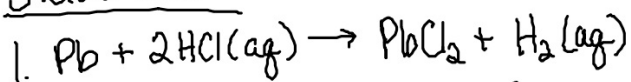


3/15/16

Stoich. Hmwk:



a) given: 0.36 mol Pb need: ? mol HCl Type: mol \rightarrow mol

$$0.36 \text{ mol Pb} \times \frac{2 \text{ mol HCl}}{1 \text{ mol Pb}} = \boxed{0.72 \text{ mol HCl}}$$

2sf

b) given: 4.3 mol HCl need: ? mol H₂ Type: mol \rightarrow mol

$$4.3 \text{ mol HCl} \times \frac{1 \text{ mol H}_2}{2 \text{ mol HCl}} = 2.15 \rightarrow \boxed{2.2 \text{ mol H}_2}$$

2sf

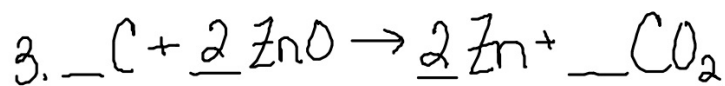
2. $\text{N}_2\text{O}_5 + \text{H}_2\text{O} \rightarrow 2 \text{HNO}_3$ given: 0.51 mol N₂O₅ need: ? mol HNO₃

$$0.51 \text{ mol N}_2\text{O}_5 \times \frac{2 \text{ mol HNO}_3}{1 \text{ mol N}_2\text{O}_5} = \boxed{1.0 \text{ mol HNO}_3}$$

2sf

2b) given: 1.2 mol N_2O_5 need: ? mol H_2O Type: mol \rightarrow mol

$$1.2 \text{ mol } \text{N}_2\text{O}_5 \times \frac{1 \text{ mol } \text{H}_2\text{O}}{1 \text{ mol } \text{N}_2\text{O}_5} = \boxed{1.2 \text{ mol } \text{H}_2\text{O}}$$



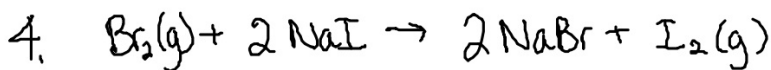
a) given: 0.38 mol ZnO need: ? mol CO_2 Type: mol \rightarrow mol

$$0.38 \text{ mol ZnO} \times \frac{1 \text{ mol } \text{CO}_2}{2 \text{ mol ZnO}} = \boxed{0.19 \text{ mol } \text{CO}_2}$$

2sf

b) given: 3.7 mol Zn need: ? mol ZnO Type: mol \rightarrow mol

$$3.7 \text{ mol Zn} \times \frac{2 \text{ mol ZnO}}{2 \text{ mol Zn}} = \boxed{3.7 \text{ mol ZnO}}$$



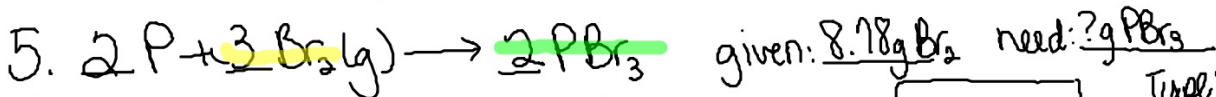
a) given: 0.69 mol Br_2 need: ? g NaBr Type: mole \rightarrow mass

$$0.69 \text{ mol } \text{Br}_2 \times \frac{2 \text{ mol NaBr}}{1 \text{ mol } \text{Br}_2} \times \frac{102.90 \text{ g NaBr}}{1 \text{ mol NaBr}} = 142 \rightarrow \boxed{140 \text{ g NaBr}}$$

molar ratio 1.42×10^2 1.4×10^2

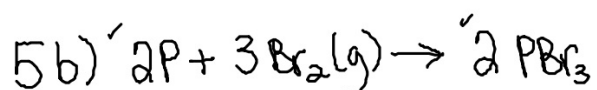
b) given: 20.0g Br_2 need: ? mol I_2 Type: mass \rightarrow mol

$$20.0 \text{ g } \text{Br}_2 \times \frac{1 \text{ mol } \text{Br}_2}{159.80 \text{ g } \text{Br}_2} \times \frac{1 \text{ mol } \text{I}_2}{1 \text{ mol } \text{Br}_2} = \boxed{1.25 \times 10^{-1} \text{ or } 0.125 \text{ mol } \text{I}_2}$$



