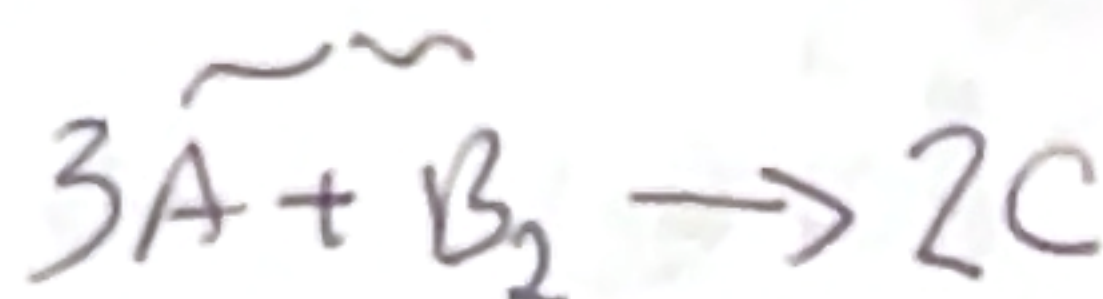


9/09/25

Key!



Ch. 3 Chemical Reactions & Balancing Equations

Chemical equations are used to represent chemical reactions on paper.

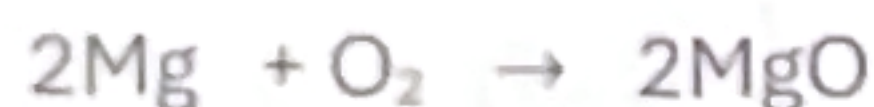
The left side of the equation is for the reactants.

The right side of the equation is for the products.

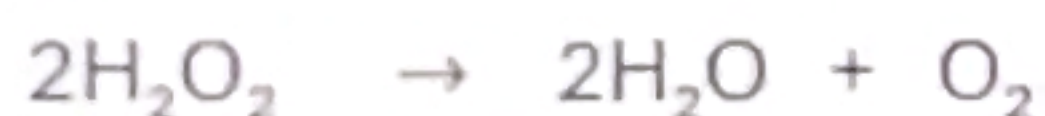
Coefficients represent the number of molecules or moles of that compound.

Subscripts indicate how many atoms of that element are in a single molecule.

Identify what type of chemical reactions are the following:

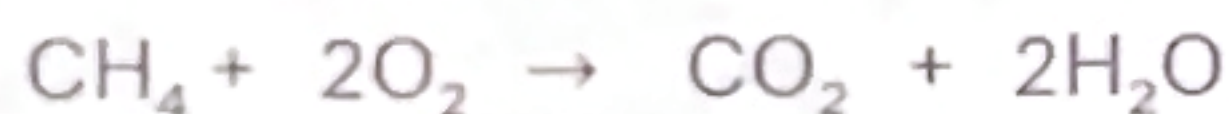


Combination
(synthesis)



Decomposition
(analysis)

