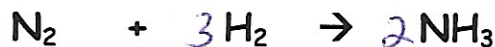


Name: KEY Date: \_\_\_\_\_ Hr: \_\_\_\_\_

## Stoichiometry worksheet #2

Show all work for credit - box your answers

1. The equation for the synthesis of ammonia is below. How many moles of  $H_2$  are needed to produce 9.33 moles of  $NH_3$ ?



$$\frac{9.33 \text{ mol } NH_3}{1} \times \frac{3 \text{ mol } H_2}{2 \text{ mol } NH_3} = \boxed{13.995 \text{ mol } H_2}$$

2. What mass (in grams) of copper is produced when 3.80 g of iron reacts with excess  $CuSO_4$ ?



$$\frac{3.80 \text{ g } Fe}{1} \times \frac{1 \text{ mol } Fe}{55.845 \text{ g } Fe} \times \frac{1 \text{ mol } Cu}{1 \text{ mol } Fe} \times \frac{63.546 \text{ g } Cu}{1 \text{ mol } Cu} = \boxed{4.32 \text{ g } Cu}$$

3. If 5.00g of  $CH_4$  are burned according to the equation below, what mass in grams of  $CO_2$  are produced?



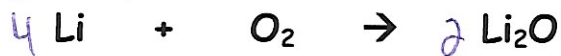
$$\frac{5.00 \text{ g } CH_4}{1} \times \frac{1 \text{ mol } CH_4}{16.043 \text{ g } CH_4} \times \frac{1 \text{ mol } CO_2}{1 \text{ mol } CH_4} \times \frac{44.01 \text{ g } CO_2}{1 \text{ mol } CO_2} = \boxed{13.72 \text{ g } CO_2}$$

4. In the reaction that follows, determine how many grams of aluminum chloride ( $AlCl_3$ ) will be produced from 92.01 g of  $Cl_2$ .



$$\frac{92.01 \text{ g } Cl_2}{1} \times \frac{1 \text{ mol } Cl_2}{70.906 \text{ g } Cl_2} \times \frac{2 \text{ mol } AlCl_3}{3 \text{ mol } Cl_2} \times \frac{133.34 \text{ g } AlCl_3}{1 \text{ mol } AlCl_3} = \boxed{115.4 \text{ g } AlCl_3}$$

5. How many moles of  $O_2$  are needed to combine with 87.01 g of lithium according to the given equation?



$$\frac{87.01 \text{ g Li}}{1} \times \frac{1 \text{ mol Li}}{6.941 \text{ g Li}} \times \frac{1 \text{ mol O}_2}{4 \text{ mol Li}} = \boxed{3.13 \text{ mol O}_2}$$

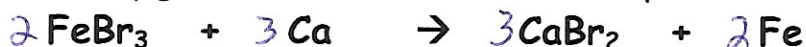
6. Toluene ( $C_7H_8$ ) burns in  $O_2$  (oxygen) to produce carbon dioxide ( $CO_2$ ) and water.  
a. Write the balanced equation.



- b. How many grams of  $O_2$  are needed for the reaction of 94.5 g of toluene?

$$\frac{94.5 \text{ g } C_7H_8}{1} \times \frac{1 \text{ mol } C_7H_8}{92.14 \text{ g } C_7H_8} \times \frac{9 \text{ mol } O_2}{1 \text{ mol } C_7H_8} \times \frac{31.998 \text{ g } O_2}{1 \text{ mol } O_2} = \boxed{295.4 \text{ g } O_2}$$

7. How many grams of calcium are needed to produce 10 moles of iron?



$$\frac{10 \text{ mol Fe}}{1} \times \frac{3 \text{ mol Ca}}{2 \text{ mol Fe}} \times \frac{40.078 \text{ g Ca}}{1 \text{ mol Ca}} = \boxed{601.2 \text{ g Ca}}$$

9. How many molecules of magnesium phosphate,  $Mg_3(PO_4)_2$ , will be produced from 35.8 g of  $Na_3PO_4$ ?



$$\frac{35.8 \text{ g } Na_3PO_4}{1} \times \frac{1 \text{ mol } Na_3PO_4}{163.94 \text{ g } Na_3PO_4} \times \frac{1 \text{ mol } Mg_3(PO_4)_2}{2 \text{ mol } Na_3PO_4} \times \frac{6.02 \times 10^{23} \text{ molecules } Mg_3(PO_4)_2}{1 \text{ mol } Mg_3(PO_4)_2} =$$

$$\boxed{6.57 \times 10^{22} \text{ molecules } Mg_3(PO_4)_2}$$