

□ Stoichiometry Of Solutions □

1. What volume of 0.496 M HCl is required to neutralize 20.0 mL of 0.809 M sodium hydroxide?

2. How many mL of 0.715 M HCl is required to neutralize 1.25 grams of sodium carbonate, producing carbonic acid?

3. What minimum number of grams of oxalic acid monohydrate, $\text{H}_2\text{C}_2\text{O}_4 \cdot \text{H}_2\text{O}$, would you specify for a titration of no fewer than 15.0 mL of 0.100 M NaOH? Both the hydrogen from oxalic acid are replaceable in this reaction.

4. How many grams of magnesium hydroxide will precipitate if 25.0 mL of 0.235 M magnesium nitrate are combined with 30.0 mL of 0.260 M potassium hydroxide?

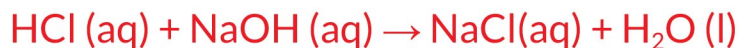
Name : _____

Date : _____

Stoichiometry Of Solutions

Answers

1. What volume of 0.496 M HCl is required to neutralize 20.0 mL of 0.809 M sodium hydroxide?



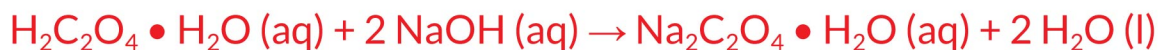
$$0.020 \text{ L NaOH} \times (0.809 \text{ mol NaOH}/1 \text{ L NaOH}) \times (1 \text{ mol HCl}/1 \text{ mol NaOH}) \\ \times (1 \text{ L HCl}/0.496 \text{ mol HCl}) = 33 \text{ mL HCl}$$

2. How many mL of 0.715 M HCl is required to neutralize 1.25 grams of sodium carbonate, producing carbonic acid?



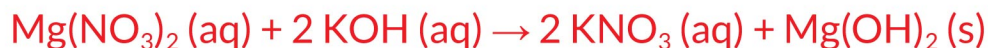
$$1.25 \text{ g Na}_2\text{CO}_3 \times (1 \text{ mol Na}_2\text{CO}_3/105.99 \text{ g Na}_2\text{CO}_3) \times (2 \text{ mol HCl}/1 \text{ mol Na}_2\text{CO}_3) \\ \times (1 \text{ L HCl}/0.715 \text{ mol HCl}) = 33 \text{ mL HCl}$$

3. What minimum number of grams of oxalic acid monohydrate, $\text{H}_2\text{C}_2\text{O}_4 \cdot \text{H}_2\text{O}$, would you specify for a titration of no fewer than 15.0 mL of 0.100 M NaOH? Both the hydrogen from oxalic acid are replaceable in this reaction.



$$0.0150 \text{ L NaOH} \times (0.1 \text{ mol NaOH}/1 \text{ L NaOH}) \times (1 \text{ mol H}_2\text{C}_2\text{O}_4 \cdot \text{H}_2\text{O}/2 \text{ mol NaOH}) \\ \times (108.06 \text{ g H}_2\text{C}_2\text{O}_4 \cdot \text{H}_2\text{O}/1 \text{ mol H}_2\text{C}_2\text{O}_4 \cdot \text{H}_2\text{O}) = 0.0810 \text{ g H}_2\text{C}_2\text{O}_4 \cdot \text{H}_2\text{O}$$

4. How many grams of magnesium hydroxide will precipitate if 25.0 mL of 0.235 M magnesium nitrate are combined with 30.0 mL of 0.260 M potassium hydroxide?



$$0.025 \text{ L Mg}(\text{NO}_3)_2 \times (0.235 \text{ mol Mg}(\text{NO}_3)_2/1 \text{ L Mg}(\text{NO}_3)_2) \\ \times (1 \text{ mol Mg}(\text{OH})_2/1 \text{ mol Mg}(\text{NO}_3)_2) \times (58.33 \text{ g Mg}(\text{OH})_2/1 \text{ mol Mg}(\text{OH})_2) \\ = 0.343 \text{ g Mg}(\text{OH})_2$$

$$0.030 \text{ L KOH} \times (0.260 \text{ mol KOH}/1 \text{ L KOH}) \times (1 \text{ mol Mg}(\text{OH})_2/2 \text{ mol KOH}) \\ \times (58.33 \text{ g Mg}(\text{OH})_2/1 \text{ mol Mg}(\text{OH})_2) = \boxed{0.227 \text{ g Mg}(\text{OH})_2}$$

The lower amount will precipitate.

Name : _____

Date : _____