

# Titration Lab Expectations and Grading (**Due Feb 11, 2022**)

Chem 112000-2: Section-33

February 5, 2022

## 1 General Remarks

This can be handwritten or typed, though typed is easier to read/grade. Or, some portions can be handwritten and some can be typed. Though, you may run out of space if you try and handwrite it. If it is handwritten, make sure that it is legible and the scan is readable. All graphs should be plotted in excel or google sheets or something similar. **DO NOT HAND DRAW GRAPHS.** Note this assignment is due Monday **Feb 11, 2021** at 5:30 pm.

If something still doesn't make sense, please email me!

## 2 Pre-Lab Questions (20 points)

Each question is worth 10 points. Use tables in the lab manual, your book, or the internet to make your decision.

## 3 Data Analysis (60 points)

Plot the pH (y-axis) versus volume ( $V$ ) (x-axis). Plot  $\Delta\text{pH}/\Delta V$  versus  $V$ . This is actually a numerical estimate of the derivative of pH with respect to  $V$ . That is,

$$\frac{\Delta\text{pH}}{\Delta V} = \frac{\text{pH}_{i+1} - \text{pH}_i}{V_{i+1} - V_i}$$

where  $i$  denotes different entries in the table. Now do this again to plot  $\Delta(\Delta\text{pH}/\Delta V)/\Delta V$  versus  $V$ . Each graph is worth 10 points. Ensure you label axis, have a title, and have a legend if necessary.

For question 4 (10 points), identify each midpoint and determine the  $\text{pK}_a$ . Note you will have at least 2, and perhaps 3.

For question 5 (10 points), determine the concentration and give the  $\text{K}_a$ s (again at least 2 and perhaps 3).

For question 6 (10 points), use Table 1 in the lab manual to identify which acid we have.

In general, each question is worth 10 points.

## **4 Discussion (20 points)**

Each question is worth 5 points each. Question 1 is should be very familiar at this point. For question 2, it should be "Discuss the difference in titrations between weak-polyprotic acids/strong-bases and strong-acid/strong-bases." Question 3 is fairly straight forward. For question 4, give at least 1 advantage and 1 disadvantage.