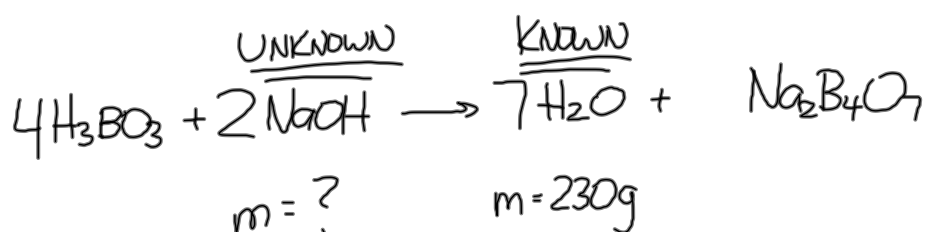
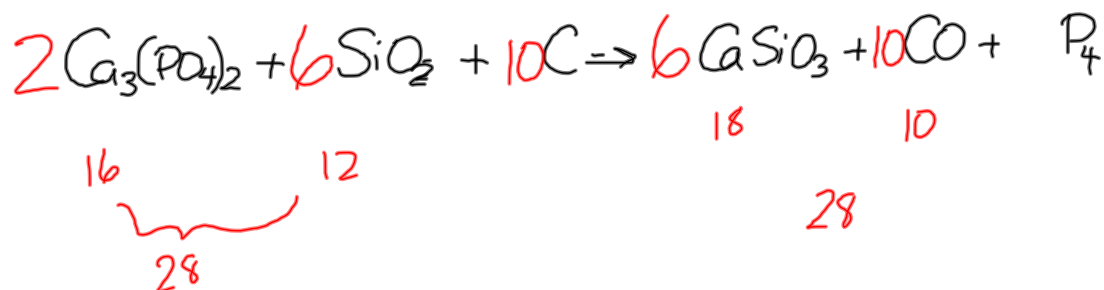


Check Worksheet



Step 1: Moles Known

$$230 \text{g H}_2\text{O} \times \frac{1 \text{ mol H}_2\text{O}}{18.02 \text{ g H}_2\text{O}} = 12.764 \text{ mol H}_2\text{O}$$

Step 2: Moles Unknown

$$12.764 \text{ mol H}_2\text{O} \times \frac{2 \text{ mol NaOH}}{7 \text{ mol H}_2\text{O}} = 3.647 \text{ mol NaOH}$$

Step 3: Mass Unknown

$$3.647 \text{ mol NaOH} \times \frac{40.00 \text{ g NaOH}}{1 \text{ mol NaOH}} = \boxed{150 \text{ g NaOH}}$$

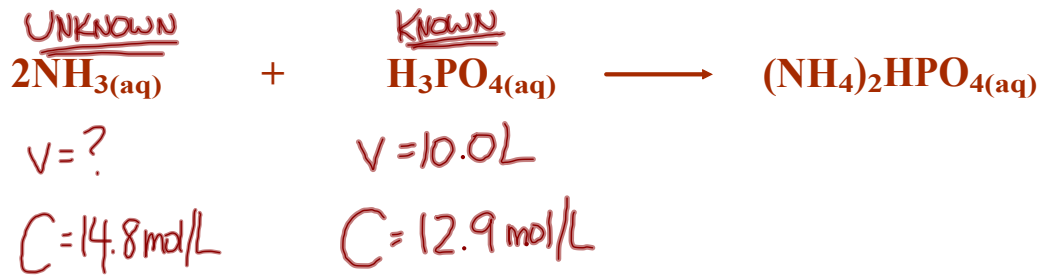
Solution Stoichiometry

SOLUTION STOICHIOMETRY

- the methods used to calculate the quantities of substances in solution.
- involves **molar concentrations and the volumes of solutions.**

Solution Stoichiometry

Solutions of ammonia and phosphoric acid are used to produce ammonium hydrogen phosphate fertilizer. What volume of 14.8 mol/L $\text{NH}_3(\text{aq})$ is needed for the ammonia to react completely with 10.0 L of 12.9 mol/L $\text{H}_3\text{PO}_4(\text{aq})$ to produce fertilizer?



Step 1: Moles Known

$$10.0\text{L H}_3\text{PO}_4 \times \frac{12.9\text{ mol H}_3\text{PO}_4}{1\text{ L H}_3\text{PO}_4} = 129\text{ mol H}_3\text{PO}_4$$

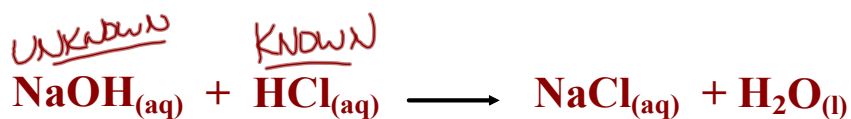
Step 2: Moles Unknown

$$129\text{ mol H}_3\text{PO}_4 \times \frac{2\text{ mol NH}_3}{1\text{ mol H}_3\text{PO}_4} = 258\text{ mol NH}_3$$

Step 3: Volume Unknown

$$258\text{ mol NH}_3 \times \frac{1\text{ L NH}_3}{14.8\text{ mol NH}_3} = 17.4\text{ L NH}_3$$

If 25.00 mL HCl acid with a concentration of 0.1234 M is neutralized by 23.45 mL of NaOH, what is the concentration of the base?



$$V = 23.45 \text{ mL} \quad V = 25.00 \text{ mL}$$
$$C = ? \quad C = 0.1234 \text{ M}$$

Step 1: Moles Known

$$0.02500 \text{ L HCl} \times \frac{0.1234 \text{ mol HCl}}{1 \text{ L HCl}} = 0.003085 \text{ mol HCl}$$

Step 2: Moles Unknown

$$0.003085 \text{ mol HCl} \times \frac{1 \text{ mol NaOH}}{1 \text{ mol HCl}} = 0.003085 \text{ mol NaOH}$$

Step 3: Concentration Unknown

$$\frac{0.003085 \text{ mol NaOH}}{0.02345 \text{ L NaOH}} = \boxed{0.1316 \text{ mol/L NaOH}}$$

$$0.003085 \text{ mol NaOH} \times \frac{1}{0.02345 \text{ L}} =$$

Worksheet

