

Name: \_\_\_\_\_

Period: \_\_\_\_ Subject: \_\_\_\_\_

Date: \_\_\_\_\_

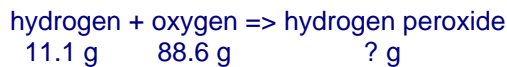
## Law of Definite Proportions

Solve for the appropriate value. Be sure to *show your work* and remember to use the correct number of significant figures.

1. \_\_\_\_\_ A 53.0 g sample of an unknown compound contains 13.5 g of oxygen. What is the percent by mass of oxygen in the unknown compound?

$$\frac{13.5 \text{ g}}{53.0 \text{ g}} = 0.25471698 = \boxed{25.5 \%}$$

2. \_\_\_\_\_ If 11.1 g of hydrogen reacts completely with 88.6 g of oxygen to form hydrogen peroxide, what is the percent by mass of hydrogen in hydrogen peroxide?



$$11.1 \text{ g} + 88.6 \text{ g} = 99.7 \text{ g}$$

$$\frac{11.1 \text{ g}}{99.7 \text{ g}} = 0.11133400 = \boxed{11.1 \%}$$

3. \_\_\_\_\_ A 111.7 g sample of iron reacts with 100.0 g of oxygen to form iron oxide (rust). After the reaction, there is 52.0 g of unreacted oxygen remaining. What is the percent by mass of oxygen in the rust?



$$(111.7 \text{ g} + 100.0 \text{ g}) - 52.0 \text{ g} = 159.7 \text{ g} \quad (\text{this gives the total grams of rust})$$

$$100.0 \text{ g} - 52.0 \text{ g} = 48.0 \text{ g} \quad (\text{this gives the oxygen that actually went into the rust})$$

$$\frac{48.0 \text{ g}}{159.7 \text{ g}} = 0.30056356 = \boxed{30.1 \%}$$

4. \_\_\_\_\_ If a 43.0 g sample of carbon dioxide (CO<sub>2</sub>) is found to be 27.3% by mass carbon, then how much oxygen (in grams) is found in a 78.0 g sample of carbon dioxide?

$$\frac{\text{oxygen}}{\text{carbon dioxide}} = 27.3 \% \quad (\text{Sample 1})$$

$$\frac{\text{oxygen}}{78.0 \text{ g}} = 27.3 \% \quad (2^{\text{nd}} \text{ sample})$$

$$\text{oxygen} = 78.0 \text{ g} \cdot 27.3 \% = 78.0 \text{ g} \cdot 0.273 = 21.294 \text{ g} = \boxed{21.3 \text{ g}}$$

5. \_\_\_\_\_ A 57.6 g sample of methane (CH<sub>4</sub>) is found to contain 43.2 g of carbon. How much hydrogen (in grams) would a 37.8 g sample of methane contain?

$$\frac{43.2 \text{ g carbon}}{57.6 \text{ g methane}} = \frac{? \text{ g carbon}}{37.8 \text{ g methane}}$$

Sample 1                      Sample 2

Solving for above, Sample 2 has 28.35 g carbon.

$$37.8 \text{ g methane} - 28.35 \text{ g carbon} = \boxed{9.45 \text{ g hydrogen}}$$