Stoichiometry Practice Worksheet

Solve the following stoichiometry grams-grams problems:

M(NaOH) = 23 + 16 + 1 = 40 g.mol⁻¹

1) Using the following equation:

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

2 NaOH: 200 g; Na_2SO_4: 1, 3 g

How many grams of sodium sulfate will be formed if you start with 200 grams of sodium hydroxide and you have an excess of sulfuric acid?

Step 1: $n = m/M = \frac{200}{40} = 5$ mol

Step 2: $5\ \text{mol NaOH} \times \frac{1\ \text{mol } Na_2SO_4}{2\ \text{mol NaOH}} = 2{,}5$ mol Na_2SO_4

Step 3: $m = n \cdot M = 2{,}5 \times 142 = 355$ g

2) Using the following equation:

$$Pb(SO_4)_2 + 4\ LiNO_3 \rightarrow Pb(NO_3)_4 + 2\ Li_2SO_4$$

2) Using the following equation:

2g 250g

$$Pb(SO_4)_2 + 4\ LiNO_3 \rightarrow Pb(NO_3)_4 + 2\ Li_2SO_4$$

4×2 2×1

How many grams of lithium nitrate will be needed to make 250 grams of lithium sulfate, assuming that you have an adequate amount of lead (IV) sulfate to do the reaction?

$n = \frac{m}{M}$

$M(Li_2SO_4) = 14 + 32 + 4(16)$
$= 110\ g.mol^{-1}$

$n = \frac{m}{M}$

$n = \frac{250}{110}$
$= 2{,}27\ mols$

$2{,}27 \times 2$
$= 4{,}54$

$M(LiNO_3)$
$= 7 + 14 + 3(16)$

$m = n \times M$
$= 4{,}54 \times 69$
$= 313\ g$

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http://www.chemfiesta.com

Empirical Formula

↳ Formula with the simplest ratios of a compound

Example: Substance:

	C		H
	79,8%	:	20,2%

Assume:

100g of substance.	79,8 g	:	20,2 g

$n = m/M$ moles	$\frac{79,8}{12}$	:	$\frac{20,2}{1}$
	$= 6,65$		$= 20,2$
÷ by smallest mole $= 6,65$	$\frac{6,65}{6,65}$	:	$= \frac{20,2}{6,65}$
	$= 1$	:	$= 3$

CH_3

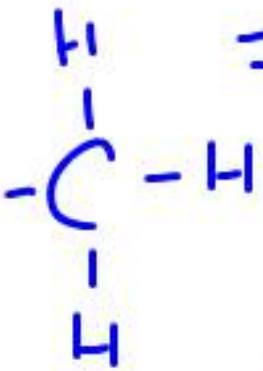
(b) If the molecular formula is 30 g/mol

<u>True Formula</u>:

