

## Worksheet 1

### Stoichiometry

## Mole to Mole Ratio

Name:

Gr/Sec:

### Sample Problem:

Equation:  $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$

Problem: If we have 2.00 mol of  $\text{N}_2$  reacting with sufficient  $\text{H}_2$ , how many moles of  $\text{NH}_3$  will be produced?

### Solving the Problem:

(a) Balance the equation (the equation is already balanced).

(b) The ratio from the problem that you will have to deal with is the ratio of  $\text{N}_2$  and  $\text{NH}_3$ .

You will be having **1 mol  $\text{N}_2$  : 2 mol  $\text{NH}_3$**  as observed from the given equation.

(c) What is being asked in the problem is the number of **mol  $\text{NH}_3$**  that you will be deriving from the given **2 mol  $\text{N}_2$** .

(d) Start the conversion factor.

$$2 \text{ mol } \text{N}_2 \times \frac{2 \text{ mol } \text{NH}_3}{1 \text{ mol } \text{N}_2} = 4 \text{ mol } \text{NH}_3$$

= 4 moles of  $\text{NH}_3$  will be produced.

**Try to answer this ff sample problems.**

1. Equation:  $\text{C}_3\text{H}_8 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2$

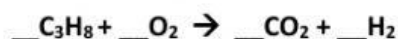
**(a)** Write the correct balanced equation.

**(b)** How many moles of  $\text{O}_2$  are required to combust with 3.5 moles of  $\text{C}_3\text{H}_8$ ?

**(c)** How many moles of  $\text{CO}_2$  are produced if 4.12 moles of  $\text{O}_2$  is reacted with  $\text{C}_3\text{H}_8$ ?

**(d)** How many moles of  $\text{H}_2$  are produced if 2 moles of  $\text{C}_3\text{H}_8$ ?

Answer to **(a)** :



Solution/Answer to **(b)**:

$$\boxed{\phantom{000}} \times \frac{\boxed{\phantom{000}}}{\boxed{\phantom{000}}} = \boxed{\phantom{000}}$$

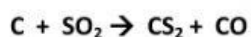
Solution/Answer to **(c)**:

$$\boxed{\phantom{000}} \times \frac{\boxed{\phantom{000}}}{\boxed{\phantom{000}}} = \boxed{\phantom{000}}$$

Solution/Answer to **(d)**:

$$\boxed{\phantom{000}} \times \frac{\boxed{\phantom{000}}}{\boxed{\phantom{000}}} = \boxed{\phantom{000}}$$

2. Carbon disulfide is an important industrial solvent. It is prepared by the reaction of carbon (called coke) with sulfur dioxide:



(a) Balance the equation.

(b) How many moles of carbon are needed to react with 3.01 mol  $\text{SO}_2$ ?

(c) How many moles of carbon monoxide form at the same time that 0.45 mol  $\text{SO}_2$  reacts with C?

(d) How many moles of  $\text{SO}_2$  are required to make 125 mol  $\text{CS}_2$ ?

Answer to (a) :



Solution/Answer to (b):

$$\boxed{\phantom{000}} \times \frac{\boxed{\phantom{000}}}{\boxed{\phantom{000}}} = \boxed{\phantom{000}}$$

Solution/Answer to (c):

$$\boxed{\phantom{000}} \times \frac{\boxed{\phantom{000}}}{\boxed{\phantom{000}}} = \boxed{\phantom{000}}$$

Solution/Answer to (d):

$$\boxed{\phantom{000}} \times \frac{\boxed{\phantom{000}}}{\boxed{\phantom{000}}} = \boxed{\phantom{000}}$$