Stoichiometry Calculation Practice Worksheet

1. Calculate the number of moles of NaOH that are needed to react with 500.0 g of H₂SO₄ according to the following equation:

\[ \text{H}_2\text{SO}_4 + 2 \text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 2 \text{H}_2\text{O} \]

ANS: 10.19 mol

2. Calculate the mass of NH₃ that can be produced from the reaction of 125 g of NCl₃ according to the following equation:

\[ \text{NCl}_3 + 3 \text{H}_2\text{O} \rightarrow \text{NH}_3 + 3 \text{HOCl} \]

ANS: 17.7 g

3. Identify the limiting reactant and determine the mass of CO₂ that can be produced from the reaction of 25.0 g of C₃H₈ with 75.0 g of O₂ according to the following equation:

\[ \text{C}_3\text{H}_8 + 5 \text{O}_2 \rightarrow 3 \text{CO}_2 + 4 \text{H}_2\text{O} \]

ANS: 61.9 g

4. How many grams of SO₂ are produced when 152 g of CS₂ react with 48.0 g of O₂ according to the following equation:

\[ \text{CS}_2 + 3 \text{O}_2 \rightarrow \text{CO}_2 + 2 \text{SO}_2 \]

ANS: 64.1 g
5. When 50.0 g of MgCO$_3$ react completely with H$_3$PO$_4$, as shown below, 15.8 g of CO$_2$ are produced. What is the percent yield for this reaction?

$$2 \text{H}_3\text{PO}_4 + 3 \text{MgCO}_3 \rightarrow \text{Mg}_3(\text{PO}_4)_2 + 3 \text{CO}_2 + 3 \text{H}_2\text{O}$$

ANS: 60.5%

6. How many grams of P$_4$O$_{10}$ can be produced from the reaction of 52.9 g of KClO$_3$ with excess phosphorous as shown below:

$$\text{KClO}_3 (s) + \text{P}_4 (s) \rightarrow \text{P}_4\text{O}_{10} (s) + \text{KCl} (s)$$

ANS: 36.8 g

7. Given the equation below, determine the limiting reactant, and calculate how many grams of Cu can be formed from the reaction of 18.1 g of NH$_3$ and 90.4 g of CuO.

$$2 \text{NH}_3 (g) + 3 \text{CuO} (s) \rightarrow \text{N}_2 (g) + 3 \text{Cu} (s) + 3 \text{H}_2\text{O} (g)$$

ANS: 72.2 g
8. When 50.0 g of MgCO₃ react completely with H₃PO₄, as shown below, 15.8 g of CO₂ is produced. Determine the theoretical and percent yield for this reaction?

\[ 2 \text{H}_3\text{PO}_4 + 3 \text{MgCO}_3 \rightarrow \text{Mg}_3(\text{PO}_4)_2 + 3 \text{CO}_2 + 3 \text{H}_2\text{O} \]

ANS: 26.1 g; 60.5%

9. What mass of F₂ is needed to produce 120.0 g of PF₃, as shown, if the reaction has a 78.1% yield?

\[ \text{P}_4 (s) + 6 \text{F}_2 (g) \rightarrow 4 \text{PF}_3 \]

ANS: 99.6 g