

Name \_\_\_\_\_ Date \_\_\_\_\_

### Titration of a Weak Acid - Lab Analysis

The accompanying graph was created during the titration of an unknown weak monoprotic acid with 0.100 M NaOH.

1. Use your graph to find the mL of NaOH used to neutralize the acid (to reach the equivalence point). Put a dot on the curve at the equivalence point and draw a line to cross the x-axis at the mL of NaOH. Draw another line from the equivalence point that crosses the y-axis and indicates the pH at the equivalence point.

\_\_\_\_\_ mL of NaOH needed to reach equivalence point

\_\_\_\_\_ pH of the equivalence point

2. Explain how the graph can be used to find the  $K_a$  of the weak acid. Use your graph to do this. Mark the graph to indicate the points used. What is the  $K_a$  of your unknown acid?

Explanation:

$K_a$  of unknown acid \_\_\_\_\_

3. Use the concentration of the NaOH and the mL of NaOH needed to reach the equivalence point to calculate the moles of unknown acid that were titrated.
4. Use your answer to number 4 and the volume of the unknown acid to calculate the molarity of the unknown acid.

5. Fill in the last column of the table. Use the information below and your answer to numbers 3 and 4 to identify your acid.

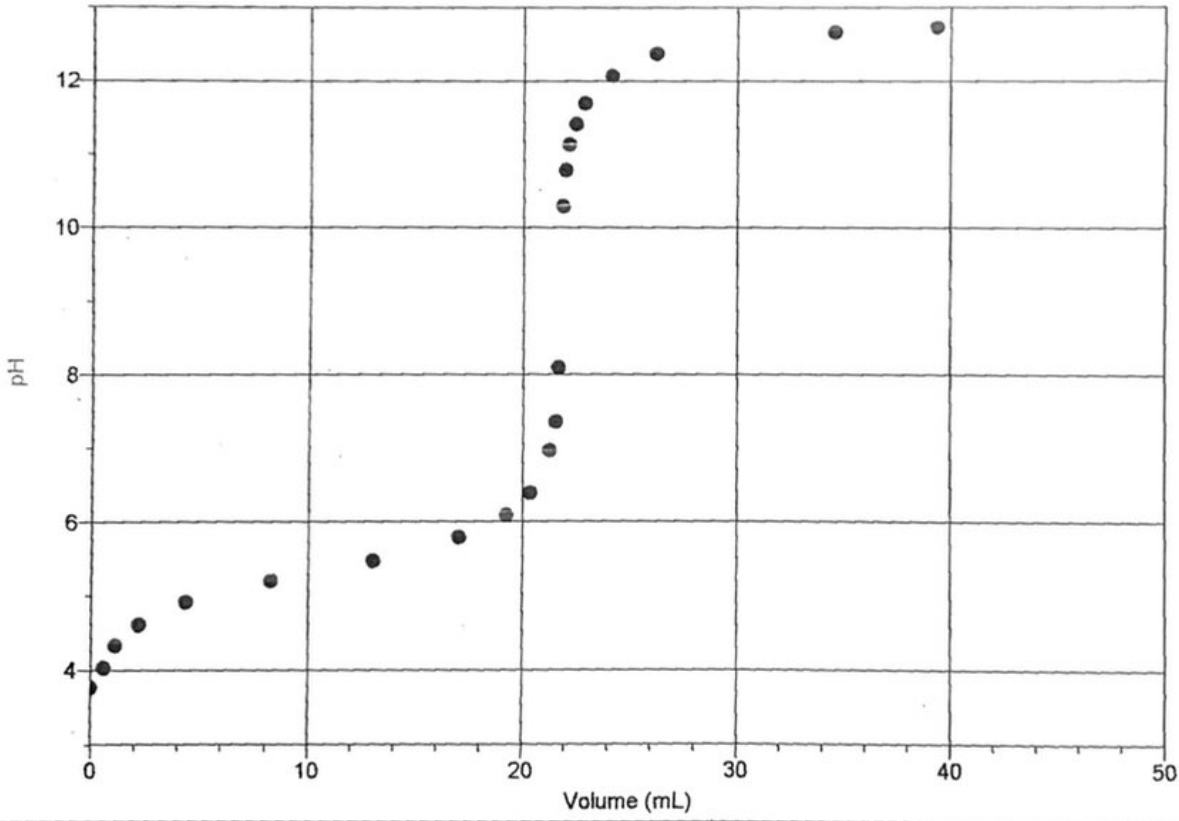
<b>Acid</b>	<b>Molar Mass (g/mol)</b>	<b>pKa</b>	<b>Ka</b>
Benzoic acid	122.1	4.20	
Potassium hydrogen phthalate	204.23	5.41	
2-chlorobenzoic acid	157.58	3.99	
Sodium hydrogen sulfite	104.06	7.21	
trans-Crotonic acid	86.09	4.69	

Identity of your acid \_\_\_\_\_

Explain your choice.

B

### Acid-Base Titration



Latest				
Volume (mL)	pH	d1 (pH/vol)	d2 (d1/vol)	
1	0	3.78	0.454	-0.033
2	0.59	4.04	0.459	-0.119
3	1.11	4.33	0.327	-0.145
4	2.22	4.62	0.171	-0.064
5	4.39	4.92	0.096	-0.018
6	8.29	5.21	0.069	-0.004
7	13.09	5.48	0.071	0.004
8	17.08	5.80	0.099	0.021
9	19.28	6.10	0.180	0.091
10	20.39	6.39	0.404	0.399
11	21.3	6.97	0.808	2.381

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12	21.6	7.36	2.699	13.914
13	21.71	8.10	8.323	13.104
14	21.9	10.30	8.079	-12.053
15	22.01	10.79	3.251	-18.251
16	22.2	11.14	1.291	-5.917
17	22.51	11.41	0.723	-1.342
18	22.91	11.70	0.364	-0.320
19	24.19	12.08	0.169	-0.079
20	26.29	12.38	0.059	-0.016
21	34.61	12.66	0.033	-0.005
22	39.42	12.74	0.020	-0.003