INTOCHEMISTRY

Stoichiometry Practice Problems

STUDENT WORKSHEET

Name: _____ Date: _____

Show the setup and units for calculations. Write your work in the open space below each question.

Use: H 1.01; C 12.01; N 14.01; O 16.00; Ca 40.08; Fe 55.85 g/mol. Avogadro's number = 6.022×10^{23} mol^{-1}.

1. Balance the equation by writing the smallest whole-number coefficients: ___ H_2 + ___ O_2 → ___ H_2O

2. How many moles of H_2 are required to react completely with 4.00 mol O_2? Use the equation in Question 1.

3. $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$. How many moles of CO_2 form from 2.50 mol CH_4 (excess O_2)?

4. $4\ Fe + 3\ O_2 \rightarrow 2\ Fe_2O_3$. How many moles of Fe_2O_3 form from 3.00 mol O_2 (excess Fe)?

5. $N_2 + 3\ H_2 \rightarrow 2\ NH_3$. How many moles of NH_3 form from 7.50 mol H_2 (excess N_2)?

6. $2\ H_2 + O_2 \rightarrow 2\ H_2O$. What mass of water forms from 5.00 g H_2 (excess O_2)?

7. $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$. What mass of CO_2 forms from 8.00 g CH_4 (excess O_2)?

8. $CaCO_3 \rightarrow CaO + CO_2$. What mass of CaO forms from 12.5 g $CaCO_3$?

9. $2\ H_2 + O_2 \rightarrow 2\ H_2O$. A mixture starts with 3.00 mol H_2 and 2.00 mol O_2. Identify the limiting reactant, find moles of H_2O made, and moles of excess reactant remaining.

10. $N_2 + 3\ H_2 \rightarrow 2\ NH_3$. A mixture starts with 2.00 mol N_2 and 5.00 mol H_2. Identify the limiting reactant and calculate moles of NH_3 formed.

11. The theoretical yield of CO_2 is 8.00 g. An experiment recovers 6.40 g. Calculate percent yield.

12. How many moles of water molecules are present in 1.80×10^{24} molecules of H_2O?