Complete
products



$CO_2 + H_2O$

Combustion

incomplete

$CO + H_2O$

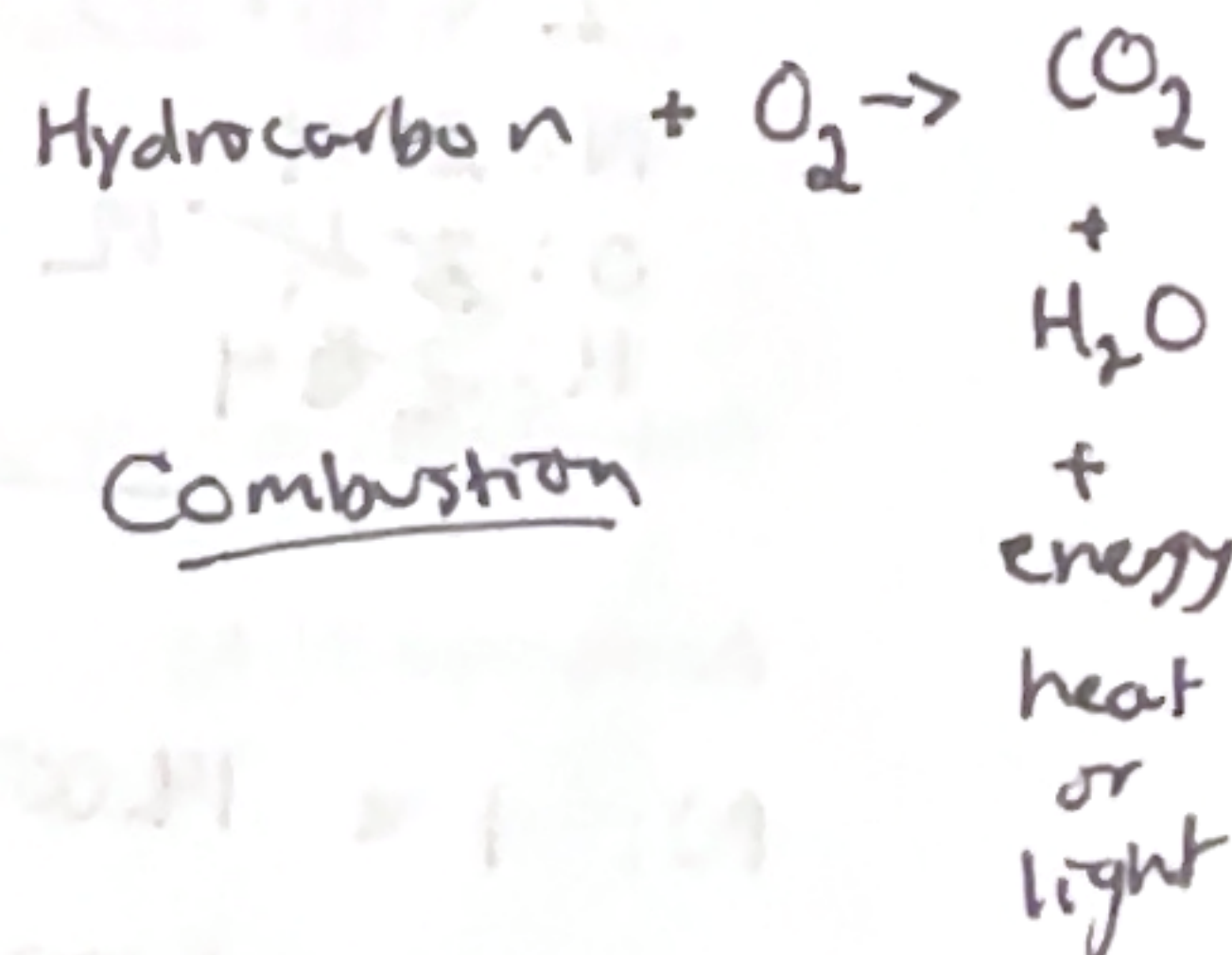
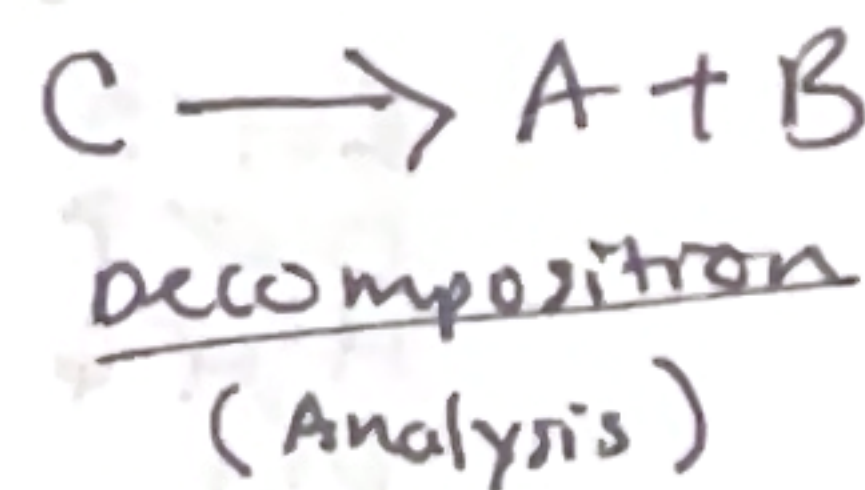
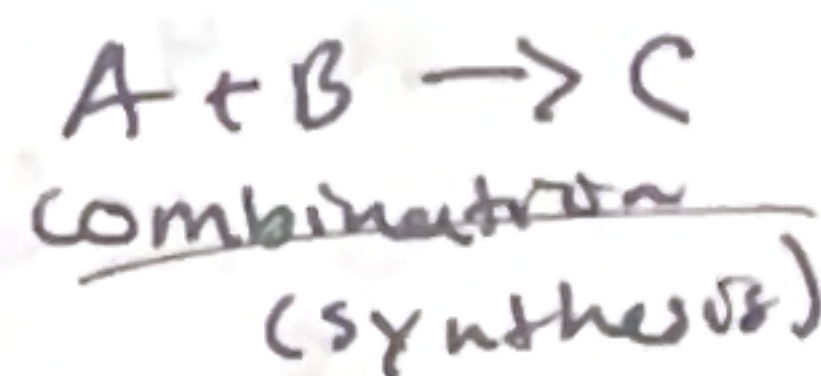


