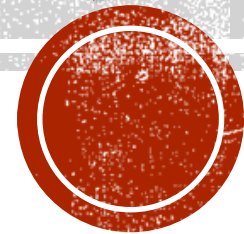


Medical Chemistry Laboratory



EXPERIMENT 5

***QUANTITATIVE ANALYSIS OF A MIXTURE
(SODIUM HYDROXIDE + SODIUM CARBONATE)***



INTRODUCTION

- The analysis of such mixtures requires two titrations: one with an alkaline-range indicator, such as phenolphthalein with a transition range at a pH of about (9), and the other with an acid-range indicator, such as methyl orange.



PROCEDURE

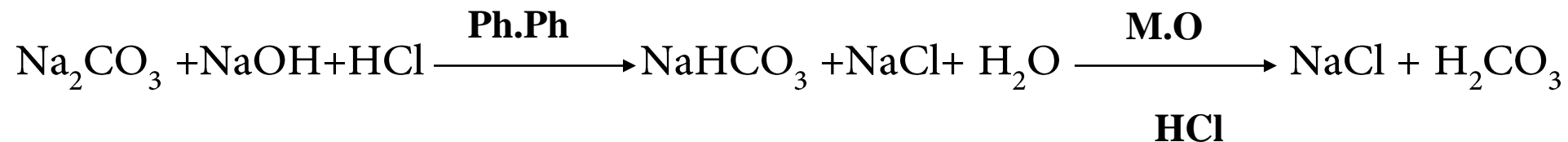
1. Clean the burette and Homogenized with HCl solution.
 2. Fill the burette with (0.1 N) HCl.
 3. Transfer (10ml) unknown of a mixture solution into conical flask.
 4. Add 1-2 drops of phenolphthalein indicator (solution become pink).
 5. Titrate with standard (0.1 N) HCl from burette until the pink color disappears (change to colorless).
- ❖ At this grade: all the hydroxide and half of the carbonate have been neutralized. Let us assume that the volume of acid by “P” ml.



PROCEDURE

6. Now add 2-3 drops methyl orange indicator in to the mixture solution (become yellow).
 7. Titration until the solution just begins to change from yellow to red (Onion).
- ❖ At this grade: all the hydroxide and all of the carbon have been neutralized. Let us assume that the volume of acid by “M” ml.

The equation of reaction :



CALCULATION

- ✓ P (ml) = Volume of HCl which equivalent to all OH^- and $\frac{1}{2} \text{CO}_3^{=}$.
- ✓ M (ml) = Volume of HCl which equivalent to all OH^- and all $\text{CO}_3^{=}$.
- ✓ $M-P$ = Volume of HCl which equivalent to $\frac{1}{2} \text{CO}_3^{=}$.
- ✓ $2(M-P)$ = Volume of HCl which equivalent to all $\text{CO}_3^{=}$.
- ✓ $M-2(M-P)$ = Volume of HCl which equivalent to all OH^- .



CALCULATION

☒ *calculate the normality of hydroxide:*

$$\text{N}_{\text{acid}} \times V_{\text{acid}}[M-2(M-m)] = \text{N}_{\text{base}} \times V_{\text{base}}$$

☒ *To calculate the normality of carbonate:*

$$\text{N}_{\text{acid}} \times V_{\text{acid}}[2(M-m)] = \text{N}_{\text{base}} \times V_{\text{base}}$$

☐ *Weight in grams per liter (no. of grams) = Normality x GEW*

▪ GEW for NaOH = 40 g/mol and GEW for Na₂CO₃ = 53 g/mol

$$\text{NaOH \% } \frac{W}{V} = \text{no. of grams} \times \frac{100}{1000}$$

$$\text{Na}_2\text{CO}_3 \% \frac{W}{V} = \text{no. of grams} \times \frac{100}{1000}$$

