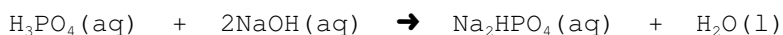


More - Titration Calculations

1. Calculate the concentration of acetic acid (CH_3COOH), if an average of 67.0 ml of 0.468 mol/L magnesium hydroxide ($\text{Mg}(\text{OH})_2$) is required to titrate 50.0 ml of the acid in order to reach the endpoint.
2. An average volume of 24.5 mL of 0.560 mol/L $\text{Ca}(\text{OH})_2$ was required to titrate 10.0 mL samples of sulfuric acid (H_2SO_4) to their endpoints. What is the concentration of sulfuric acid?
3. What volume of 0.060 mol/L NaOH is needed to titrate 25.0 ml samples of 0.075 mol/L $\text{H}_3\text{PO}_4(\text{aq})$ to the second endpoint. The neutralization reaction is as follows.



4. Using the following data of the results of a titration with 0.100 M potassium hydroxide (KOH), calculate the concentration of sulfuric acid (H_2SO_4).

| Burette reading from the titration of 20.0 ml of sulfuric acid with potassium hydroxide | | |
|---|----------------|--------------|
| Trial | Initial Volume | Final Volume |
| 1 | 0.0 | 23.0 |
| 2 | 23 | 47.0 |
| 3 | 0.0 | 23.5 |

- a) Calculate the volume of KOH added in each trail and use this to determine the average volume of KOH required to neutralize the 20.0 mL aliquots of H_2SO_4
 - b) Use your answer in a) to determine the concentration of sulphuric acid
5. Calculate the concentration of phosphoric acid if 25.00 mL of acid requires 76.00 ml of 0.560 mol/L $\text{Ba}(\text{OH})_2$ to titrate it to the endpoint (answer based on the third endpoint).
 6. A impure sample of ascorbic acid ($\text{HC}_6\text{H}_7\text{O}_6$), with a mass of 2.06 grams is dissolved in water. It is titrated with 0.200 mol/L sodium hydroxide. (The ascorbic acid reacts with sodium hydroxide in a 1: 1 ratio). The sample required 46.0 ml to reach an endpoint using phenolphthalein as the indicator.
 - a) Calculate the number of moles of ascorbic acid in the sample.
 - b) Calculate the mass of ascorbic acid in the sample.
 - c) Calculate the % purity of the sample.
 7. Determine the mass of NaHCO_3 that will exact neutralize the following combination of acids and bases:
 - 25 mL of 18.0 M H_2SO_4
 - 50 mL of 14.8 M H_3PO_4
 - 125 mL of 6.0 M NaOH
 - 12.5 g of $\text{Ca}(\text{OH})_2$

Answers: 1. 1.25 M 2. 1.372 M 3. 62.5 mL
 4. 0.05875 M 5. 1.135 M 6. 78.6 %
 7. 171 g