Combination



Incomplete
combustion

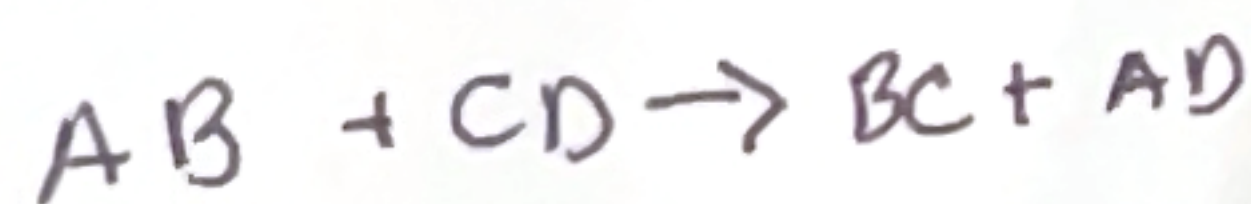
General Formula

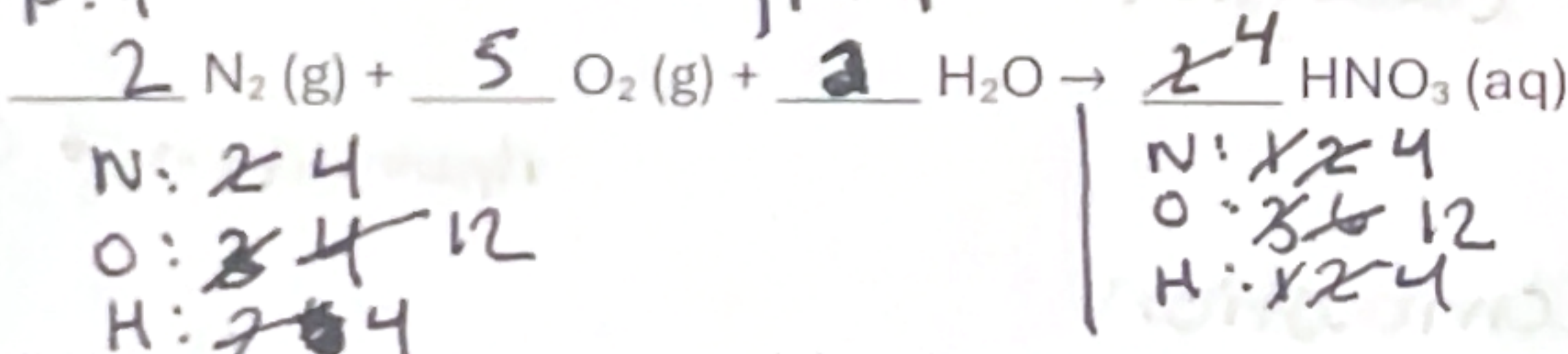
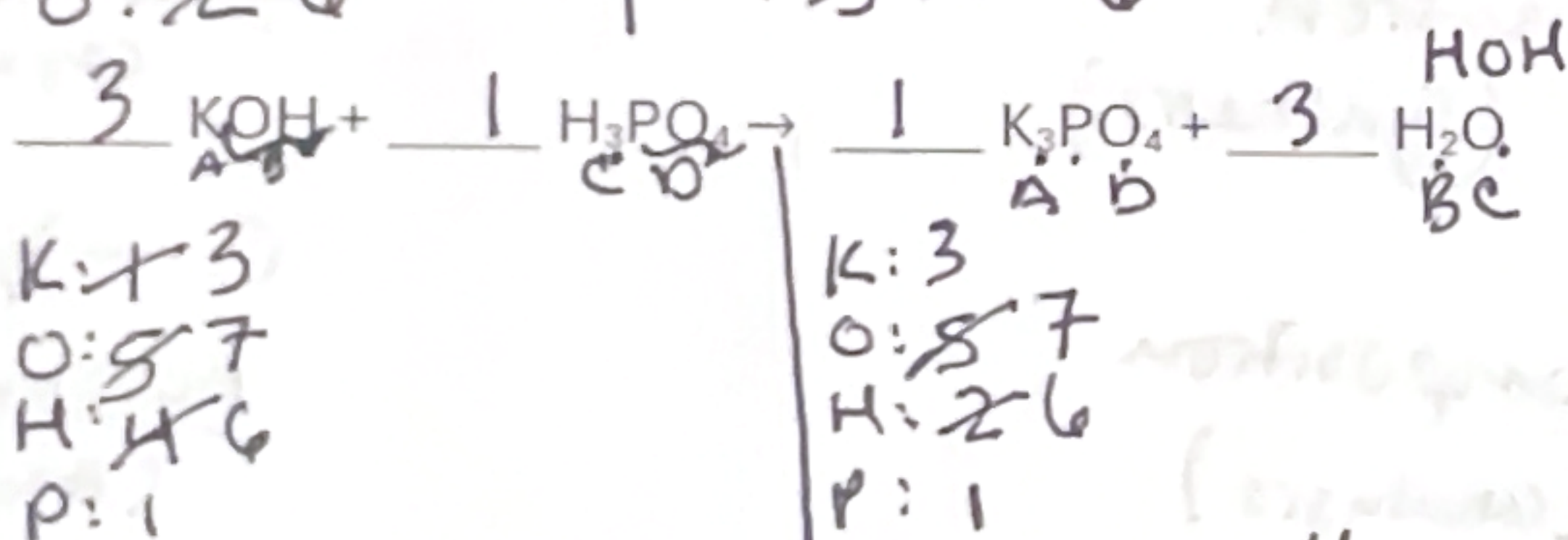
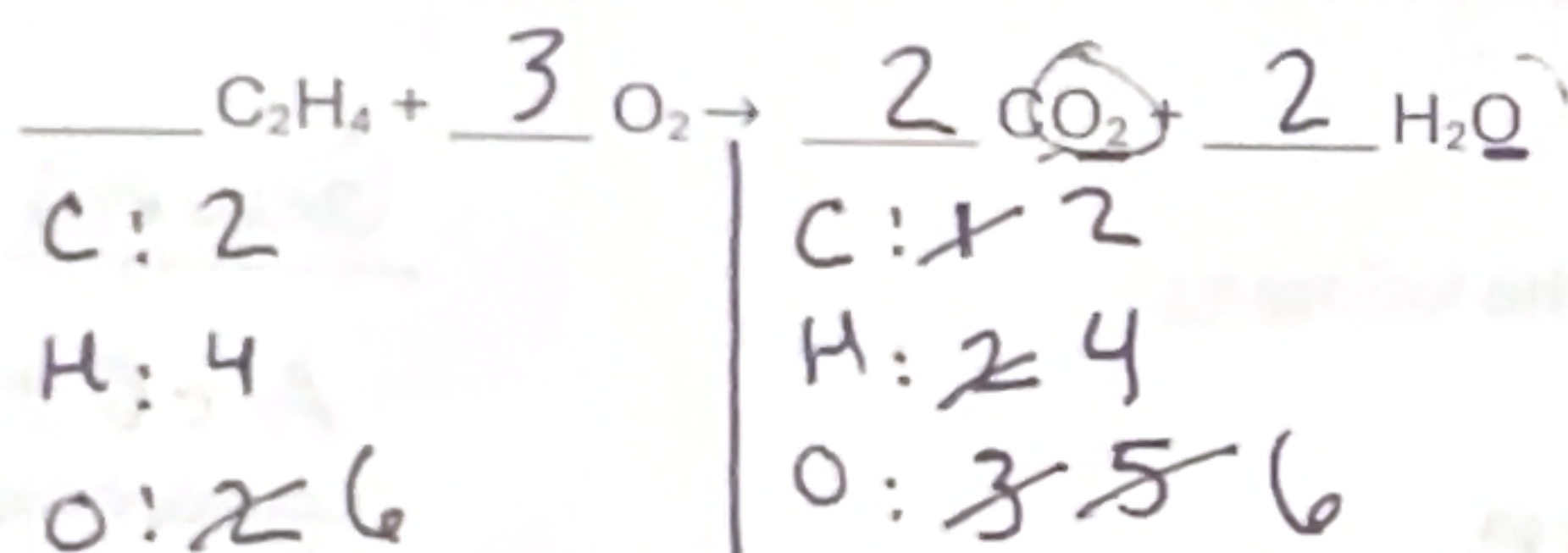