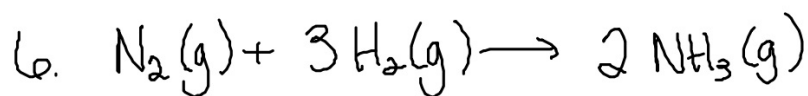
$$8.78 \text{ g } \text{Br}_2 \times \frac{1 \text{ mol } \text{Br}_2}{159.80 \text{ g } \text{Br}_2} \times \frac{2 \text{ mol } \text{PBr}_3}{3 \text{ mol } \text{Br}_2} \times \frac{270.61 \text{ g } \text{PBr}_3}{1 \text{ mol } \text{PBr}_3} = \boxed{9.91 \text{ g } \text{PBr}_3}$$

molar ratio Type: mass \rightarrow mass



given: 12.87 g P need: ? g PBr_3 Type: mass \rightarrow mass

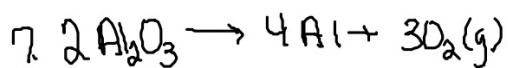
$$12.87gP \times \frac{1 \text{ mol P}}{30.97 \text{ gP}} \times \underbrace{\frac{2 \text{ mol } PBr_3}{2 \text{ mol P}}}_{\text{molar ratio}} \times \frac{270.67 \text{ g } PBr_3}{1 \text{ mol } PBr_3} = \boxed{112.5 \text{ g } PBr_3}$$



a) given: 21.48 g NH_3 need: ? g N_2 mass \rightarrow mass

$$21.48gNH_3 \times \frac{1 \text{ mol } NH_3}{17.04 \text{ g } NH_3} \times \frac{1 \text{ mol } N_2}{2 \text{ mol } NH_3} \times \frac{28.02 \text{ g } N_2}{1 \text{ mol } N_2} = \boxed{17.66 \text{ g } N_2}$$

$$b) 2.24gH_2 \times \frac{1 \text{ mol } H_2}{2.02 \text{ g } H_2} \times \frac{1 \text{ mol } N_2}{3 \text{ mol } H_2} \times \frac{28.02 \text{ g } N_2}{1 \text{ mol } N_2} = \boxed{10.4 \text{ g } N_2}$$



a) given: 9.8g Al_2O_3 need: ? g Al mass \rightarrow mass

$$9.8 \text{g Al}_2\text{O}_3 \times \frac{1 \text{ mol Al}_2\text{O}_3}{101.96 \text{g Al}_2\text{O}_3} \times \frac{4 \text{ mol Al}}{2 \text{ mol Al}_2\text{O}_3} \times \frac{26.98 \text{g Al}}{1 \text{ mol Al}} = \boxed{5.2 \text{g Al}}$$

b) given: 24.97g O_2 need: ? g Al_2O_3 mass \rightarrow mass

$$24.97 \text{g O}_2 \times \frac{1 \text{ mol O}_2}{32.00 \text{g O}_2} \times \frac{2 \text{ mol Al}_2\text{O}_3}{3 \text{ mol O}_2} \times \frac{101.96 \text{g Al}_2\text{O}_3}{1 \text{ mol Al}_2\text{O}_3} = \boxed{53.04 \text{g Al}_2\text{O}_3}$$

When volume is used replace molar mass with 22.4 L.

Vol \rightarrow Vol

$$\text{amt given} \times \frac{1 \text{ mol given}}{22.4 \text{ L given}} \times \frac{\# \text{ mol needed}}{\# \text{ mol given}} \times \frac{22.4 \text{ L needed}}{1 \text{ mol needed}} =$$

mol \rightarrow mol (2 conv.)

Vol \rightarrow mol (2 conv.)

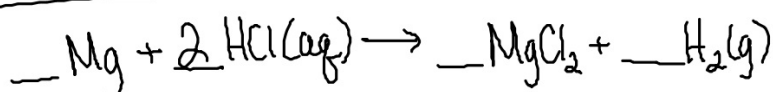
Mass \rightarrow Vol

$$\text{amt given} \times \frac{1 \text{ mol given}}{\text{molar mass given}} \times \frac{\# \text{ mol needed}}{\# \text{ mol given}} \times \frac{22.4 \text{ L needed}}{1 \text{ mol needed}} =$$

Vol \rightarrow mass

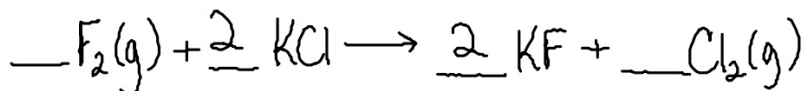
$$\text{amt given} \times \frac{1 \text{ mol given}}{22.4 \text{ L given}} \times \frac{\# \text{ mol needed}}{\# \text{ mol given}} \times \frac{\text{molar mass needed}}{1 \text{ mol needed}} =$$

Practice



if 15.0g of Mg react, how many liters of hydrogen gas will be produced?
given: 15.0g Mg need: ? L H₂ Type: mass → vol

$$15.0\text{g Mg} \times \frac{1\text{mol Mg}}{24.31\text{g Mg}} \times \frac{1\text{mol H}_2}{1\text{mol Mg}} \times \frac{22.4\text{L H}_2}{1\text{mol H}_2} = \boxed{13.8\text{L H}_2}$$



How many liters of F₂(g) will produce 38.7L of Cl₂(g)?
given: 38.7L Cl₂ need: ? L F₂ Type: vol → vol

$$38.7\text{L Cl}_2 \times \frac{1\text{mol Cl}_2}{22.4\text{L Cl}_2} \times \frac{1\text{mol F}_2}{1\text{mol Cl}_2} \times \frac{22.4\text{L F}_2}{1\text{mol F}_2} = \boxed{38.7\text{L F}_2}$$