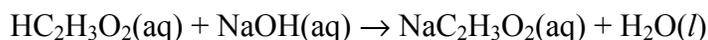


**WKS**  
**Solution Stoichiometry 2**

Name \_\_\_\_\_  
Period \_\_\_\_\_

1. 34.57 mL of HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub> (acetic acid) solution of unknown concentration is used to neutralize 25.19 mL of NaOH (sodium hydroxide) with concentration 0.4295 M according to the following balanced equation:



a. How many moles of acetic acid are used?

b. What is the concentration of the acetic acid solution, in M?

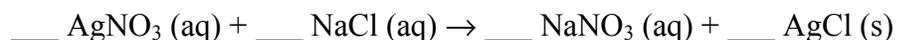
2. When 321 mL of HCl (hydrochloric acid) solution of unknown concentration reacts with Na<sub>2</sub>CO<sub>3</sub> (sodium carbonate), it forms NaCl (sodium chloride), water, and 11.1 g of CO<sub>2</sub> (carbon dioxide):



a. How many moles of HCl are used in the reaction?

b. What was the concentration of the HCl solution, in M?

3. Gravimetric analysis is a method of determining the concentration of a compound in solution by measuring the mass of a precipitate. In one experiment, 1.18 g AgCl precipitates when 25.0 mL of AgNO<sub>3</sub> solution reacts with excess NaCl solution in the following reaction:



a. Balance the equation.

b. How many moles of AgNO<sub>3</sub> were reacted?

c. What is the concentration of AgNO<sub>3</sub> solution, in M?

4. For the double replacement reaction described here, 57.2 mL of potassium phosphate solution of unknown concentration is needed to completely react with 40.0 mL of 0.650 M of cobalt(II) nitrate to produce aqueous potassium nitrate and solid cobalt(II) phosphate.
- Write and balance the equation
  - Determine the number of moles of potassium phosphate used.
  - What is the concentration of the potassium phosphate solution, in M?

Answers: 1a)  $0.0108 \text{ mol HC}_2\text{H}_3\text{O}_2$ ; 1b)  $0.3130 \text{ M HC}_2\text{H}_3\text{O}_2$ ; 2a)  $0.504 \text{ mol HCl}$ ; 5b)  $1.57 \text{ M HCl}$ ; 3a)  $1.1, 1.1$ ; 3b)  $8.23 \times 10^{-3} \text{ mol AgNO}_3$ ; 3c)  $0.329 \text{ M AgNO}_3$ ; 4a)  $2.3, 6.1$ ; 4b)  $0.0173 \text{ mol K}_3\text{PO}_4$ ; 4c)  $0.303 \text{ M K}_3\text{PO}_4$ .