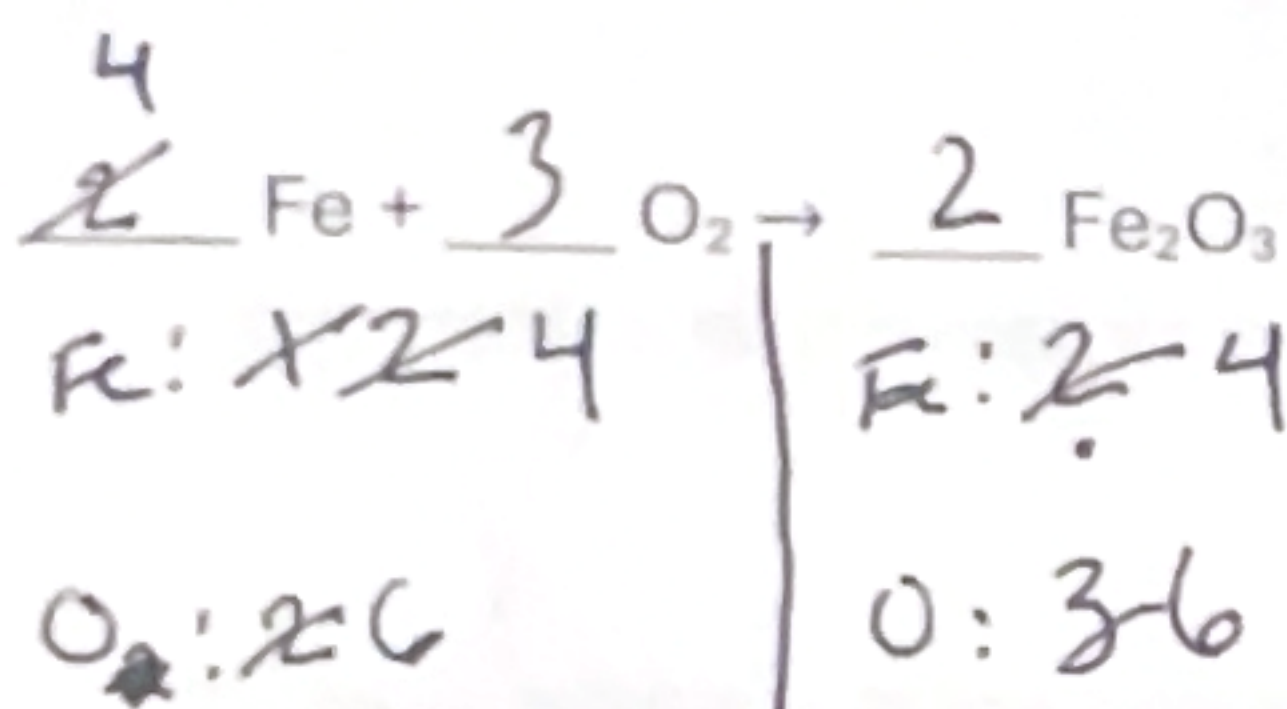
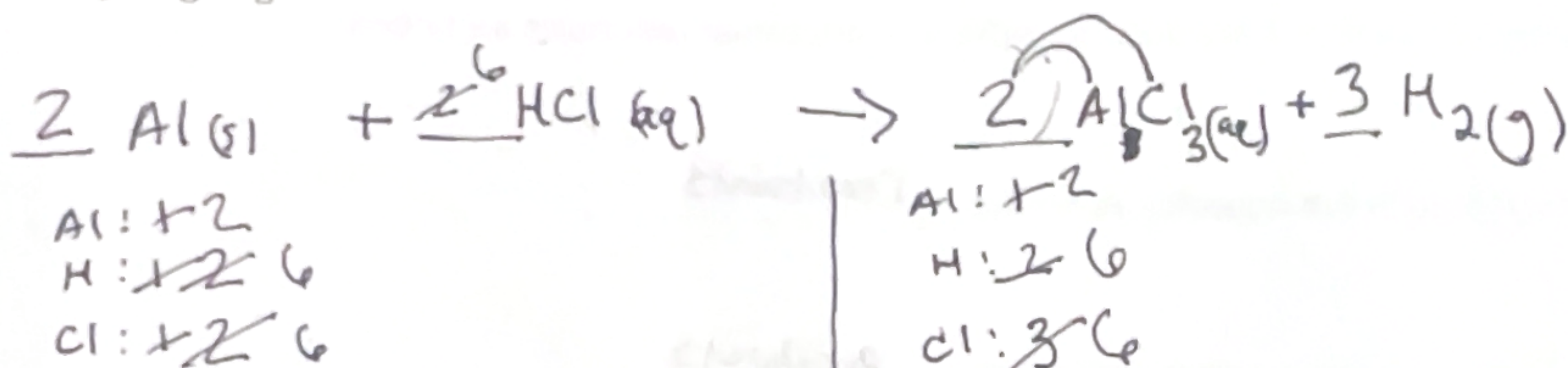


