

Chemistry 12
Chemistry 11 Review

Name:
 Date:
 Block:

$\frac{g}{1 \text{ mol}}$

1. Calculate the **molar mass** of each of the following:

a) NO $\boxed{30.0 \text{ g/mol}}$

b) $\text{Al}_2(\text{SO}_4)_3$ $(2 \times 27.0) + (3 \times 32.1) + \frac{(12 \times 16.0)}{= \boxed{342.3 \text{ g/mol}}}$

c) CH_3COOH $(2 \times 12.0) + (4 \times 1.0) + \frac{(2 \times 16.0)}{= \boxed{60.0 \text{ g/mol}}}$

g

2. Calculate the **mass** of the following:

a) 1.00 mol of NH_4Cl
 $1.00 \text{ mol} \times \frac{53.5 \text{ g}}{1 \text{ mol}} = \boxed{53.5 \text{ g}}$

b) 0.0125 mol of XeF_3
 $0.0125 \text{ mol} \times \frac{188.3 \text{ g}}{1 \text{ mol}} = 2.35375 = \boxed{2.35 \text{ g}}$

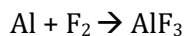
mol

3. Calculate the **number of moles** in the following:

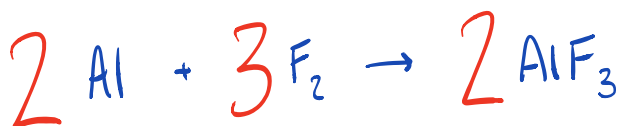
a) 17.0 g of H_2SO_4
 $17.0 \text{ g} \times \frac{1 \text{ mol}}{98.1 \text{ g}} = 0.17329 = \boxed{0.173 \text{ mol}}$

b) 1.5 g of H_2O
 $1.5 \text{ g} \times \frac{1 \text{ mol}}{18.0 \text{ g}} = \boxed{0.083 = 8.3 \times 10^{-2} \text{ mol}}$

4. The equation for the reaction of aluminum metal with fluorine gas is:



a) What is the balanced chemical equation?

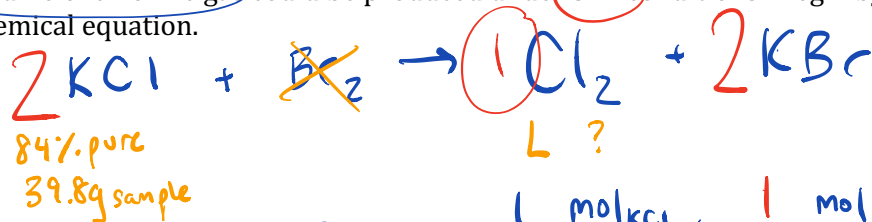


g

b) If 116.1 g of Al reacts, how much mass of the product is made?

$$116.1 \text{ g Al} \times \frac{1 \text{ mol Al}}{27.0 \text{ g Al}} \times \frac{2 \text{ mol AlF}_3}{2 \text{ mol Al}} \times \frac{84.0 \text{ g AlF}_3}{1 \text{ mol AlF}_3} = \boxed{361.2 \text{ g AlF}_3}$$

5. A sample of potassium chloride has 84.0% purity. If 39.8 g of this sample reacts with excess bromine gas, what volume of chlorine gas could be produced under STP conditions? Begin by writing a balanced chemical equation.



$$\% \text{ purity} = \frac{\text{pure}}{\text{sample}} \times 100\%$$

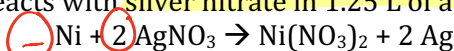
$$84.0\% = \frac{x}{39.8 \text{ g}} \times 100\%$$

$$33.4 \text{ g KCl} \times \frac{1 \text{ mol KCl}}{74.6 \text{ g KCl}} \times \frac{1 \text{ mol Cl}_2}{2 \text{ mol KCl}} \times \frac{22.4 \text{ L Cl}_2}{1 \text{ mol Cl}_2}$$

$$= \boxed{5.01 \text{ L Cl}_2}$$

$$39.8 \times 0.840 = \frac{x}{39.8} \times 39.8 \quad x = 33.4 \text{ g pure KCl}$$

6. What mass of nickel wire reacts with silver nitrate in 1.25 L of a 0.150 M solution?



$$1.25 \text{ L AgNO}_3 \times \frac{0.150 \text{ mol AgNO}_3}{1 \text{ L AgNO}_3} \times \frac{1 \text{ mol Ni}}{2 \text{ mol AgNO}_3} \times \frac{58.7 \text{ g Ni}}{1 \text{ mol Ni}} = \boxed{5.50 \text{ g Ni}}$$

7. Consider a solution containing 5.12 g of CuSO₄ in 250.0 mL of solution.

a) What is the molar concentration of the solution?

$$\frac{5.12 \text{ g}}{250.0 \text{ mL}} \times \frac{1 \text{ mol}}{159.6 \text{ g}} \times \frac{1000 \text{ mL}}{1 \text{ L}} = \frac{0.128 \text{ mol}}{1 \text{ L}} = \boxed{0.128 \text{ M}}$$

b) If 150.0 mL of water was added to the above solution, what would be the resulting molar concentration?

$$C_1 V_1 = C_2 V_2$$

$$(0.128 \text{ M})(250.0 \text{ mL}) = C_2 (400.0 \text{ mL})$$

$$C_2 = \boxed{0.0800 \text{ M}}$$

~ or ~

$$\frac{5.12 \text{ g CuSO}_4}{0.400 \text{ L}} \times \frac{1 \text{ mol}}{159.6 \text{ g CuSO}_4} = \boxed{0.0802 \text{ M}}$$

$$\frac{\text{mol}}{\text{L}} = \text{M}$$

M