

(10/10)

Chemistry 203
Pre-Lab Assignment: Acid-Base Titration Exp 1

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Lab Section: 8

- The pH of rainwater collected in a certain region was 4.82. Calculate the H⁺ ion concentration of the rainwater. 2 decimal digit

$$\text{pH} = 4.82 = -\log [\text{H}^+]$$

$$\Rightarrow [\text{H}^+] = 10^{-\text{pH}} = 10^{-4.82} = \frac{1.5 \times 10^{-5}}{2 \text{ sig fig.}} \text{ mol/L}$$

(2)

- What is the mass of K₂Cr₂O₇ needed to prepare 250.0 ml of potassium dichromate (K₂Cr₂O₇) solution 2.16 M?

$$n = \frac{m}{M} = CV$$

$$V = 250.0 \text{ mL}$$

$$C = 2.16 \text{ M}$$

$$M_{\text{K}} = 39.1 \text{ g/mol}$$

$$M_{\text{Cr}} = 52.0 \text{ g/mol}$$

$$M_{\text{O}} = 16.0 \text{ g/mol}$$

$$\frac{m}{M} = CV \Rightarrow m = CV M = 250 \times 10^{-3} \times 2.16 \times (2 \times 39.1 + 2 \times 52 + 7 \times 16)$$

$$m = 158.87 \text{ g}$$

but since in 3 sig fig $\Rightarrow m = 159 \text{ g}$ 3 sig fig.

(4)

- 10.00 mL of a dilute acetic acid solution are titrated with a sodium hydroxide (NaOH) solution of molar concentration 0.1078 M. At the equivalence point, it is found that 13.42 mL of NaOH have been added. What is the molarity of the unknown acetic acid solution?

$$V_{\text{acid}} = 10.00 \text{ mL} \quad C_{\text{acid}} = 0.1078 \text{ M} \quad V_{\text{base}} = 13.42 \text{ mL}$$

$$\text{CH}_3\text{COOH} + \text{NaOH} \rightleftharpoons \text{NaCH}_2\text{COO} + \text{H}_2\text{O}$$

at the equivalence point $n_a = n_b$

$$C_a V_a = C_b V_b \Rightarrow C_a = \frac{C_b V_b}{V_a} = \frac{0.1078 \times 13.42}{10.00} = 0.1447 \text{ mol/L}$$

4 sig fig.

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