QUEST FOR EXCELLENCE				
	Practical Experiment Instruction Sheet			
	EXPERIMENT TITLE : **Conductometric Titration**			
EXPERIMENT NO. :6 MIT(T)/BSH/Engg. Chemistry Lab/ Engg. Chemistry /Manual No				
Class: F.Y. BTech.	DEPARTMENT: Basic Sciences & Humanity			
LABORATORY : Engg. Chemistry		Location:-	PART:	PAGE:

Aim:-Determination of conductance by conductometric titration.

Apparatus:- Conductometer ,conductivity cell, beaker, burette, burette stand, etc.

Chemicals:- 0.1 N HCl solution, 0.1 N NaOH solution, distilled water, etc.

Theory:-

1. Conductivity deals with the measurement of electrical conductance of electrolytic solution.
2. Their electrolytic solution conduct electric current due to the movements of ions (cations and anions) towards oppositely charged electrodes.
3. Conductometric titration in the volumetric analysis based upon the measurement of the conductance during the course of titration.
4. Conductance of an aqueous solution containing an electrolyte depends on the:-
   a. Number of free ions.
   b. Charge on the free ions
   c. Mobility of free ions.
5. Conductometric titration are of two types:-
   a. Acid base titration
   b. Precipitation titration
6. Acid base titration are of four types:
   a. Strong acid + Strong base
   b. Weak acid + Strong base
   c. Strong acid + weak base
   d. Weak acid +weak base

Titration of strong acid (HCl) with strong base (NaOH)

Procedure:- *Settings*-

1. Determine the cell constants of given conductivity cell (calibration of conductivity cell).
2. Rinse the conductivity cell with the solution whose conductivity is o be measured.
3. Wash the conductivity cell with distilled water and then rinse it with the given HCl solution. Deep the cell in the solution taken in beaker (HCl).
4. Connect the conductivity cell to Conductometer.
5. (Set the function switch to display position it must be read=1, cell Constant of temperature should be adjusted or set first).

Actual procedure-

1. 20ml of the given HCl solution is taken into a 100ml beaker.
2. And the burette is filled with NaOH solution and 1ml of it is added into a beaker beaker containing HCl.
3. The conductance of the solution is determined or observed by continuous stirring.
4. Same procedure is repeated (i.e. addition of 1ml of NaOH) and conductance is noted.
5. Such 12-15 readings are taken.

Observation:-

1. The conductance measurement is found to be decreased progressively.
2. This decrease in conductance continues until the endpoint of titration i.e. equivalence point.
3. At the end point concentration H^+ ions is negligible.
4. Beyond this point, on adding NaOH, there is a stip rise in conductance.
5. Thus on plotting the conductance against the volume of NaOH added, a 'V' shaped graph is obtained and the minimum point in this graph denotes the end point. This point is actually the intersection of two lines.

Precautions:-

1. The conductivity cell should be handled very carefully as it is very delicate.
2. Stirring should be done after each addition of the titrant.

Advantages or applications of conductance titration:-

1. This method can be used to very dilute solutions.
2. Gives very accurate end points with an error of $\pm 0.5\%$
3. These titrations are very useful in case of coloured solutions which cannot be titrated by ordinary volumetric method because colour change of indicator is not clear.
4. Useful of titrating weak acids against weak bases, which otherwise do not give sharp end points.
5. NO keen observation is necessary near the end point since it is detected graphically.

Observation table:-

Volume of unknown acid (v_1) =20 ml.

Sr no.	Volume of NaOH Added in (ml)	Specific conductance (mho/cm)
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		

Calculations:- $n_1 v_1(HCl) = n_2 v_2(NaOH)$

$$n_1 = \frac{0.1 \times v_2}{20}$$

Strength of solution = Eq. wt × Normality

= 36.5 × n_1

= _____ g/lit

Conclusion:- Conductance of given strong acid (HCl) decreases first with addition of strong base (NaOH) and after end point (i.e Neutralization of acid) conductance increases due to the strong base (NaOH).