

Name Key

Moles test review

What is a mole? a unit of measurement that is equal to 6.02×10^{23}

Know how to use dimensional analysis

If I have 86g of Carbon, how many moles of Carbon do I have?

$$\frac{86g \text{ C}}{12g \text{ C}} \times \frac{1 \text{ mol}}{1} = 7.1 \text{ moles Carbon}$$

If I have 6.2 moles of Boron, how many grams of Boron do I have?

$$6.2 \text{ mol B} \times \frac{10.8g \text{ B}}{1 \text{ mol}} = 66.9g \text{ B}$$

If I have 36g of Magnesium, how many atoms of Magnesium do I have?

$$\frac{36g \text{ Mg}}{24.3g \text{ Mg}} \times \frac{1 \text{ mol Mg}}{1} \times \frac{6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol Mg}} = 8.9 \times 10^{23} \text{ atoms Mg}$$

If I have 7.2 moles of Na_2SO_4 , how many grams do I have?

$$7.2 \text{ mol Na}_2\text{SO}_4 \times \frac{142g \text{ Na}_2\text{SO}_4}{1 \text{ mol Na}_2\text{SO}_4} = 1022.4g \text{ Na}_2\text{SO}_4$$

If I have 84 grams of MgCl_2 , how many moles do I have?

$$\frac{84g \text{ MgCl}_2}{95.3g \text{ MgCl}_2} \times \frac{1 \text{ mol}}{1} = 0.87 \text{ mol MgCl}_2$$

If I have 9.2×10^{21} molecules of CaCl_2 , how many grams do I have?

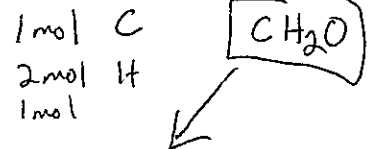
$$\frac{9.2 \times 10^{21} \text{ molecules CaCl}_2}{6.02 \times 10^{23} \text{ molecules}} \times \frac{1 \text{ mol CaCl}_2}{1} \times \frac{182g \text{ CaCl}_2}{1 \text{ mol CaCl}_2} = 2.8g \text{ CaCl}_2$$

If I have 6.8 moles of H_2O , how many moles of Hydrogen do I have?

~~$6.8 \text{ mol H}_2\text{O} \times \frac{2 \text{ mol H}}{1 \text{ mol H}_2\text{O}} = 13.6 \text{ mol H}$~~

How many grams of Hydrogen are in 6.4 moles of CH_4 ?

How many grams of Hydrogen are in 3×10^{20} molecules of CH_4 ?

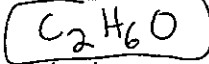


What is the empirical formula if I have 40.0% Carbon, 6.7% Hydrogen, and 53.3% Oxygen?

$$\frac{40g \text{ C}}{12g} \times \frac{1 \text{ mol}}{1} = 3.33 \text{ mol C} \quad \frac{6.7g \text{ H}}{1g} \times \frac{1 \text{ mol}}{1} = 6.7 \text{ mol H} \quad \frac{53.3g \text{ O}}{16g} \times \frac{1 \text{ mol}}{1} = 3.33 \text{ mol O}$$

A compound contains .0130 moles Carbon, .0390 moles Hydrogen, and .0065 moles Oxygen. What is the Empirical Formula?

$$\frac{.0130 \text{ mol C}}{.0065} = 2 \text{ mol C} \quad \frac{.0390 \text{ mol H}}{.0065} = 6 \text{ mol H} \quad \frac{.0065 \text{ mol O}}{.0065} = 1 \text{ mol O}$$



Determine the molecular formula of a compound that has an empirical formula of NO_2 and a molar mass of 92.02g.

NO_2 molar mass = 46g

$$\frac{92.02}{46} = 2$$

So $\text{NO}_2 \times 2$

