Quiz 5.4 – Titration

Name: *Key*

Question 1 (1 points)

$25.00 \, ml$ of HCl with unknown concentration were titrated to the end-point with $37.21 \, ml$ of $0.150 \, M$ NaOH. Find the initial [HCl]

$$\frac{C_A V_A}{\nu_A} = \frac{C_B V_B}{\nu_B} \qquad \frac{C_A \cdot 25.00 \, ml}{1} = \frac{0.150 \, M \cdot 37.21 \, ml}{2}$$

$$C_A = 0.223 \, M$$

Question 2 (2 points)

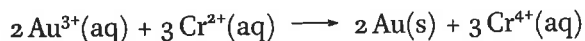$25.00 \, ml$ of $Ba(OH)_2$ with unknown concentration were titrated to the end-point with $42.85 \, ml$ of $0.350 \, M$ HNO_3. Find the initial $[Ba(OH)_2]$ $2 \, HNO_3 + Ba(OH)_2 \rightarrow 2 \, H_2O + Ba(NO_3)_2$

$$\frac{C_A V_A}{\nu_A} = \frac{C_B V_B}{\nu_B} \qquad \frac{0.350 \, M \cdot 42.85 \, ml}{2} = \frac{C_B \cdot 25.00 \, ml}{1}$$

$$C_B = 0.300 \, M$$

Question 3 (2 points)

Color-changing indicators are available for redox reactions as well as for acid-base reactions. Consider the following reaction:

$$2 \, Au^{3+}(aq) + 3 \, Cr^{2+}(aq) \longrightarrow 2 \, Au(s) + 3 \, Cr^{4+}(aq)$$

$50.00 \, ml$ of $Au(NO_3)_3$ with unknown concentration were titrated to the end-point with $28.63 \, ml$ of $0.125 \, M$ $Cr(C_2H_3O_2)_2$. Find the initial $[Au(NO_3)_3]$

$$\frac{C_A V_A}{\nu_A} = \frac{C_B V_B}{\nu_B} \qquad \frac{C_A \cdot 50.00 \, ml}{2} = \frac{0.125 \, M \cdot 28.63 \, ml}{3}$$

$$C_A = 0.0477 \, M$$