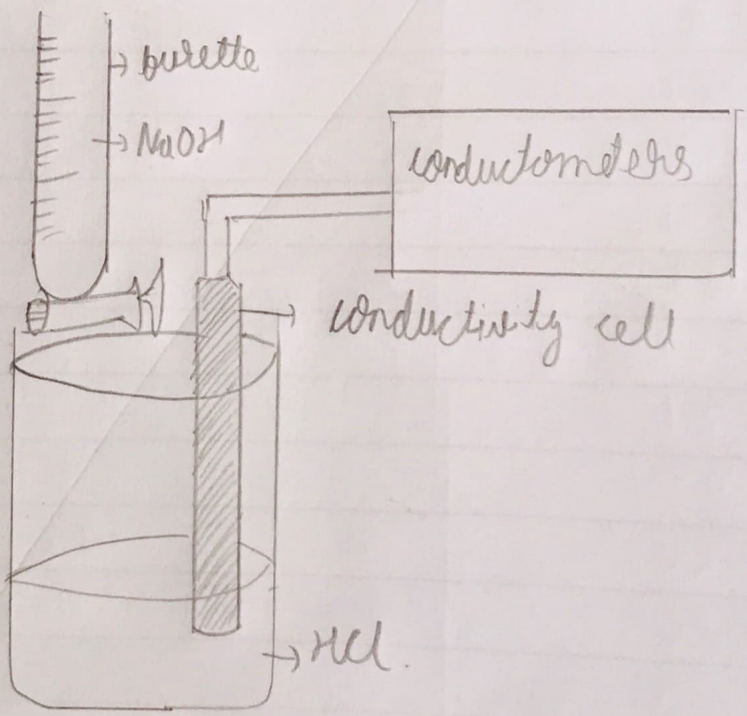
Experiment No-7

Experiment - Determine the strength of sodium hydroxide sol^{n} by titration with standard hydrochloric acid (0·1 N) conductometrically.

Apparatus - Pipette, burette, beaker, funnel, burette, stand and clamp, conductometer and conduct cell.

Chemical Required - Standard HCl and NaOH

Chemical Reactions - $NaOH + HCl \longrightarrow NaCl + H_2O$



Observations - Volume of 0·1 N HCl taken in the beaker = 50 ml

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Experiment-07

Aim- Determine the strength of sodium hydroxide sol^n by titration with standard hydrochloric acid (0.1 N) conductometrically.

Theory- There is a decrease in H^+ ion concentration upon addition of NaOH sol^n to the HCl sol^n, resulting in decrease in conductivity of the sol^n.

$$NaOH + HCl \rightarrow NaCl + H_2O$$

During titration, conductivity of sol^n first decreases upto equivalence point, then increases due to increase in hydroxyl ion concentration. After the neutralisation is complete, further addition of alkali would result in increase of conductance, since the additional OH^- ions from NaOH are no longer used up in the chemical reaction. So if we plot conductance versus volume of titrant, NaOH, we get V shaped curve. From the titration curve an equivalence point can be obtained.

Procedure- 1. Take 50 ml of HCl sol^n in a clean beaker and immersed dip the conductivity cell in it. Make sure that the two platinum electrodes of the cell are completely dipped in the sol^n.

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	Volume of NaOH added from the burette (ml)	Loading (N/m²) (millisiemens)
1	0·5	26·6
2	1	24·6
3	1·5	22·7
4	2	21·9
5	2·5	19·1
6	3	17·3
7	3·5	15·5
8	4	11
9	4·5	9·9
10	5	8·9
11	5·5	10·4
12	6	12
13	6·5	13·4
14	7	14·8
15	7·5	16·
16	8	17·2
17	8·5	18·7
18	9	20·2
19	9·5	22·5
20	10	23·6
21	10·5	24·9
22	11	26·

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Connect the cell to the bridge. Note down the conductivity.

Add NaOH from the burette at an interval of 0.5ml each time, stir the contents and note the conductivity every time. The conductivity will first decrease and then increase.

Plot the conductance against volume of NaOH added the equivalence point can be determined from the intersection of two lines on the graph and we hence the strength of NaOH can be calculated. This procedure can also be applicable to find the strength of mixture of two acids or bases and also in the precipitation titration.

Result- The strength of sodium hydroxide present in the given sample is 40 gm/L.

