

Maye

Adapted from 1987

The concentration of an unknown nitric acid solution is to be determined.

(a) Initially, a NaOH solution is standardized by titration with a sample of potassium hydrogen phthalate,  $\text{KHC}_8\text{H}_4\text{O}_4$ , often used in standardization experiments. A sample of pure  $\text{KHC}_8\text{H}_4\text{O}_4$  weighing 1.518 grams was dissolved in water and titrated with the NaOH solution. To reach the endpoint, 26.90 mL of base was required. Calculate the molarity of the NaOH solution.

(FM  $\text{KHC}_8\text{H}_4\text{O}_4 = 204.2 \text{ g/mol}$ )

(b) A 25.00 mL sample of unknown nitric acid solution is titrated with the standardized NaOH solution. This titration required 28.35 mL of base solution. Determine the molarity of the nitric acid solution.

(c) The nitric acid solution used in part (b) had been prepared by measuring 10.00 mL of concentrated nitric acid and diluting to a final volume of 500.0 mL. It was a sample from this diluted acid that was used in part (b). Determine the molarity of the original concentrated nitric acid.