Titration pH Calculations: Weak + Strong Titration Curves

Example One

Calculate the starting pH of the 50.0 mL of 1.00 M NH_3 solution before any HCl has been added.
Determine the major chemical species present at this point in the titration.
K_b (NH_3) $= 1.8 \times 10^{-5}$

Example Two

Find the pH when 20.0 mL of 1.00 M HCl is added to 50.0 mL of 1.00 M NH_3.
Determine the major chemical species present at this point in the titration.
K_b (NH_3) = 1.8 x 10^{-5}

Example Three

The Half-Equivalence Point

Find the pH when 25.0 mL of 1.00 M HCl is added to 50.0 mL of 1.00 M NH_3.
Determine the major chemical species present at this point in the titration.
$K_b\ (NH_3\ ) = 1.8 \times 10^{-5}$

Example Four

Find the pH when 30.0 mL of 1.00 M NaOH is added to 50.0 mL of 1.00 M NH_3.
Determine the major chemical species present at this point in the titration.
K_b (NH_3) = 1.8 x 10^{-5}

Example Five

The Equivalence Point

Find pH at equivalence when 50.0 mL of 1.00 M NH_3 is titrated with 1.00 M HCl.
Determine the major chemical species present at this point in the titration.
K_b (NH_3) $= 1.8 \times 10^{-5}$

Example Six

Find the pH when 60.0 mL of 1.00 M HCl is added to 50.0 mL of 1.00 M NH_3.
Determine the major chemical species present at this point in the titration.
K_b (NH_3) = 1.8 x 10^{-5}

Example Seven

Find pH at equivalence when 50.0 mL of 1.0 M $HC_2H_3O_2$ is titrated with 1.0 M NaOH.
K_a ($HC_2H_3O_2$) $= 1.8 \times 10^{-5}$

Example Eight

Find pH at equivalence when 50.0 mL of 1.0 M NH_3 is titrated with 2.0 M HCl.
K_b (NH_3) $= 1.8 \times 10^{-5}$

Example Nine

Find the pH at equivalence when 100.0 mL of 2.0 M HF is titrated with 1.0 M NaOH.
K_a (HF) $= 6.8 \times 10^{-4}$

Example Ten

Find the pH at equivalence when 500.0 mL of 0.10 M NH_3 is titrated with 0.10 M HCl.
K_b $(NH_3) = 1.8 \times 10^{-5}$