Precaution- (i) Rinse the pipette / burette with the sol^n to be transferred to the titration flask / burette.

(ii) Don't rinse the titration flask.

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Applying normality eq:

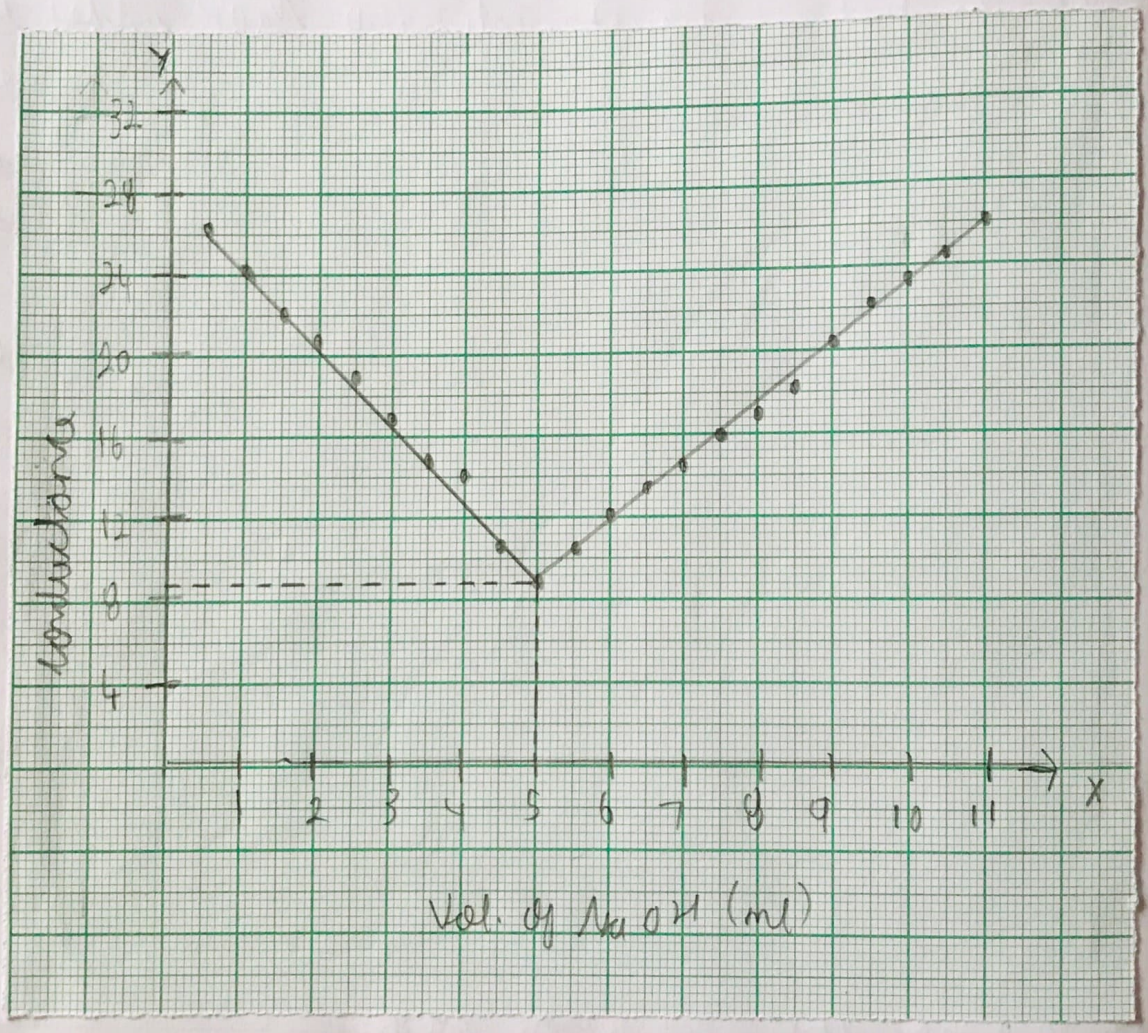
$$N_{NaOH} = \frac{N_{HCl} \times 50}{A} = \frac{0.1 \times 50}{5} = 1$$

A → volume of $NaOH$ at point A

Strength of $NaOH$ (gm/L) = Normality × Eq wt

$= 1 \times 40 = 40$ g/L

Graph-



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