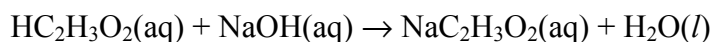


**WKS**  
**Solution Stoichiometry 2**

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:



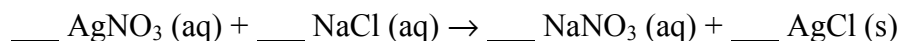
- a. How many moles of acetic acid are used?
- b. What is the concentration of the acetic acid solution, in M?

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)  $0.303 \text{ M K}_3\text{PO}_4$ .