

Must Show Calculations! No Work, No Credit!

Molar Mass:

- 1.) Calculate the molar mass of ethanol. **CH₃CH₂OH**

C	2	x	12	=	24
H	6	x	1	=	6
O	1	x	16	=	16

Ethanol = 46 g/mol CH₃CH₂OH

- 2.) Calculate the molar mass of ammonium nitrate. **NH₄NO₃**

N	2	x	14	=	28
H	4	x	1	=	4
O	3	x	16	=	48

Ammonium nitrate = 80 g/mol NH₄NO₃

Percent Composition:

- 1.) Calculate the percent composition for the elements in ethanol. **CH₃CH₂OH**

C	24	÷	46	x	100	=	52.17% C
H	6	÷	46	x	100	=	13.04% H
O	16	÷	46	x	100	=	34.78% O

- 2.) Calculate the percent composition for the elements in iron III nitrate. **NH₄NO₃**

N	28	÷	80	x	100	=	35.00% N
H	4	÷	80	x	100	=	5.00% H
O	48	÷	80	x	100	=	60.00% O

Empirical Formula:

- 1.) Find the empirical formula for Vanilla, a flavoring derived from orchids, which contains 63.15% C, 5.30 % H, and 31.55% O. Calculate (x3)

C	63.15 grams		1 mol					
			12.0 grams	=	5.263	mol /	1.972 =	2.67
								x 3 = 8

H	5.30 grams		1 mol					
			1.0 grams	=	5.300	mol /	1.972 =	2.69
								x 3 = 8

O	31.55 grams		1 mol					
			16.0 grams	=	1.972	mol /	1.972 =	1
								x 3 = 3

Formula is: **C₈H₈O₃** vanilla

2.) A strong oxidizer contains 25.94% N and 74.6% O. Calculate its empirical formula.

$$\text{N} \quad \frac{25.94 \text{ grams}}{14.0 \text{ grams}} \times \frac{1 \text{ mol}}{1} = 1.853 \text{ mol} \quad 1.853 \times 2 = 3.706 \approx 4$$

$$\text{O} \quad \frac{74.60 \text{ grams}}{16.0 \text{ grams}} \times \frac{1 \text{ mol}}{1} = 4.663 \text{ mol} \quad 4.663 \times 2 = 9.326 \approx 10$$

Formula is: N_4O_{10}

Molecular Formula:

1.) Phenolphthalein, an acid base indicator, has an empirical formula of $\text{C}_{10}\text{H}_7\text{O}_2$ and a molar mass of 318.32 g/mol. Calculate its molecular formula.

$$\text{C}_{10}\text{H}_7\text{O}_2 = 10(12) + 7(1) + 2(16) = 159 \text{ g/mol}$$

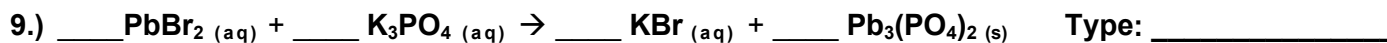
$$318.32 \text{ g/mol} \div 159 \text{ g/mol} = 2 \quad \rightarrow \quad \text{C}_{20}\text{H}_{14}\text{O}_4$$

2.) An ingredient, used by the food industry to produce fruity flavors, has an empirical formula of $\text{C}_2\text{H}_4\text{O}$ and a molar mass of 132 g/mol. Calculate the molecular formula of this compound.

$$\text{C}_2\text{H}_4\text{O}_1 = 2(12) + 4(1) + 1(16) = 44 \text{ g/mol}$$

$$132 \text{ g/mol} \div 44 \text{ g/mol} = 3 \quad \rightarrow \quad \text{C}_6\text{H}_{12}\text{O}_3$$

Chemical Reactions:



Predict the Products & Write a Balanced Equation

1) Magnesium nitrate reacts with potassium chloride: _____

2) Aluminum reacts with iron III oxide: _____

3) Hexane burns in presence of oxygen: _____

4) Calcium carbonate decomposes into its elements: _____

Activity Series

potassium	most reactive	K
sodium		Na
calcium		Ca
magnesium		Mg
aluminium		Al
carbon		C
zinc		Zn
iron		Fe
tin		Sn
lead		Pb
hydrogen		H
copper		Cu
silver		Ag
gold		Au
platinum	least reactive	Pt

