Ministry of Higher Education and Scientific Research

Mustansiriyah University

College of Science / Department of Chemistry

Practical Analytical Chemistry

For First Year Students Biology Department

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Standardization of acetic acid solution (CH_3COOH) using standard solution of sodium hydroxide (NaOH)

- ***Purpose:*** o Determine the exact normality of acetic acid.
- ***Theory:*** In this experiment, a standard solution of sodium hydroxide, NaOH was used to determine the normality of acetic acid present in a sample. The reaction can be written as:

$$NaOH + CH_3COOH \longrightarrow CH_3COONa + H_2O$$

Equipment	***Materials***
• Burette	Acetic acid solution (CH_3COOH) unknown
• Beaker	Sodium hydroxide solution (NaOH) 0.1N
• Pipette	Phenolphthalein indicator
• Pipette filler	Distilled water
• Conical flask	
• Dropper bottle	
• Funnel	
• Stand	
• Clamp	
• Filter paper	

Procedures

1. Wash the burette, pipette and conical flask with distilled water.
2. Rinse the burette with sodium hydroxide solution (NaOH).
3. Using a funnel, fill the burette with sodium hydroxide solution (NaOH) 0.1N.
4. Add 5.00 mL volume of the acetic acid solution by the pipette into a conical flask.
5. Add a few drops of phenolphthalein indicator to the acid solution in the conical flask. Note the color of the solution (solution I).
6. Added sodium hydroxide solution (NaOH) 0.1N slowly from the burette in about 1.00 mL portions to the acetic acid in a conical flask (solution I), swirling the conical flask after each addition. The end-point of the titration is reached when the color of the solution in the conical flask changes.
7. Note the burette reading and calculate how adding Sodium hydroxide solution (NaOH) 0.1N was used.
8. Repeat the titration for a more accurate reading. Repeat the titration until two readings agree within 0.10 mL. Calculate the normality of the acetic acid.

Calculations

$$N_1 \times V_1 = N_2 \times V_2$$

(NaOH) (CH_3COOH)

Questions:

Explain briefly:

1. Name the salt formed in this titration?
2. Describe briefly, the washing-rinsing procedure for apparatus before starting the titration?
3. In using a burette, why it is important (1) to clamp it vertically, (2) to have the part below the tap full?