Single replacement



Double replacement





Calculate the molecular weight of the following compounds:

Ammonia (NH_3)

$$\begin{aligned} \text{N: } 1 \times 14.007 &= 14.007 \\ \text{H: } 3 \times 1.008 &= 3.024 \\ \hline &17.031 \end{aligned}$$

17.031 amu

Glucose ($\text{C}_6\text{H}_{12}\text{O}_6$)

$$\begin{aligned} \text{C: } 6 \times 12.011 &= 72.066 \\ \text{H: } 12 \times 1.008 &= 12.096 \\ \text{O: } 6 \times 16.000 &= 96.000 \\ \hline &180.162 \end{aligned}$$

180.162 amu

Ethanol (C_2H_5OH)

$$C: 2 \times 12.01 = 24.02$$

$$H: 6 \times 1.008 = 6.048 +$$

$$O: 1 \times 16.00 = \underline{16.00} \\ 46.068 \text{ amu}$$

Sulfuric Acid (H_2SO_4)

$$H: 2 \times 1.008 = 2.016$$

$$S: 1 \times 32.06 = 32.06 +$$

$$O: 4 \times 16.00 = \underline{64.00} \\ 98.076 \text{ amu}$$

What's the formula for percent composition?

$$\% \text{ element} = \frac{\left(\begin{array}{c} \# \text{ of atoms} \\ \text{of element} \end{array} \right) \left(\begin{array}{c} \text{atomic weight} \\ \text{of element} \end{array} \right)}{\text{Formula weight of substance}} \times 100$$

Calculate the percent composition of Calcium, Carbon, and Oxygen:

Calcium Carbonate ($CaCO_3$) $\rightarrow$ Ionic bond

$$\frac{\text{part}}{\text{whole}} \times 100 = \% \text{ comp.}$$

$$\underline{Ca}: 1 \times 40.078 = \underline{40.078}$$

$$\underline{C}: 1 \times 12.011 = \underline{12.011}$$

$$\underline{O}: 3 \times 16.000 = \underline{48.000} \\ \underline{100.089}$$

$$Ca: \frac{40.078}{100.089} \times 100 = \underline{40.04 \%}$$

$$C: \frac{12.011}{100.089} \times 100 = \underline{12.00 \%}$$

$$O: \frac{48.000}{100.089} \times 100 = \underline{47.96 \%}$$

100