

Chemistry 146 – Van Bramer
Spring Problem Set – Week 1

1. A solution is made using 10.0 mL of acetic acid (density 1.0492 g/mL CRC Handbook of Chemistry and Physics 73rd ed) which is diluted to a volume of 250 mL with deionized water.
 - a. Write a balanced chemical equation for the dissociation of acetic acid
 - b. Draw a Lewis dot structure for acetic acid
 - c. Draw a Lewis dot structure for acetate ion
 - d. Based upon the Lewis dot structures for acetic acid and for the acetate ion, do you expect them to be soluble in water?
 - e. Determine the concentration of the acetic acid solution
 - f. Determine the concentration of the acetate ion in solution
 - g. Determine the concentration of H^+ ion in solution
2. The pH of this solution is measured using a pH meter. This experiment determines that the concentration of H^+ ion in the solution is 0.0035 M. Compare this experimental result with the expected concentration.
3. This acetic acid solution is titrated with an unknown sodium hydroxide solution. 21.36 mL of the acetic acid is required to reach the endpoint for the titration of 50.00 mL of sodium hydroxide. Determine the concentration of the original sodium hydroxide solution.
4. When the acetic acid is mixed with the sodium hydroxide, the temperature of the solution increases. In the titration described above, if the temperature of the solutions changes from 18.9 °C to 21.4 °C what is $[\Delta]H_{\text{rxn}}$ for this process?
5. Acetic acid has a pungent odor. What would you expect to find if you compare the odor for the acetic acid with the acetic acid solution? Based upon your understanding of how molecules behave, explain why you expect this result.