WKS
Solution Stoichiometry 2

Name _____
Period _____

1. 34.57 mL of $HC_2H_3O_2$ (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:

$$HC_2H_3O_2(aq) + NaOH(aq) \rightarrow NaC_2H_3O_2(aq) + H_2O(l)$$

   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_2CO_3 (sodium carbonate), it forms NaCl (sodium chloride), water, and 11.1 g of CO_2 (carbon dioxide):

$$2HCl(aq) + Na_2CO_3(aq) \rightarrow 2NaCl(aq) + H_2O(l) + CO_2(g).$$

   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 $AgNO_3$ solution reacts with excess NaCl solution in the following reaction:

$$\_\_\_ AgNO_3\ (aq) + \_\_\_ NaCl\ (aq) \rightarrow \_\_\_ NaNO_3\ (aq) + \_\_\_ AgCl\ (s)$$

   a. Balance the equation.
   b. How many moles of $AgNO_3$ were reacted?

   c. What is the concentration of $AgNO_3$ solution, in M?

[Over]

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.

   a. Write and balance the equation

   b. Determine the number of moles of potassium phosphate used.

   c. What is the concentration of the potassium phosphate solution, in M?

Answers: 1a) 0.0108 mol $HC_2H_3O_2$; 1b) 0.3130 M $HC_2H_3O_2$; 2a) 0.504 mol HCl; 5b) 1.57 M HCl; 3a) 1,1,1,1; 3b) 8.23×10^{-3} mol $AgNO_3$; 3c) 0.329 M $AgNO_3$; 4a) 2,3,6,1; 4b) 0.0173 mol K_3PO_4; 4c) 0.303 M K_3PO_4.