

Chemistry 1105

Ionization Constant of Acetic Acid

Date: _____

Name: _____

OBJECT: To determine the ionization constant, K_a , of acetic acid and to see if it remains relatively constant in variously prepared acetic acid solutions.

OBSERVATIONS:

PROCEDURE: As in Chemistry 1105 Lab Manual, pp. _____.

DATA:

Part A: Standardizing the NaOH Solution

Concentration of Acetic Acid: _____

Run	Volume of 0.20 M Acetic Acid	Initial Volume NaOH	Final Volume NaOH	Volume NaOH Used
1				
2				
Avg. or best run				

Part B & C: Using Method One & Two to Determine K_a

pH of pure acetic acid: _____

Average Volume NaOH used in Part A: _____

$\frac{1}{2}$ Volume = _____

$\frac{3}{4}$ Volume = _____

Sample Description	Initial Volume NaOH	Final Volume NaOH	<i>Total</i> Volume NaOH added	pH
$\frac{1}{2}$ neutralized acetic acid				
$\frac{3}{4}$ neutralized acetic acid				

Part D: Using Method Three to Determine K_a

Sample Description	Mass of boat	Mass of Boat + sodium acetate	<i>Total</i> Mass of sodium acetate added	pH
15.00 mL acetic acid + ~0.35g sodium acetate				
15.00 mL acetic acid + ~1.10g sodium acetate				

CALCULATIONS:

Part A

Calculate the concentration of the NaOH solution:

Part B & C

a) Calculate the K_a of the pure acetic acid sample

b) Calculate the K_a of the $\frac{1}{2}$ neutralized sample

c) Calculate the K_a of the $\frac{3}{4}$ neutralized sample

Part D

a) Calculate the K_a of acetic acid with 0.35g of dissolved sodium acetate

b) Calculate the K_a of acetic acid with 1.10g of dissolved sodium acetate

RESULTS:

K_a from pure acetic acid solution	
K_a from half neutralized solution	
K_a from $\frac{3}{4}$ neutralized solution	
K_a from solution containing 0.35g $\text{NaCH}_3\text{COO} \cdot 3\text{H}_2\text{O}$	
K_a from solution containing 1.10g $\text{NaCH}_3\text{COO} \cdot 3\text{H}_2\text{O}$	
Literature K_a (give reference)	

CONCLUSION: