \_\_\_\_\_



Type of reaction: \_\_\_\_\_



Type of reaction: \_\_\_\_\_



Type of reaction: \_\_\_\_\_



Type of reaction: \_\_\_\_\_

### **Molar Conversions**

9. How many grams does 0.500 moles of CuBr weigh?
10. How many molecules are there in 0.655 moles of C<sub>6</sub>H<sub>14</sub>?
11. How many moles are there in  $2.35 \times 10^{24}$  molecules of water?
12. How many grams does  $5.60 \times 10^{22}$  molecules of SiO<sub>2</sub> weigh?
13. How many molecules are there in 21.6 grams of CH<sub>4</sub>?

### **Calculations Involving Moles and Gases**

14. How many moles of gas does it take to occupy 120 L at a pressure of 2.3 atm and a temperature of 340 K?
15. If I have a 50 L container that holds 45 moles of gas at a temperature of 200 °C, what is the pressure inside the container?
16. It is not safe to put aerosol canisters in a campfire, because the pressure inside the canisters gets very high and they can explode. If I have a 1.0 L canister that holds 2 moles of gas, and the campfire temperature is 1400 °C, what is the pressure inside the canister?
17. How many moles of gas are in a 30 L scuba canister if the temperature of the canister is 300 K and the pressure is 200 atm?
18. I have a balloon that can hold 100 L of air. If I blow up this balloon with 3 moles of oxygen gas at a pressure of 1 atm, what is the temperature of the balloon?