Name .....

Lab. Instructor ..... Date .....

Pre-Laboratory Questions

1. Why was the standard NaOH solution not prepared by calculating the amount of solid NaOH needed for 100 mL of solution, weighing it accurately, and making it up to exactly 100 mL of total volume?

..Because...NaOH.is..a...Secondary...Standard...Solution...which mean that-
..its..concentration...Changes...with...time..and..it...may....
.....react....with..Vapor...water...and...absorb...H2o.....

2. Why not simply rinse the buret with distilled water rather than the solution to be used in it?

.....This.assures.....that.....the...Solution...to...be....used
.....in...the...buret...will..not...be..diluted.....with
....distilled..water.....adhering...to..the...buret...wall.

3. Why does the volume of water added to potassium hydrogen phthalate not have to be measured carefully?

..Because..the...basis...of...this...reaction..is...that....if.....one
..reactant.....reacts...completely...with...another...reactant..
..with.....no...excess...remaining...the..number...of...moles
..of...each...reactant...is...the...same.....

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Results and Calculations

A. Standardization of NaOH Solution

	Trial (I)	Trial (II)
Mass of flask	g	g
Mass of Flask + KHP	g	g
Mass of KHP	0.20 g	0.22 g
Molar mass of KHP	~~71.08~~ 204 g/mol	~~71.08~~ 204 g/mol
Moles of KHP	$9.80 * 10^{-4}$ mol	$1.08 * 10^{-3}$ mol
Initial buret reading	6.60 mL	14.5 mL
Final buret reading	14.50 mL	21.30 mL
Volume of NaOH	7.90 mL	6.80 mL
Moles of NaOH = mole KHP	$9.80 * 10^{-4}$ mol	$1.08 * 10^{-3}$ mol
Molarity of NaOH	0.12 M	0.15 0.16 M
Average Molarity of NaOH		0.11 0.14 M

B. Mass percent of acetic acid in vinegar.

unknown: 57

	Trial (I)		Trial (II)	
Volume of vinegar	10.00	mL	10.00	mL
Initial buret reading	21.30	mL	34.00	mL
Final buret reading	30.56	mL	39.90	mL
Volume of NaOH used (final-initial)	9.20	mL	8.90	mL
Average molarity of NaOH, From Part A:			0.15	M
Moles of NaOH used (MV)	1.38×10^{-3} 1.4×10^{-3}	mol	1.34×10^{-3} 1.3×10^{-3}	mol
Moles of CH_3COOH in vinegar Reacted with the NaOH	1.38×10^{-3}	mol	1.34×10^{-3}	mol
Molarity of CH_3COOH in vinegar	0.14	M	0.13	M
Average molarity of acetic acid in vinegar			0.14	M
Molar Mass of acetic acid, CH_3COOH (m*n)			60	g/mol
Mass of CH_3COOH per liter of vinegar			8.4	g
Mass percent acetic acid in vinegar (assume that vinegar has a density of 1.00 g/mL)			$\frac{8.4}{10} = 0.84$	%

8.4

-0.5

QUESTIONS

$\left(\frac{|real - C|}{real}\right) \times 100\%$

1. Calculate the percent error would have been in a titration that used 32.75 mL of a solution if a bubble with a volume of 0.25 mL had been swept out of the tip during the titration.

real

$\frac{0.25}{32.50} \times 100\% = 0.76\%$

2. The label on the vinegar bottle used in this experiment claims that the vinegar contains 3 % acetic acid by weight. Use your results and a density of 1.0 g/mL to investigate this claim. $M.m = 60.052\ g/mol$

$3\% = \frac{C_{conc} \times 60.052}{d \times 1000} \times 100\%$

Concentration $= 0.499 \simeq 0.5\ M$

$\% = \frac{M * M.\omega}{d \times 10}$