EXPERIMENT NO: **DATE:**

Conductometric estimation of acid mixture using Standard NaOH solution

PRINCIPLE: Conductance of any solution is the capacity of all the ions in it to carry current. It is represented as G and it is reciprocal of the resistance R. G=1/R. Conductance of any solution depends on the number of ions, charges on ions and mobility of ions. The principle underlying conductometric titrations is the substitution of ions of one mobility by ions of another mobility. During the titration conductance changes, and the equivalence point is indicated by a break in the conductance-volume curve. When acid mixture is titrated against sodium hydroxide, hydrochloric acid reacts first and the conductance is decreased. Hydrochloric acid in Free State is completely dissociated in to ions in solution. When sodium hydroxide is added conductance is decreases due to the replacement of highly mobile hydrogen ions by less mobile sodium ions.

$$H^+ + Cl^- + Na^+ + OH^- \longrightarrow Na^+ + Cl^- + H_2O$$

This trend will continue till all the available hydrogen ions are replaced by sodium ions. If the addition of sodium hydroxide is continued the conductance increases slightly due to reaction with acetic acid, which dissociates slowly in solution and sodium acetate is formed.

$$CH3COO^- + H^+ + Na^+ + OH^- \longrightarrow CH_3COONa + H_2O$$

If sodium hydroxide addition is continued conductance increases steeply due to the accumulation of more number of hydroxyl ions whose mobility is more. If a graph of conductance value versus volume of sodium hydroxide is plotted a typical curve as shown in the previous page is obtained. Two equivalence points are obtained; first one for hydrochloric acid and second one for acetic acid from that value the concentration and the weight of hydrochloric acid and acetic acid can be calculated using the concentration and volume of sodium hydroxide.

PROCEDURE: Pipette out 50cm^3 of the given acid mixture in to a clean 100cm^3 beaker. Dip the conductivity cell connected to a conductivity bridge such that the platinum electrodes are completely immersed in the solution. Note down the conductance. Fill a burette with the given standard sodium hydroxides solution and run down 0.5cm^3 of the same. Mix well and note down the conductance value. Continue the procedure, initially the conductance decreases till all the HCl is neutralized, then conductance value gradually increases and later increases sharply. Take another 8-10 readings. Plot a graph of conductance versus volume of sodium hydroxide added. Find out the equivalence points. Calculate the normality and amount of hydrochloric acid and acetic acid.

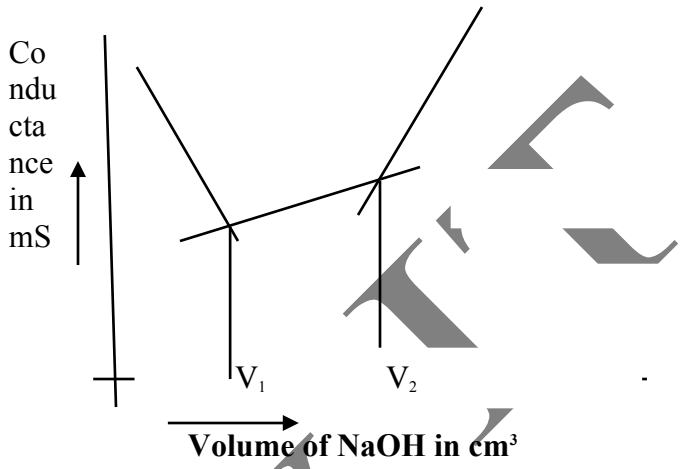
REPORT: The amount of hydrochloric acid present in the given mixture: g
The amount of acetic acid present in the given mixture: g

Signature of the teacher

Experiment no:

Observation and Calculations

Volume of NaOH in cm^3	Conductance in mS



Estimation of HCl

Volume of NaOH required to neutralise HCl = $V_1 cm^3$ =

Normality of HCl = Normality x Volume of NaOH

50

Therefore,

the weight of HCl/dm^3 = N of HCl x Eq.wt. of HCl

=----------g

Estimation of CH_3COOH

Volume of NaOH required to neutralise CH_3COOH = $(V2 – V_1) cm^3$ =

Normality of CH_3COOH = (Normality x Volume of NaOH)/50

=

Therefore, the weight of CH_3COOH/dm^3 = Normality of CH_3COOH x Eq.wt. of CH_3COOH =

RESULT:**The amount of hydrochloric acid present in the given mixture: g**

The amount of acetic acid present in the given mixture: g

Signature of the teacher