- 1. 49 mL of 0.200 M HCl is mixed with 50 mL of 0.200 M NaOH to reach the endpoint.
  - a. moles HCI =
  - b. moles NaOH =
  - c. excess moles NaOH =
  - d. [H<sup>1+</sup>]
  - e. [OH<sup>1-</sup>]
  - f. pOH =
  - g. pH =
- 2. 86.30 mL of an HCl solution was required to neutralize 31.75 mL of 0.150 M NaOH. Determine the molarity of the HCl.

3. 63.15 mL of calcium hydroxide is required to titrate 18.9 mL of a 0.200 M  $H_3PO_4$  solution. What is the molarity of the basic solution?

4. How many mL of 0.160 M HCIO<sub>4</sub> are needed to titrate 35.0 mL of 0.215 M LiOH?

5. 25.0 mL of 1.00 M HCl are required to titrate a Drano solution (active ingredient NaOH). How many moles of NaOH are present in the solution?

- 6. Ten grams of vinegar (containing acetic acid, HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub>, is titrated with 65.40 mL of 0.150 M NaOH.
  - a. How many moles of acetic acid are present in ten grams of vinegar?
  - b. How many grams of acetic acid are present in ten grams of vinegar?