

Prelab Questions--Experiment 9: Titration of a Weak Acid

Everyone answer the same first two questions then:

Answer **one** (1) of the following questions, based on the last digit of your student ID number.*

ID ending in: 0 or 1: a 2 or 3: b 4 or 5: c 6 or 7: d 8 or 9: e

Two Questions for everyone:

1. Calculate the volume of 50% NaOH hydroxide required to make 1.00 L of 0.100 M solution. The density of 50% NaOH in water is 1.53 g mL^{-1} .

2. Write an EXCEL spreadsheet to calculate the derivative of the following titration data (see Table 1 for an example). You can copy and paste the data into EXCEL, so you shouldn't need to type in the data. Show a plot of the derivative curve as a function of volume.

V (mL)	pH
20.98	5.15
22.43	5.31
23.78	5.50
24.45	5.65
24.77	5.75
25.13	6.00
25.82	6.30
26.03	6.75
26.2	7.45
26.32	8.85
27.01	10.4
27.38	10.55
28.25	10.85
28.98	10.95

a. The pH at the equivalence point of a titration of a weak acid with a strong base is:

(choose one:) acidic basic or neutral

b. The primary standard KHP is supplied as a: (choose one:) solid or solution

c. For the weak acid titration, the solution in the burette is:

(choose one:) the weak acid or NaOH

d. A 25.00 mL sample of an unknown weak acid is titrated to the equivalence point with 34.12 mL of 0.0998 M NaOH. At what volume is the pH equal to the pK_a of the weak acid?

e. A 25.00 mL sample of an unknown weak acid is titrated to the equivalence point with 14.65 mL of 0.0986 M NaOH. Calculate the concentration of the unknown weak acid.