Lab sheet #7

-Titration of a weak acid with a strong base-

Objectives:

- To study titration curves.
- Determine the pKa value of a weak acid.
- Calculate the pH value at a given point.
- Reinforce the understanding of buffers.

Method:

You are provided with **0.1M CH₃COOH** (weak acid solution) and **0.1M NaOH** (strong base solution)**:**
1. Fill up the Burette with **0.1M NaOH** solution using the funnel.
2. To a beaker, add 10 ml of **0.1M CH₃COOH** solution and measure its pH value.
3. Start the titration: slowly add 0.5ml of **0.1M NaOH** (drop-wise) to the weak acid solution and mix, then record the pH value.
4. Keep on titration (step 3) until the pH reaches 9.

Results:

ml of 0.1M NaOH	pH	ml of 0.1M NaOH	pH
0		8.5	
0.5		9	
1		9.5	
1.5		10	
2		10.5	
2.5		11	
3		11.5	
3.5		12	
4		12.5	
4.5		13	
5		13.5	
5.5		14	
6		14.5	
6.5		15	
7		15.5	
7.5		16	
8		16.5	

1. Record the pH values in the titration Table
2. Plot the titration curve (pH versus ml of 0.1M NaOH added.
3. The calculations
   a. Calculate the pH of the weak acid HA solution at 0 ml of NaOH and after the addition of 3ml, 5ml, and 10ml of 0.1M NaOH. (using the theoretical Pka = 4.76)
   b. Determine pH value from the curve (measured)

(In the discussion: compare between pH values from a&b)

0.1M NaOH (ml)	Calculated pH	pH from titration curve
0		
3		
5		
10		

   c. <u>Determine </u>the pKa value of weak acid from the curve
       (In the discussion: compare the calculated Pka value with the theoretical one)

In the Discussion
At what pH-range did the acid show the **best** buffering behavior?
What are the chemical species at that region, what are their proportions?