SCH 4UI - Independent Study - Experimental

The experimental independent study will involve the identification of unknown organic acids. You will be given several unknowns and it will be your task to devise a method for identifying that unknown using titration. There will be due dates for pre-lab work. This work will be evaluated for effectiveness, completeness etc.

Organic acids are long hydrocarbon chains with one or more carboxylic acid groups. Keep this in mind as you design your procedure.

Please refer also to the Academic Dishonesty Policy for science.

KEY DATES:
procedure due - _____
lab periods _____
final report due _____

Possible unknowns - Adipic acid, benzoic acid, citric acid, fumaric acid, 1-naphthylacetic acid, malonic acid, oxalic acid dihydrate, salicylic acid or tartaric acid

Your tasks:

DAY 1
1 - make up 500 ml of 0.5M NaOH using solid NaOH
2 - Four individuals combine their NaOH sol'ns into one plastic container
3 - make up 500 ml of 0.5M HCl solution from 6M stock
4 - Four individuals will combine their HCl sol'ns into one glass bottle

DAY 2
5 - standardize the NaOH solution with potassium hydrogen phthalate (KHP)
6 - standardize the HCl sol'n using the NaOH solution

DAY 3-4
7 - Analyze 3 unknown solid organic acids by titrating with the NaOH solution in order to identify the acid
8 - Write up a full laboratory report. (complete & concise)

Hints:

- Some organic acids are not soluble in water (backtitration!)
- not all acids are monoprotic
- Why use a plastic container for the NaOH solution?
- standardize NaOH using 3 samples (each of 1.5g) of potassium hydrogen phthalate (KHP)
- standardize HCl using three 25ml samples of HCl
- each unknown should be analyzed using three samples of 0.5 to 0.7 grams of the solid acid
- possible indicators are phenolphthalein and methyl orange

Report:

1. Title page
2. Purpose
3. Background theory including choosing indicators.
4. Abstract
5. Your procedure – good copy
6. Observations
7. Calculations
8. Discussion (include all balanced chemical equations)
9. Sources of error
10. Conclusion
11. Safety report – dealing with organic acids, acids and bases
12. Bibliography

Evaluation:

Draft of procedure	5%
Lab Journal	15%
Report	40%
Results	30%
Lab techniques	10% (preparation, safety etc.)

late - 10% per day up to 3 days then a mark of zero will be assigned.

Before coming to the lab you mast have

1. A working procedure that has been checked with me
2. A safety report consisting of two or three sentences outlining the hazards of each chemical used in the lab.

SCH 4UI – IS – ORGANIC ACIDS TITRATION

Name: _____

Procedure	/5
Lab Journal	/15
REPORT	
Background + Indicator choice	/5
Abstract	/5
Observations and Calculations	/5
Discussion and Sources of Error	/10
Safety Report + Bibliography	/5
Referencing	/5
Grammar and spelling	/5
UNKNOWNS IDENTIFICATION	
#1	/10
#2	/10
#3	/10
LAB TECHNIQUE	/10
OVERALL	/100