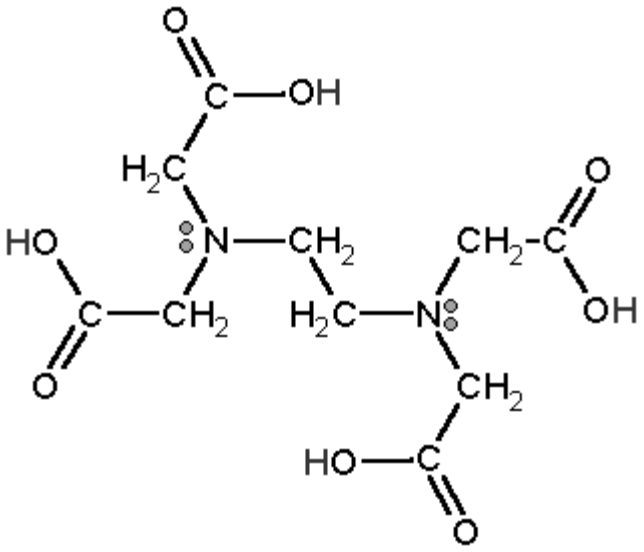
Spring 2004 Name_____

Sinex

CHM 103 EXAM II

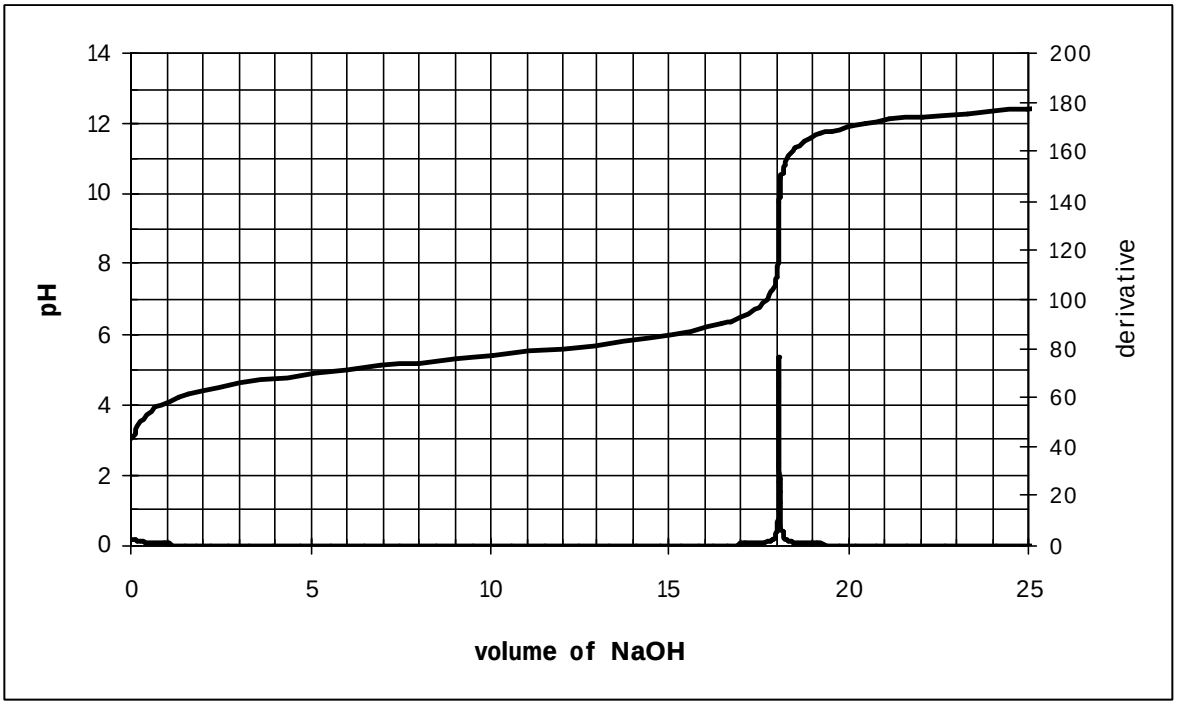
Show all calculations with correct units and significant figures. Write in complete sentences. Pick up the take-home question. **Good Luck!!!**

1. EDTA forms an octahedral complex with many metal ions. The EDTA molecule raps around the metal ion. Circle the binding sites on the EDTA molecule shown below. (12)



2. Calculate the molarity of the calcium ion in a 25.00 mL water sample, if 19.55 mL of 0.0274 M EDTA solution is required to titrate the sample. (13)

3. Calculate the molar mass of a weak monoprotic acid sample if a sample of 257.1 mg was titrated with 0.0447 M NaOH. (20)

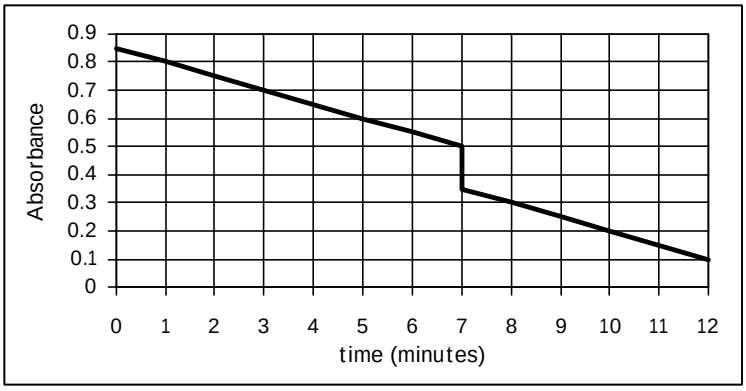


What is the K_a of the weak acid? Illustrate how you determined this using the graph.

Which indicator would work best for this titration? Circle your choice.

7.5 - 9.5 8 -10 8.5 -10.5

4. Consider the absorbance as a function of time plot given below for the crystal violet reaction where rate = k $(CV^+)(OH^-)$. The analysis was performed at λ_{max}. An error occurred during the run at 7 minutes. (25)



Did the rate of reaction change as compared to before and after the error? Support your answer.

Here are three possible scenarios. For each scenario, would it produce the results above and is the scenario physically possible during an experiment.

- The pathlength of the cell decreased.

- The wavelength on the spectrophotometer increased.

- The concentration of the crystal violet was diluted.