Stoichiometry Practice Worksheet

12 questions • Beginner to advanced • Name: _____ Date: _____

Molar masses (g/mol): H_2 2.02 | O_2 32.00 | H_2O 18.02 | N_2 28.02 | NH_3 17.04 | $KClO_3$ 122.55 | $CaCO_3$ 100.09 | CH_4 16.05 | CO_2 44.01 | Al 26.98 | Al_2O_3 101.96 | Mg 24.31 | MgO 40.31

For each problem, show conversion factors, cancel units, and include an appropriately rounded final answer. Assume complete reaction unless a measured yield is specified.

1. $2\ H_2 + O_2 \rightarrow 2\ H_2O$. If 1.25 mol O_2 reacts with excess H_2, how many moles of H_2O can form?

2. $N_2 + 3\ H_2 \rightarrow 2\ NH_3$. Starting with 0.600 mol N_2 and excess H_2, find moles of NH_3.

3. $2\ KClO_3 \rightarrow 2\ KCl + 3\ O_2$. How many moles of O_2 can form from 0.800 mol $KClO_3$?

4. $CaCO_3 \rightarrow CaO + CO_2$. From 2.40 mol $CaCO_3$, calculate moles of CO_2 produced.

Intermediate Problems

5. $N_2 + 3\ H_2 \rightarrow 2\ NH_3$. Calculate grams of NH_3 from 3.00 mol H_2 (N_2 is excess).

6. $CaCO_3 \rightarrow CaO + CO_2$. Calculate moles of CO_2 produced from 50.0 g $CaCO_3$.

7. $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$. Calculate grams of CO_2 from 16.0 g CH_4 (O_2 excess).

8. $4\ Al + 3\ O_2 \rightarrow 2\ Al_2O_3$. Calculate grams of Al_2O_3 from 5.40 g Al (O_2 excess).

Advanced Problems

9. $N_2 + 3\ H_2 \rightarrow 2\ NH_3$. With 14.0 g N_2 and 2.00 g H_2, identify the limiting reactant and calculate theoretical grams of NH_3.

10. $2\ Mg + O_2 \rightarrow 2\ MgO$. With 12.0 g Mg and 10.0 g O_2, identify the limiting reactant and find theoretical grams of MgO.

11. Using the same reaction and reactant quantities as problem 10, suppose 16.5 g MgO is collected. Find percent yield.

12. $2\ KClO_3 \rightarrow 2\ KCl + 3\ O_2$. From 24.5 g $KClO_3$, find theoretical grams of O_2. If 8.40 g O_2 is collected, calculate percent yield.