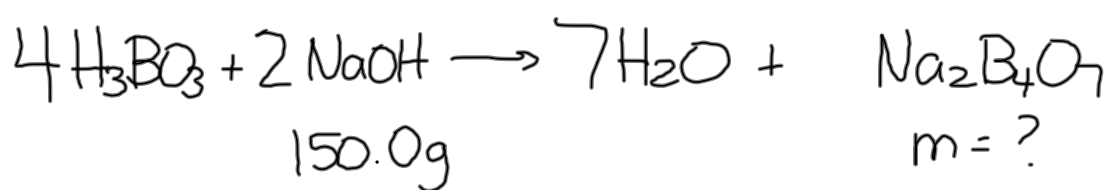


Homework - Worksheet



$$150.0\text{g NaOH} \times \frac{1 \text{ mol NaOH}}{40.00\text{g NaOH}} = 3.75 \text{ mol NaOH}$$

$$3.75 \text{ mol NaOH} \times \frac{1 \text{ mol Na}_2\text{B}_4\text{O}_7}{2 \text{ mol NaOH}} = 1.875 \text{ mol Na}_2\text{B}_4\text{O}_7$$

$$1.875 \text{ mol Na}_2\text{B}_4\text{O}_7 \times \frac{201.22\text{g Na}_2\text{B}_4\text{O}_7}{1 \text{ mol Na}_2\text{B}_4\text{O}_7} = \boxed{377.3\text{g Na}_2\text{B}_4\text{O}_7}$$

Solution Stoichiometry

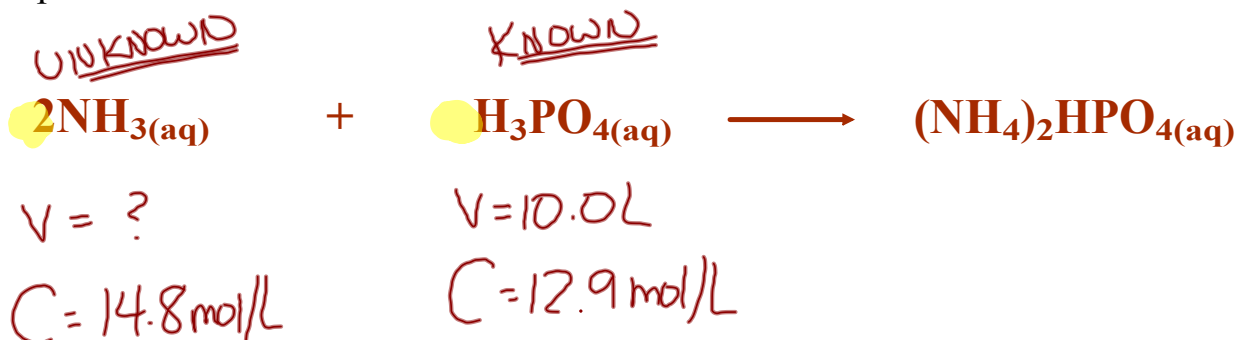
SOLUTION STOICHIOMETRY

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

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?



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Step 1: Moles Known

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

Step 2: Moles Unknown

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

Step 3: Volume Unknown

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

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?

UNKNOWN

KNOWN



$$V = 23.45 \text{ mL}$$

$$V = 25.00 \text{ mL}$$

$$C = ?$$

$$C = 0.1234 \text{ M}$$

$$0.02500 \text{ L HCl} \times \frac{0.1234 \text{ mol HCl}}{1 \text{ L HCl}} \times \frac{1 \text{ mol NaOH}}{1 \text{ mol HCl}} \times \frac{1}{0.02345 \text{ L NaOH}}$$

$$= 0.1316 \text{ mol/L NaOH}$$

Worksheet

