

The background features two ball-and-stick molecular models. On the left is a water molecule (H2O) with a central yellow oxygen atom bonded to two red hydrogen atoms. On the right is a methane molecule (CH4) with a central black carbon atom bonded to four white hydrogen atoms. The models are set against a light grey background with a red circular glow around them.

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Key Concepts for
A Level
Chemistry

Introduction to Chemistry

Calculations Part 4a Examples

This resource may be downloaded for free at

<https://www.chemistrytuition.net/chemistry-calculations>

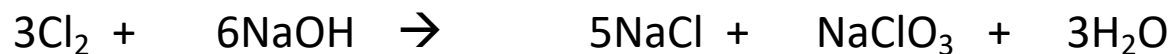
1) What mass of PbSO_4 would be produced by 100 g of $\text{Pb}(\text{NO}_3)_2$?



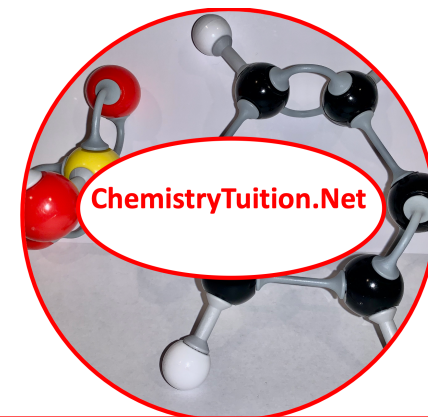
2) What mass of KCl would be produced from 20 g K_2CO_3 ?



3) What mass of NaCl would be produced from 0.71g of chlorine gas?



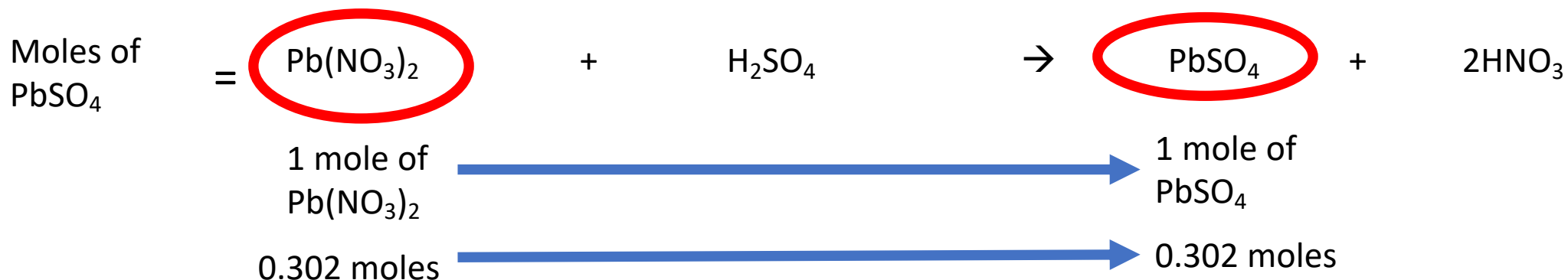
4) What mass of NaOH would produce 15 g of NaCl ?



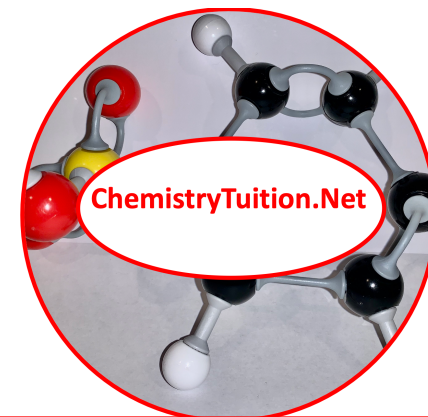
1) What mass of PbSO_4 would be produced by 100 g of $\text{Pb}(\text{NO}_3)_2$?



$$\text{Moles of } \text{Pb}(\text{NO}_3)_2 = \frac{\text{Mass}}{\text{Molar Mass}} = \frac{100}{331.2} = 0.302 \text{ moles}$$



$$\text{Mass of } \text{PbSO}_4 = \text{Moles} \times \text{Molar Mass} = 0.302 \times 303.2 = \underline{\underline{91.6 \text{ grams}}}$$



2) What mass of KCl would be produced from 20 g K_2CO_3 ?



