

1.) Isopropanol, commonly known as rubbing alcohol, has a chemical formula of  $\text{C}_3\text{H}_7\text{OH}$ .

a.) Write the **balanced** chemical equation for the combustion of isopropanol.

b.) Calculate the grams of carbon dioxide produced when 345 mL of  $\text{C}_3\text{H}_7\text{OH}$  combusts, provided that the density of  $\text{C}_3\text{H}_7\text{OH}$  is  $0.786 \text{ g/cm}^3$ .

2.) An unknown element is a reddish liquid at room temperature and has a mass number of 80. If the element carries an anionic charge of 1, how many protons, neutrons, and electrons does one atom of this element contain?

3.) Name the following compounds appropriately.

a.)  $\text{Cs}_2\text{SO}_4$  \_\_\_\_\_

b.)  $\text{I}_2\text{Cl}_6$  \_\_\_\_\_

c.)  $\text{HNO}_2(\text{aq})$  \_\_\_\_\_

d.)  $\text{Cu}(\text{OH})_2$  \_\_\_\_\_

4.) Give the balanced ionic or molecular formulas for the following compounds.

a.) perchloric acid \_\_\_\_\_

b.) tetrasulfur dioxide \_\_\_\_\_

c.) zinc phosphate \_\_\_\_\_

d.) manganese(III) carbonate \_\_\_\_\_

5.) A compound contains 10.7% C, 46.4% Cr, and the rest as O by mass. It has a molecular weight of 112.0 g/mol. Determine its molecular formula and name it appropriately. (25 pts)

6.) Boron has two main isotopes:  $^{10}\text{B}$  and  $^{11}\text{B}$ . The  $^{10}\text{B}$  isotope has a mass of 10.012 amu while the  $^{11}\text{B}$  isotope is 11.009 amu, and an atomic mass of 10.811 amu. Determine the natural abundance of each isotope.

7.) Chlorine gas will combine with solid phosphorous ( $P_4$ ) to synthesize solid phosphorous trichloride.

- a.) Write the **balanced equation** for this reaction.
- b.) Determine the limiting reactant and theoretical yield, in g, when 15.86 g of phosphorous react with 23.59 g chlorine.
- c.) Calculate the amount of reactant in excess left over when the reaction is complete, in g.
- d.) If the percent yield for this reaction was 85.67%, calculate the **actual yield** of product, in g.