Title: Acid-Base Titration Curves

Purpose: To carry out a titration in which a pH meter provides a constant measure of system pH and to determine the K_a values at the equivalence point of acids in the titration by using the principle that pH=pKa – log [HA]/[A^-], and [HA] and [A^-] are equal.

Procedure: A Vernier Drop Counter was used to take volume readings of a titration sample in a 250 mL beaker. A magnetic stirrer bar was added to the beaker. A buret was rinsed and filled with NaOH, which was then used to titrate 25 mL of HCl, acetic acid, and oxalic acid. The volume at the buret was occasionally compared to volume calculated by the drop counter. The titration was completed when a large change in pH occurred and the system leveled.

Data Tables and graph: See attached

After Lab: See attached

2.

Table 1		
Equivalence Points for Trials		
Trial 1	7.863	25.27
Trial 2	8.14	26.743
Trial 3 – First Eq Point	3.40	9.900
Trial 3 – Second Eq Point	8.42	18.800

Error Analysis: The majority of the error stems from the quantitative equipment used in this experiment. The drop counter continually makes errors in the volumetric readings. Inaccurate initial readings for calibration can make enormous errors after hundreds of drops are counted. This device also assumes that every drop from the buret is of the same volume, which is not the case. The pH sensor also has error involved because of the fluctuations that occur when trying to calibrate the sensor. The device's voltage readings would fluctuate continuously, which affects the ph read as well.

Conclusion: In Acid-Base Titration Curves, acid base titration curves of strong acid, weak acid, and diprotic acid were examined using quantitative equipment. The equivalence points were determined and the graphs examined.