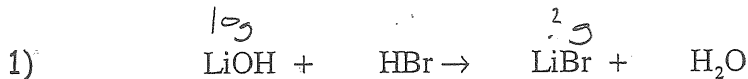Name_____ Date_____

## Mass-to-Mass Stoichiometry Worksheet #2

In the following problems, calculate how much of the indicated product is made. Show all of your work.

1) $\overset{10g}{LiOH}$ +   HBr → $\overset{2g}{LiBr}$ + H_2O

If you start with ten grams of lithium hydroxide, how many grams of lithium bromide will be produced?

$$\frac{86.84 \; g \; LiBr}{1 \; mol \; LiBr} \Bigg| \frac{1 \; mol \; LiBr}{1 \; mol \; LiOH} \Bigg| \frac{1 \; mol \; LiOH}{23.95g \; LiOH} \Bigg| \frac{10g \; LiOH}{} = \boxed{40 g \; LiBr}$$

2) $\overset{45g}{C_2H_4}$ + $3O_2$ → $\overset{?g}{2CO_2}$ + $2H_2O$
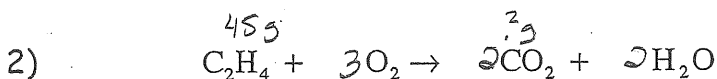
If you start with 45 grams of ethylene (C_2H_4), how many grams of carbon dioxide will be produced?

$$\frac{44.01 \; g \; CO_2}{1 \; mol \; CO_2} \Bigg| \frac{2 \; mol \; CO_2}{1 \; mol \; C_2H_4} \Bigg| \frac{1 \; mol \; C_2H_4}{28.06 \; g \; C_2H_4} \Bigg| \frac{45g \; C_2H_4}{} = \boxed{140 \; g \; CO_2}$$

3) $\overset{5.5g}{Ca}$ + $2 \; LiCl$ → $\overset{?g}{CaCl_2}$ + $2 \; Li$
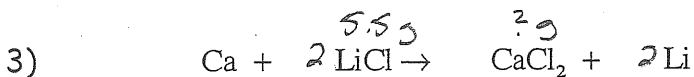
If you start with 5.5 grams of lithium chloride, how many grams of calcium chloride will be produced?

$$\frac{110.98 \; g \; CaCl_2}{1 \; mol \; CaCl_2} \Bigg| \frac{1 \; mol \; CaCl_2}{2 \; mol \; LiCl} \Bigg| \frac{1 \; mol \; LiCl}{42.39 \; g \; LiCl} \Bigg| \frac{5.5g \; LiCl}{} = \boxed{7.2 \; g \; CaCl_2}$$

4) $\overset{20g}{2 \; HCl}$ + Na_2SO_4 → $2 \; NaCl$ + $\overset{?g}{H_2SO_4}$
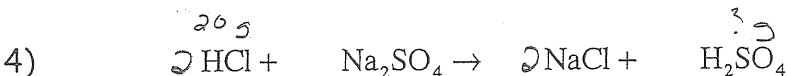
If you start with 20 grams of hydrochloric acid, how many grams of sulfuric acid will be produced?

$$\frac{98.09 \; g \; H_2SO_4}{1 \; mol \; H_2SO_4} \Bigg| \frac{1 \; mol \; H_2SO_4}{2 \; mol \; HCl} \Bigg| \frac{1 \; mol \; HCl}{36.46 \; g \; HCl} \Bigg| \frac{20g \; HCl}{} = \boxed{30 \; g \; H_2SO_4}$$

5) How many grams of NaCl will be produced when 22.85 g of HCl are neutralized by an excess of NaOH according to the equation below?

$$\overset{22.85g}{HCl} + \quad NaOH \rightarrow \quad H_2O + \quad \overset{?\,g}{NaCl}$$
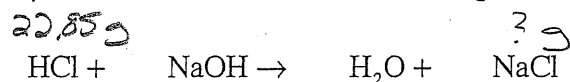
$$\frac{58.44\ g\ NaCl}{1\ mol\ NaCl} \bigg| \frac{1\ mol\ NaCl}{1\ mol\ HCl} \bigg| \frac{1\ mol\ HCl}{36.46\ g\ HCl} \bigg| \frac{22.85\ g\ HCl}{}$$

$$= \boxed{36.63\ g\ NaCl}$$

6) How many grams of potassium nitrate are required to produce 5.00 g of potassium nitrite according to the equation below?
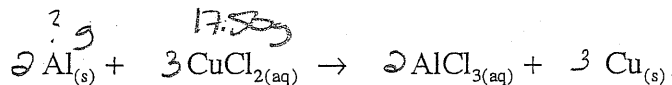
$$\overset{?\,g}{2\ KNO_{3(s)}} \rightarrow \overset{5.00\,g}{2\ KNO_{2(s)}} + \quad O_{2(g)}$$
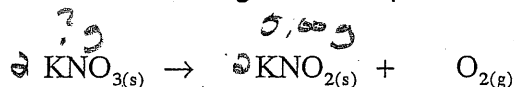
$$\frac{101.11\ g\ KNO_3}{1\ mol\ KNO_3} \bigg| \frac{2\ mol\ KNO_3}{2\ mol\ KNO_2} \bigg| \frac{1\ mol\ KNO_2}{85.11\ g\ KNO_2} \bigg| \frac{5.00\ g\ KNO_2}{}$$

$$= \boxed{5.94\ g\ KNO_3}$$

7) How many grams of magnesium oxide are produced when 10.00 grams of magnesium burn in an excess of oxygen, as shown below?

$$\overset{10.00g}{2\ Mg} + \quad O_2 \rightarrow \overset{?\,g}{2\ MgO}$$
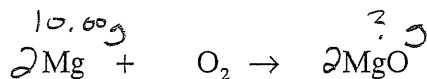
$$\frac{40.31\ g\ MgO}{1\ mol\ MgO} \bigg| \frac{2\ mol\ MgO}{2\ mol\ Mg} \bigg| \frac{1\ mol\ Mg}{24.31\ g\ Mg} \bigg| \frac{10.00\ g\ Mg}{}$$

$$= \boxed{16.58\ g\ MgO}$$

8) How many grams of aluminum would react completely with 17.50 grams of copper (II) chloride according to the following equation?

$$\overset{?\,g}{2\ Al_{(s)}} + \overset{17.50g}{3\ CuCl_{2(aq)}} \rightarrow \quad 2\ AlCl_{3(aq)} + \quad 3\ Cu_{(s)}$$

$$\frac{26.98\ g\ Al}{1\ mol\ Al} \bigg| \frac{2\ mol\ Al}{3\ mol\ CuCl_2} \bigg| \frac{1\ mol\ CuCl_2}{134.45\ g\ CuCl_2} \bigg| \frac{17.50\ g\ CuCl_2}{}$$

$$= \boxed{2.341\ g\ Al}$$