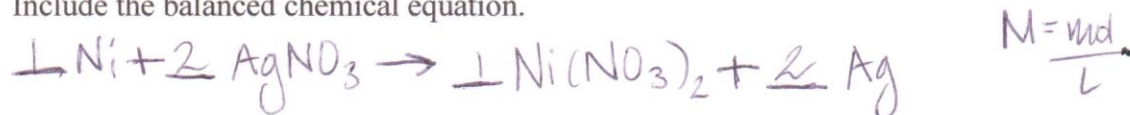


Stoichiometry Relay Questions

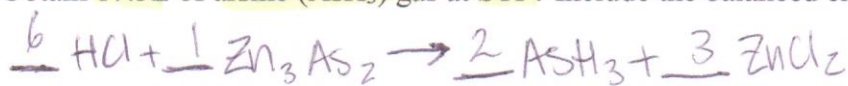
1. What mass of nickel wire reacts with all the silver nitrate in 1.25 L of a 0.15 M solution? Include the balanced chemical equation.



$$\text{moles} = 0.15 \text{ M} \times 1.25 \text{ L}$$

$$= 0.1875 \text{ mol of AgNO}_3 \times \frac{1 \text{ mol of Ni}}{2 \text{ mol AgNO}_3} \times \frac{58.69 \text{ g}}{\text{mol Ni}} = \boxed{5.5 \text{ g of Ni}}$$

2. What mass of HCl must be contained in a solution added to an excess of zinc arsenide to Obtain 17.5L of arsine (AsH₃) gas at STP? Include the balanced chemical equation.



$$17.5 \text{ L of AsH}_3 \times \frac{\text{mol of AsH}_3}{22.4 \text{ L}} \times \frac{6 \text{ mol HCl}}{2 \text{ mol AsH}_3} \times \frac{36.46 \text{ g}}{\text{mol HCl}} = \boxed{85.5 \text{ g of HCl}}$$

3. Identify the products and balance the chemical equation. Determine how many grams of water will be produced if 2.0g of C₄H₁₀ react?



$$2.0 \text{ g of C}_4\text{H}_{10} \times \frac{\text{mol C}_4\text{H}_{10}}{58.14 \text{ g}} \times \frac{10 \text{ mol H}_2\text{O}}{2 \text{ mol C}_4\text{H}_{10}} \times \frac{18.02 \text{ g}}{\text{mol H}_2\text{O}} = \boxed{3.1 \text{ g of H}_2\text{O}}$$

4. If 0.68g of Cl_2 react with 25mL of KOH , what was the original concentration of the KOH ?



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

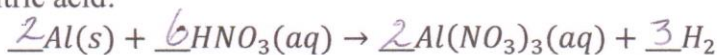
$$0.68 \text{ g} \times \frac{\text{mol of Cl}_2}{70.90 \text{ g}} \times \frac{8 \text{ mol KOH}}{3 \text{ mol Cl}_2} = 0.0255 \dots \text{mol of KOH}$$

$$\frac{0.0255 \dots \text{mol of KOH}}{0.025 \text{ L}} = 1.023 \dots \text{M}$$

$$25 \text{ mL} \times \frac{1 \text{ L}}{1000 \text{ mL}} = 0.025 \text{ L}$$

$$\boxed{= 1.0 \text{ M of KOH}}$$

5. This unbalanced equation shows one possible set of products for the reaction of aluminum and nitric acid:



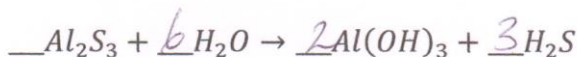
Use the balanced version of this equation to determine the mass of nitric acid required to form 145 kg of hydrogen gas.

$$145 \text{ kg} \times \frac{1000 \text{ g}}{1 \text{ kg}} = 145,000 \text{ g of H}_2 \times \frac{\text{mol H}_2}{2.02 \text{ g}} \times \frac{6 \text{ mol HNO}_3}{3 \text{ mol H}_2} \times \frac{63.02 \text{ g}}{\text{mol HNO}_3} = 905,000 \text{ g of HNO}_3$$

$$= 9.05 \times 10^5 \text{ g}$$

$$\text{OR } 9050 \text{ kg of HNO}_3$$

6. If 16.8L of H_2S gas are produced at STP, how many grams of Al(OH)_3 are also produced?



$$16.8 \text{ L} \times \frac{\text{mol H}_2\text{S}}{22.4 \text{ L}} \times \frac{2 \text{ mol Al(OH)}_3}{3 \text{ mol H}_2\text{S}} \times \frac{78.01 \text{ g}}{\text{mol Al(OH)}_3} = 39.0 \text{ g of Al(OH)}_3$$