

Simulation – Acetic Acid – Determining its K_a Using a pH Titration Curve

Name: _____ Lab TA: _____

Lab Day Mon Tue(am) Tue(pm) Wed Thu(am) Thu(pm) Fri

Grade
 >95 >90 >85 >80 >70 <70

Report:

Report Submitted on Time (Check Box)

Yes No

Data Collection:

Vol. NaOH mL	pH	Vol. NaOH mL	pH	Vol. NaOH mL	pH	Vol. NaOH mL	pH	Vol. NaOH mL	pH	Vol. NaOH mL	pH
1.00		20.80		22.75		24.15		25.55		27.80	
2.00		20.90		22.80		24.20		25.60		27.90	
3.00		21.00		22.85		24.25		25.65		28.00	
4.00		21.10		22.90		24.30		25.70		28.10	
5.00		21.20		22.95		24.35		25.75		28.20	
6.00		21.30		23.00		24.40		25.80		28.30	
7.00		21.40		23.05		24.45		25.85		28.40	
8.00		21.50		23.10		24.50		25.90		28.50	
9.00		21.60		23.15		24.55		25.96		28.60	
10.00		21.70		23.20		24.60		26.00		28.70	
11.00		21.80		23.25		24.65				28.80	
12.00		21.90		23.30		24.70		26.10		28.90	
13.00		22.00		23.35		24.75		26.20		29.00	
14.00				23.40		24.80		26.30			
15.00		22.05		23.45		24.85		26.40		30.00	
16.00		22.10		23.50		24.90		26.50		31.00	
17.00		22.15		23.55		24.95		26.60		32.00	
18.00		22.20		23.60		25.00		26.70		33.00	
19.00		22.25		23.65		25.05		26.80		34.00	
20.00		22.30		23.70		25.10		26.90		35.00	
		22.35		23.75		25.15		27.00		36.00	
20.10		22.40		23.80		25.20		27.10		37.00	
20.20		22.45		23.85		25.25		27.20		38.00	
20.30		22.50		23.90		25.30		27.30		39.00	
20.40		22.55		23.95		25.35		27.40		40.00	
20.50		22.60		24.00		25.40		27.50			
20.60		22.65		24.05		25.45		27.60			
20.70		22.70		24.10		25.50		27.70			

From your pH Titration Curve:

1a. What is the pH before the addition of any NaOH?

1b. What is the pH at the End Point?

1c. What is the **pH** at the **mid-point**?

1d. What value for K_a for CH_3COOH did you obtain?

2a. Using the **K_a** value you determined for CH₃COOH, calculate the expected pH of CH₃COOH (be sure to set up an ICE Table) **before** any NaOH is added?

While you must set up the ICE Table you may either use the exact (solve the quadratic) method or if applicable the approximation method to solve this.

		+	H ₂ O(l)	⇌		+	
I							
C							
E							

pH: _____

2b. Compare this value to the value you recorded in question 1a.

Answer: Same, Less than, Greater than.

3. The **pH** at the equivalence point is **not 7**. Give the **formula** for the **ion** that caused the **pH to be something other than 7**? *Hint:- think hydrolysis.*

4. **Dissolving acids in water is an exothermic process. Without doing any calculations** how would you expect the K_a for CH_3COOH at 95°C to compare to value that you determined at 25°C ?

Simple state whether: the same, greater than or less than.

- 5a. Once again using **your value for the Ka for CH₃COOH** and that **K_w = 1x10⁻¹⁴** @ 25oC, **calculate what you would have anticipated the pH** to be at the **End Point** (be sure to set up an ICE Table).
While you must set up the ICE Table you may either use the exact (solve the quadriatic) method or if applicable the approximation method to solve this.

		+	H ₂ O(l)	⇌		+	
I							
C							
E							

	pH: _____
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- 5b. Compare this to the **value you recorded in question 1b**.
Answer: Same, Less than, Greater than.
