TABLES ⟹

1) Standardization of $AgNO_3$.

Sr. No.	Vol. of NaCl (V_2)	Burette reading		Concordant value (V_1)	Indicator
		I	F		
	ml	ml		ml	
1.	10.0	0	9.1	9.1	2% K_2CrO_4
2.	10.0	0	9.1		

2) Estimation of Chloride.

Sr. No.	Volume of Chloride (V_2)	Burette reading		Concordant value (V_1)	Indicator
		I	F		
	ml	ml		ml	
1.	10.0	0	8.6	8.6	2% K_2CrO_4
2.	10.0	0	8.6		

CALCULATIONS ⟹

1) Titration 1: STANDARDIZATION OF $AgNO_3$.

Normality of NaCl solution (N_2) = 0.02N

Volume of NaCl solution (V_2) = 10 ml

Normality of $AgNO_3$ solution (N_1) = ?

Volume of $AgNO_3$ solution (V_1) = 9.1 ml

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ESTIMATION OF AMOUNT OF CHLORIDE CONTENT IN A WATER SAMPLE.

AIM ⟹

To estimate the amount of chloride in a water sample by Mohr's method.

APPARATUS REQUIRED ⟹

Burette, conical flask, pipette, measuring cylinder, etc.

REAGENTS ⟹

1) Potassium Chromate (K_2CrO_4) indicator solution.
2) Standard Silver Nitrate ($AgNO_3$) titrant.

PRINCIPLE ⟹

It is an example of precipitation reaction. The reaction between chloride and silver nitrate is direct and simple. It proceeds as follows:

$$AgNO_3 + NaCl \longrightarrow AgCl\downarrow + NaNO_3$$

$$Ag^+ + Cl^- \longrightarrow AgCl\downarrow$$

The completion of the reaction in this case is observed by employing potassium chromate solution as an indicator. At the endpoint, the yellow colour changes into reddish brown due to the reaction.

$$2AgNO_3 + K_2CrO_4 \longrightarrow AgCrO_4 + 2KNO_3$$

K_2CrO_4 indicator will not be precipitated as $AgCrO_4$ until all the chlorides in the solution have been precipitated as $AgCl$.

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$\therefore$ Normality of $AgNO_3$ solution $(N_1) = \frac{V_2 \times N_2}{V_1} = \frac{10 \times 0.02}{9.1}$

$= 0.0219\ N$

2) Titration 2: ESTIMATION OF CHLORIDE.

Normality of Chloride Solution $(N_2) = ?$

Volume of Chloride Solution $(V_2) = 10\ ml$

Normality of $AgNO_3$ solution $(N_1) = 0.0219\ N$ (From T1)

Volume of $AgNO_3$ solution $(V_1) = 8.6\ ml$

$\therefore$ Normality of Chloride Solution $(N_2) = \frac{V_1 \times N_1}{V_2}$.

$= \frac{8.6 \times 0.0219}{10} = 0.018834\ N$

now, amount of chloride = eq. weight x Normality of Cl^-

$\therefore$ Amount of Cl^- in 100ml $= \frac{N \text{ of } Cl^- \times 35.45}{10}$

$= \frac{0.018834 \times 35.45}{10} = \frac{0.6676}{10}$

$= 0.06676\ g/mol$

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PROCEDURE ⟹

Titration 1: STANDARDIZATION OF SILVER NITRATE SOLUTION.

1) 20ml of the standard NaCl solution is pipetted out into a clean conical flask. 1ml of 2% K_2CrO_4 indicator is added to it.
2) The solution turns yellow in colour. It is titrated against $AgNO_3$ solution taken in the burette.
3) During each addition of $AgNO_3$, the content in the conical flask is shaken well. At the endpoint, yellow colour changes into reddish brown.
4) The titrations repeated till the concordant value is obtained.

Titration 2: ESTIMATION OF CHLORIDE.

1) The given chloride solution is diluted to 100ml using distilled water in a standard flask. Exactly 20ml of this solution is pipetted out in a clean conical flask.
2) To this, 10ml of 2% K_2CrO_4 indicator is added. It is titrated against standardized $AgNO_3$ solution from the burette.
3) The addition of $AgNO_3$ solution is contained until the solution produced a permanent reddish brown colour. The titration is repeated till the concordant value is obtained.

RESULT ⟹

Amount of chloride present in the given solution = 0.0668 g/mol.

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