Experiment (3)

Analysis of a mixture (sodium hydroxide + sodium carbonate)

1. Add 10 ml of a mixture solution to 100 ml conical flask and add 1 drop of phenolphthalen indicator.
2. Clean the burette and rinse with HCl.
3. Fill the burette with HCl.
4. Titrate with standard hydrochloric acid solution until the pink color disappears (the solution will be colorless).
   Note: at this stage all the hydroxide and half the carbonate have been neutralized. Let us assume that the volume of acid be "X" ml.
5. Add 3 drops of Methyl Orange indicator into the solution above and continue the titration until the solution just begins to change from yellow to red.
   Note: at this stage another half of carbonate has been neutralized. Let the volume of acid be "Y" ml.
6. Repeat the titration a few times until you get approximate results.

Calculations:

$$(X - Y) = Z \rightarrow Volume\ of\ HCl\ equivalent\ to\ OH^- \cdots ①$$

$$2 * Y \rightarrow Volume\ of\ HCl\ equivalent\ to\ CO_3^{=} \cdots ②$$

$$N_{acid} * V_{acid} = N_{base} * V_{base}$$

$$N_{acid} * Z = N_{OH^-} * 10 \cdots ①$$

$$N_{acid} * 2Y = N_{CO_3^{=}} * 10 \cdots ②$$

$$concentration\ of\ [OH^-]_{(ppm)} = N_{OH^-} * eq.wt * 1000$$

$$concentration\ of\ [CO_3^{=}]_{(ppm)} = N_{CO_3^{=}} * eq.wt * 1000$$