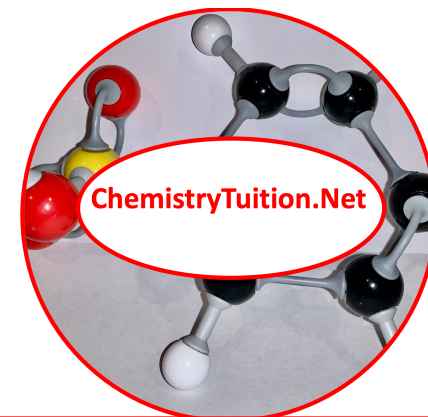
$$\text{Moles of } K_2CO_3 = \frac{\text{Mass}}{\text{Molar Mass}} = \frac{20}{138} = 0.145 \text{ moles}$$



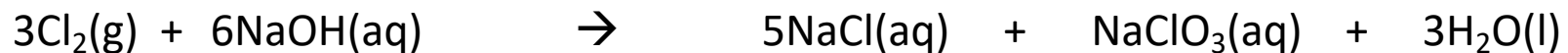
1 mole of K_2CO_3 \rightarrow 2 moles of KCl

0.145 moles $\xrightarrow{\times 2}$ 0.290 moles

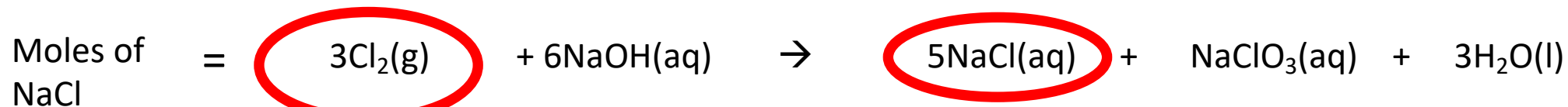
$$\text{Mass of KCl} = \text{Moles} \times \text{Molar Mass} = 0.290 \times 74.5 = \underline{\underline{21.6 \text{ grams}}}$$



3) What mass of NaCl would be produced from 7.1g of chlorine gas?



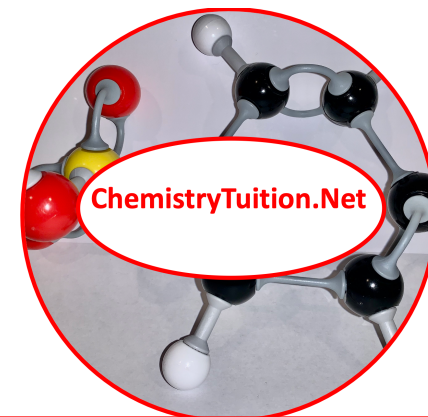
$$\text{Moles of Cl}_2 = \frac{\text{Mass}}{\text{Molar Mass}} = \frac{7.1}{71} = 0.1 \text{ moles}$$



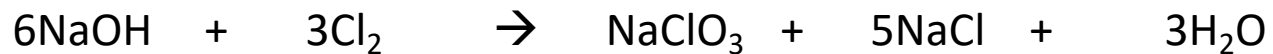
3 moles of Cl_2 → 5 moles of NaCl

0.1 moles → $\times \frac{5}{3}$ → 0.16 moles

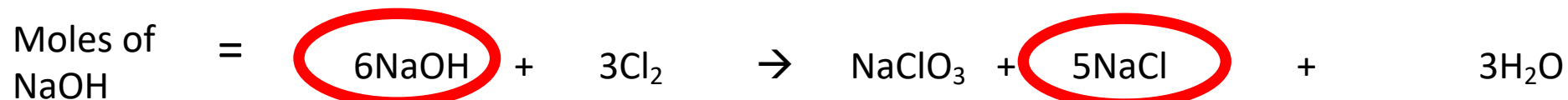
$$\text{Mass of NaCl} = \text{Moles} \times \text{Molar Mass} = 0.16 \times 58.5 = \underline{\underline{9.75 \text{ grams}}}$$



4) What mass of NaOH would produce 15 g of NaCl?



$$\text{Moles of NaCl} = \frac{\text{Mass}}{\text{Molar Mass}} = \frac{15}{58.5} = 0.256 \text{ moles}$$



6 moles of NaOH

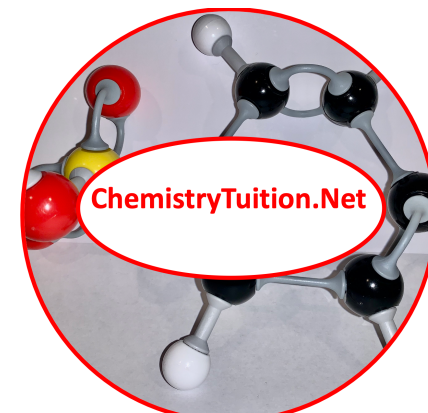
5 moles of NaCl

0.256 moles

0.256 moles

$$\frac{0.256}{5} \times 6$$

$$\text{Mass of NaOH} = \text{Moles} \times \text{Molar Mass} = 0.307 \times 40 = 12.28 \text{ grams}$$





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