$M(CH_3)$

$= 12 + 3(1)$

$= 15\ g/mol$



$\frac{\text{Mole form}}{\text{Emp. formula}}$

$= 30/15$

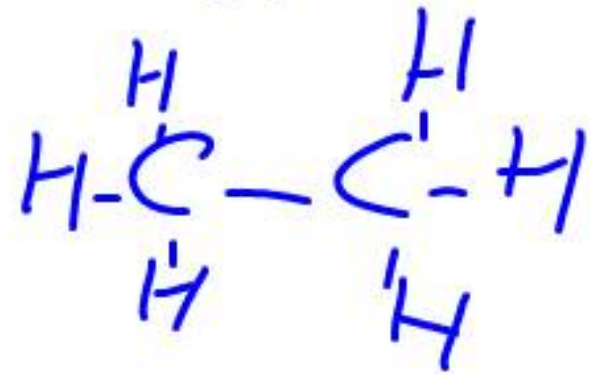
$= 2\ \times$

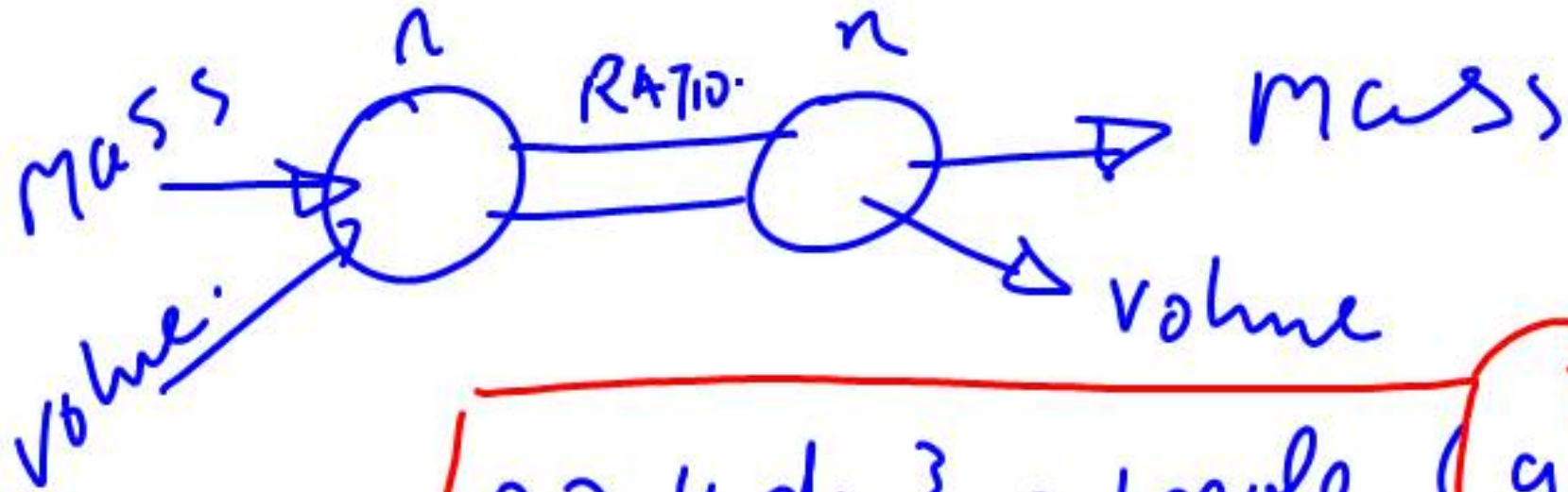
T

$\times 2$

CH_3

$\boxed{C_2H_6}$





$$\boxed{22{,}4\ dm^3 = 1\ mole}\ (\underline{gas})$$

STP

$\hookrightarrow T = 0°C$
$= 273\ K$

$P = 101{,}3\ kPa$
$= 1\ Atm$

$1\ dm^3 = 1\ L$

STP

STANDARD Temperature + Pressure.

Calculate how many molecules of $\boxed{O_2}$ gas are present in 50 cm^3 container at $\boxed{STP}$.

1 mol = 22,4 dm^3

$cm^3 \rightarrow dm^3$

$\div 1000$

(V) 50 cm^3 $\div 1000$

Volume = 0,05 dm^3

$\boxed{1 \text{ mol} = 6{,}02 \times 10^{23}}$

$0{,}05\ dm^3 \times \frac{1 \text{ mol}}{22{,}4\ dm^3}$

= 0,00223 mol

molecules of O_2

$\therefore 0{,}00223 \text{ mol} \times 6{,}02 \times 10^{23}$

$= 1{,}34 \times 10^{21}$ molecules of O_2 / mol

Concentration $\rightarrow mol.dm^{-3}$

$$\boxed{C = n/V}$$

25 dm^3

5 mol of NaCl

$$= 5/25$$

$$= 1/5 \ mol.dm^{-3}$$

$$= 0,2 \ mol.dm^{-3}$$

Chemistry Molar Volume at STP Practice Problems

Assume all of the following problems are at standard conditions.

1. What volume will 0.750 moles of nitrogen gas occupy?

2. What volume will 100. grams of oxygen gas occupy?

3. How many moles are contained in 2.500 liters of methane (CH_4)?

4. Calculate the mass of 300. liters of dinitrogen monoxide.

5. What volume will 10. grams of ammonia occupy?

Molar Volume at STP Practice Problems Answer Key

1. 16.8 L N_2
2. 70.0 L O_2
3. 0.112 mol CH_4
4. 589 g N_2O
5. 13 L NH_3