Mass/Mass Problems

1. Consider the following balanced reaction: Li_3N (s) + 3 H_2O (l) $\rightleftharpoons$ NH_3 (g) + 3 LiOH (aq)

a. What mass of lithium hydroxide is produced when 0.38 g of lithium nitride react?

b. How many grams of lithium nitride would react with 4.05 g of H_2O?

2. Balance the following reaction and answer the given questions.

$$NaI \text{ (s)} + Cl_2 \text{ (g)} \rightarrow NaCl \text{ (s)} + I_2 \text{ (g)}$$

a. What mass of sodium chloride is produced when 0.294 g of sodium iodide react?

b. If 5.80 g of iodine is formed, what is the mass of sodium iodide that reacted?

3. Write and balance the double replacement reaction between lead (II) nitrate and sodium chloride.

$$\rightarrow$$

What is the mass of each product when 50 g of lead (II) nitrate react?

4. Consider the following reaction: Cu + 2 $AgNO_3$ $\rightarrow$ 2 Ag + $Cu(NO_3)_2$
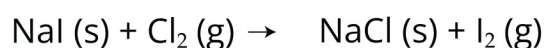
How many grams of silver are produced when 36.92 g of copper react?

Name : _____   Date : _____

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1. Consider the following balanced reaction: Li_3N (s) + 3 H_2O (l) $\rightleftharpoons$ NH_3 (g) + 3 LiOH (aq)

a. What mass of lithium hydroxide is produced when 0.38 g of lithium nitride react?

$$0.38 \text{ g Li}_3\text{N} \times \frac{1 \text{ mol Li}_3\text{N}}{34.7 \text{ g Li}_3\text{N}} \times \frac{3 \text{ mol LiOH}}{1 \text{ mol Li}_3\text{N}} \times \frac{23.9 \text{ g LiOH}}{1 \text{ mol LiOH}} = 0.79 \text{ g LiOH}$$

b. How many grams of lithium nitride would react with 4.05 g of H_2O?

$$4.05 \text{ g H}_2\text{O} \times \frac{1 \text{ mol H}_2\text{O}}{18 \text{ g H}_2\text{O}} \times \frac{1 \text{ mol Li}_3\text{N}}{3 \text{ mol H}_2\text{O}} \times \frac{34.7 \text{ g Li}_3\text{N}}{1 \text{ mol Li}_3\text{N}} = 2.6 \text{ g Li}_3\text{N}$$

2. Balance the following reaction and answer the given questions.

$$2 \text{ NaI (s)} + \text{Cl}_2 \text{ (g)} \rightarrow 2 \text{ NaCl (s)} + \text{I}_2 \text{ (g)}$$
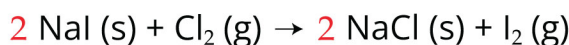
a. What mass of sodium chloride is produced when 0.294 g of sodium iodide react?

$$0.294 \text{ g NaI} \times \frac{1 \text{ mol NaI}}{149.9 \text{ Li}_3\text{N}} \times \frac{2 \text{ mol NaCl}}{2 \text{ mol NaCl}} \times \frac{58.5 \text{ g NaCl}}{1 \text{ mol LiOH}} = 0.115 \text{ g NaCl}$$

b. If 5.80 g of iodine is formed, what is the mass of sodium iodide that reacted?

$$5.8 \text{ g I}_2 \times \frac{1 \text{ mol I}_2}{253.8 \text{ g I}_2\text{N}} \times \frac{2 \text{ mol NaI}}{1 \text{ mol I}_2} \times \frac{49.9 \text{ g NaI}}{1 \text{ mol NaI}} = 6.85 \text{ g NaI}$$

3. Write and balance the double replacement reaction between lead (II) nitrate and sodium chloride.

$$\text{Pb(NO}_3)_2 + 2 \text{ NaCl} \rightarrow 2 \text{ NaNO}_3 + \text{PbCl}_2$$
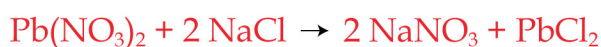
What is the mass of each product when 50 g of lead (II) nitrate react?

$$50 \text{ g Pb(NO}_3)_2 \times \frac{1 \text{ mol Pb(NO}_3)_2}{331.2 \text{ g Pb(NO}_3)_2} \times \frac{2 \text{ mol NaNO}_3}{1 \text{ mol Pb(NO}_3)_2} \times \frac{85 \text{ g NaNO}_3}{1 \text{ mol NaNO}_3} = 25.7 \text{ g NaNO}_3$$

$$50 \text{ g Pb(NO}_3)_2 \times \frac{1 \text{ mol Pb(NO}_3)_2}{331.2 \text{ g Pb(NO}_3)_2} \times \frac{2 \text{ mol PbCl}_3}{1 \text{ mol Pb(NO}_3)_2} \times \frac{278.2 \text{ g PbCl}_2}{1 \text{ mol PbCl}_2} = 42 \text{ g PbCl}_2$$

4. Consider the following reaction: Cu + 2 $AgNO_3$ $\rightarrow$ 2 Ag + $Cu(NO_3)_2$

How many grams of silver are produced when 36.92 g of copper react?

$$36.92 \text{ g Cu} \times \frac{1 \text{ mol Cu}}{63.5 \text{ g Cu}} \times \frac{2 \text{ mol Ag}}{1 \text{ mol Cu}} \times \frac{107.9 \text{ g Ag}}{1 \text{ mol Ag}} = 125 \text{ g Ag}$$