

# *CH 223 Spring 2025:*

## **“Titration of Weak Acids (in class)” Lab - Instructions**

**Note: This is the lab for section 01 and H1 of CH 223 only.**

- *If you are taking section W1 of CH 223, please use this link:*

<http://mhchem.org/q/6b.htm>

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### *Step One:*

**Get a printed copy of this lab!** You will need a printed (hard copy) version of pages Ia-6-3 through Ia-6-4 to complete this lab. If you do not turn in a printed copy of the lab, there will be a 2-point deduction.

\* **Special Note:** Also bring a printed copy of the “Acid and Base Titrations” instructions for the Vernier pH titration equipment (we will use these again this week.)

### *Step Two:*

**Bring the printed copy of the lab (and the Vernier instructions) with you on Monday, April 28 (section 01) or Wednesday, April 30 (section H1.)** During lab in room AC 2507, you will use these sheets (with the valuable instructions!) to gather data, all of which will be recorded in the printed pages below.

### *Step Three:*

Complete the lab work and calculations on your own, then **turn it in** (pages Ia-6-3 through Ia-6-4 *only* to avoid a point penalty) **at the beginning of recitation to the instructor on Monday, May 5 (section 01) or Wednesday, May 7 (section H1.)** The graded lab will be returned to you the following week during recitation.

*If you have any questions regarding this assignment, please email ([mike.russell@mhcc.edu](mailto:mike.russell@mhcc.edu)) the instructor! Good luck on this assignment!*

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## Titration of Weak Acids

Name: \_\_\_\_\_

Complete the following questions. All work must be shown to receive full credit.

Lab Partner(s): \_\_\_\_\_

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### 1. Perform in the lab

Select an unknown acid and titrate *two samples* of the acid per the guidelines in the "Acid and Base Titration" lab.

Measure approximately 0.5 g of the unknown acid sample using an analytical balance (record to 0.0001 g) and dissolve each sample in about 75 mL of water. Record the following information for each sample; show all work and include calculations.

[NaOH] (M): \_\_\_\_\_

[NaOH] (M): \_\_\_\_\_

**Sample #1** Letter = \_\_\_\_\_

**Sample #2** Letter = \_\_\_\_\_

Unknown sample (g): \_\_\_\_\_

Unknown sample (g): \_\_\_\_\_

Equivalence volume (mL): \_\_\_\_\_

Equivalence volume (mL): \_\_\_\_\_

Half-equivalence volume (mL): \_\_\_\_\_

Half-equivalence volume (mL): \_\_\_\_\_

Equivalence pH: \_\_\_\_\_

Equivalence pH: \_\_\_\_\_

Half-equivalence pH: \_\_\_\_\_

Half-equivalence pH: \_\_\_\_\_

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### 2. Lab Calculations: show all calculations on separate paper; include with your lab report

mol unknown acid at equivalence: \_\_\_\_\_

mol unknown acid at equivalence: \_\_\_\_\_

molar mass unknown (g/mol): \_\_\_\_\_

molar mass unknown (g/mol): \_\_\_\_\_

$K_a$  unknown acid: \_\_\_\_\_

$K_a$  unknown acid: \_\_\_\_\_

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Average  $K_a$ : \_\_\_\_\_

Parts per thousand ( $K_a$ ): \_\_\_\_\_

Average molar mass (g/mol): \_\_\_\_\_

Parts per thousand (molar mass): \_\_\_\_\_

3. Postlab question: (*Show all work after the problem.*)

0.4998 g an unknown acid was placed in 75.00 mL of water.  
 The unknown acid required 16.44 mL of 0.2001 M NaOH to reach equivalence.  
 The pH at half equivalence was 3.86

**K<sub>a</sub>:** \_\_\_\_\_

**Molar mass of unknown (g/mol):** \_\_\_\_\_

**Volume NaOH to reach Half-equivalence (mL):** \_\_\_\_\_

**Concentration of Unknown acid in original solution (M):** \_\_\_\_\_