CONDUCTOMETRIC TITRATION OF STRONG ACID Vs STRONG BASE

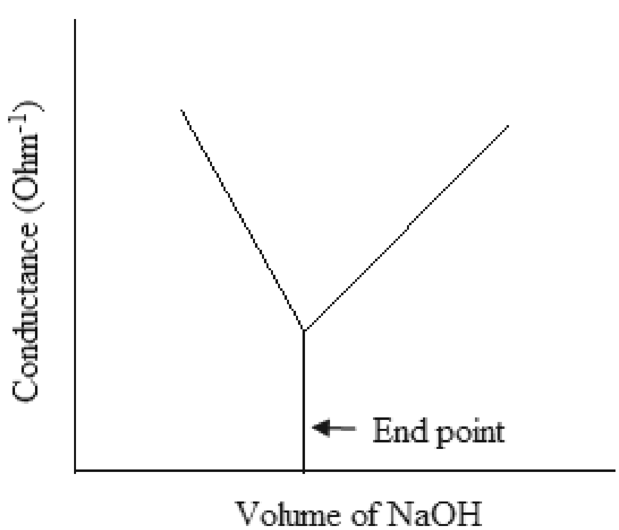
Experiment No. …………….   Date:…………………

Aim: To estimate the amount of HCl present in the given volume of test solution using conductometer.

Apparatus required: Volumetric flask, Pipette, conical flask, 50 ml Burette, 100 ml Beaker, conductivity meter, conductivity cell.

Reagents required: 0.1M HCl, 0.1M KCl, 1M NaOH

Theory: An acid-base conductometric titration using HCl and NaOH can be performed using a conductivity cell and the change of conductance followed as the base is added. The behavior of this reaction depends on high ionic conductance of H^+ and OH^- ions compared with salt ions of Na^+ and Cl^-. Initially the H^+ concentration is large and as the titration proceeds, the concentrations of H^+ decreases up to the equivalence point and is replaced by less conducting Na^+ ions. At the equivalence point, for strong acid and strong base the concentration of both H^+ and OH^+ ions are only 10^{-7}, the conductance is due to the Na^+ and Cl^- ions. As further base is added, the OH^- concentration builds up and conductance increases. The equivalence point (point of neutralization) can be conveniently taken as the intersection of the two straight lines that can



be drawn. Minimum value of the conductance in the graph will correspond to the equivalence point.

***Equation*:** $HCl + NaOH \longrightarrow NaCl + H_2O$

Procedure

1. Standardize the conductivity meter using 0.1N KCl solution at the room temperature.
2. Rinse a clean 100 ml beaker with HCL test solution and pipette out 20 ml of the HCl solution in it. Dip the conductivity cell in it.
3. Connect the conductivity cell to the conductivity meter and measure the conductance.
4. Add NaOH solution from the burette to the HCl test solution in the beaker in 1.0 ml . increments. After the addition of each increment of NaOH gently mix the solution with a glass rod and measure its conductance value and note down the same. As NaOH is gradually added H^+ of acid combine with OH^- of base and will form unionized water where as the concentration of slow moving Na^+ ions will increase. On adding more NaOH , the conductance will go down decreasing until the whole acid has been neutralized by the base. Further addition of NaOH beyond the equivalence point will increase conductance due to free and fast moving OH^- ions.
5. Plot a graph between volume of NaOH added (in ml) on X-axis against conductance (Ohm^{-1}) on Y- axis. The intersection of both the straight lines is the equivalence point (V_2) of the titration.

Observations

S.No	**Vol. of NaOH (ml)**	**Conductance (ohm^{-1})**

Result: The amount of hydrochloric acid present in the given test solution found to be …………………. g/100ml**.**