**Limiting Reactants Practice Sheet**

Name_____
Date_____Period_____

Balance all equations before beginning. Show all steps and include units and labels.

1. If 20.0 g of NaOH react with 30.0 g of $H_2SO_4$ to produce $Na_2SO_4$, which reactant is limiting and how many grams of $Na_2SO_4$ will be produced?

$$NaOH + H_2SO_4 \rightarrow Na_2SO_4 + H_2O$$

2. If 5.00 g of copper metal react with a solution containing 20.0 g of $AgNO_3$ to produce silver metal, which reactant is limiting and how many grams of silver is produced?

$$Cu + AgNO_3 \rightarrow Cu(NO_3)_2 + Ag$$

3. If 20.0 g of KOH react with 15.0 g of $(NH_4)_2SO_4$, calculate the grams of $NH_3$ produced.

$$KOH + (NH_4)_2SO_4 \rightarrow NH_3 + K_2SO_4 + H_2O$$

4. What reactant is limiting if 3.00 g of $Cl_2$ react with a solution containing 25.0 g of NaBr to produce $Br_2$?

$$Cl_2 + NaBr \rightarrow Nacl + Br_2$$

**Limiting Reactants Practice Sheet**

Name Skylar Melk
Date _____ Period _____

Balance all equations before beginning. Show all steps and include units and labels.

1. If 20.0 g of NaOH react with 30.0 g of $H_2SO_4$ to produce $Na_2SO_4$, which reactant is limiting and how many grams of $Na_2SO_4$ will be produced?

$$2\,NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2\,H_2O$$

$20.0\,g \times \frac{1\,mol}{40.0\,g} \times \frac{1\,mol}{2\,mol} \times \frac{142\,g}{1\,mol} = 35.5\,g$

$30.0\,g \times \frac{1\,mol}{98.1\,g} \times \frac{1\,mol}{1\,mol} \times \frac{142\,g}{1\,mol} = 43.4\,g$

Limiting Reactant: NaOH  Amount Produced: 35.5 g  Excess Reactant: $H_2SO_4$

$35.5\,g \times \frac{1\,mol}{142\,g} \times \frac{1\,mol}{1\,mol} \times \frac{98.1\,g}{1\,mol} = 24.5\,g$  $30.0\,g - 24.5\,g = 5.5\,g$

2. If 5.00 g of copper metal react with a solution containing 20.0 g of $AgNO_3$ to produce silver metal, which reactant is limiting and how many grams of silver is produced?

$$Cu + 2\,AgNO_3 \rightarrow Cu(NO_3)_2 + 2\,Ag$$

$5.00\,g \times \frac{1\,mol}{63.5\,g} \times \frac{2\,mol}{1\,mol} \times \frac{107.9\,g}{1\,mol} = 17.0\,g$

$20.0\,g \times \frac{1\,mol}{169.9\,g} \times \frac{2\,mol}{2\,mol} \times \frac{107.9\,g}{1\,mol} = 12.7\,g$

$12.7\,g \times \frac{1\,mol}{107.9\,g} \times \frac{1\,mol}{2\,mol} \times \frac{63.5\,g}{1\,mol} = 3.74\,g$

Limiting Reactant: $AgNO_3$
Excess Reactant: Cu
Amount Produced: 12.7 g
Amount Left over: 1.26 g
5.00 − 3.74 g

3. If 20.0 g of KOH react with 15.0 g of $(NH_4)_2SO_4$, calculate the grams of $NH_3$ produced.

$$2\,KOH + (NH_4)_2SO_4 \rightarrow 2\,NH_3 + K_2SO_4 + 2\,H_2O$$

$20.0\,g \times \frac{1\,mol}{56.1\,g} \times \frac{2\,mol}{2\,mol} \times \frac{17\,g}{1\,mol} = 6.06\,g$

$15.0\,g \times \frac{1\,mol}{132\,g} \times \frac{2\,mol}{1\,mol} \times \frac{17\,g}{1\,mol} = 3.86\,g$

$3.86\,g \times \frac{1\,mol}{17\,g} \times \frac{2\,mol}{2\,mol} \times \frac{56.1\,g}{1\,mol} = 12.7\,g$

Limiting = $(NH_4)_2SO_4$
Excess = KOH
Produced 3.86 g
Left over 20.0 g − 12.7 g
7.3 g

4. What reactant is limiting if 3.00 g of $Cl_2$ react with a solution containing 25.0 g of NaBr to produce $Br_2$?

$$Cl_2 + 2\,NaBr \rightarrow 2\,NaCl + Br_2$$

$3.00\,g \times \frac{1\,mol}{71\,g} \times \frac{1\,mol}{1\,mol} \times \frac{159.8\,g}{1\,mol} = 6.75\,g$

$25.0\,g \times \frac{1\,mol}{102.9\,g} \times \frac{1\,mol}{2\,mol} \times \frac{159.8\,g}{1\,mol} = 19.4\,g$

$6.75\,g \times \frac{1\,mol}{159.8\,g} \times \frac{2\,mol}{1\,mol} \times \frac{102.9\,g}{1\,mol} = 8.69\,g$

Limiting $Cl_2$
Excess NaBr
produced 6.75 g
Left over: 16.3 g