Record of Observations:

Weight of bleaching powder = 1 g

Part A: Estimation of % of avilable Cl_2 in (Back titration)

Solution in Burette: Std. $Na_2S_2O_3$ solution

Solution in conical flask: 25cc of bleaching powder solution + 5ml of conc. CH_3COOH + 1.0 g of KI

Indicator Used : Starch

Colour Change : Blue colour disappears.

Tabulation:

Burette levels	I	II
Final level	8.2	16.8
Initial level	0	8.2
Difference (V_1)	8.2	8.6

Part B: Estimation of % of available Cl_2 in (Blank titration)

Solution in Burette : Std. $Na_2S_2O_3$ solution

Solution in Conical flask : 25cc of distilled water + 5ml of conc. CH_3COOH + 1.0g of KI

Indicator Used : Starch

Colour Change : Blue colour disappears.

Burette levels :	I	II
Final level :	0	0
Initial level :	0	0
Difference (A_1) :	0	0

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Estimation of percentage of available chlorine in the given sample of bleaching powder (Iodometric method)

Principle:

Bleaching powder is commonly used as a disinfectant. The chlorine present in the bleaching powder get reduced with time. So, to find the exact quantity of bleaching powder required, the amount of available chlorine in the sample must be found out. Chlorine will liberate free iodine from potassium iodide solution when its pH is 8 or less. The iodine liberated, which is equivalent to the amount of active chlorine, is titrated with standard sodium thiosulphate solution using starch as indicator.

- $CaOCl_2(aq) + 2CH_3COOH(aq) \rightarrow Ca(CH_3COO)_2 + Cl_2(g) + H_2O$
- $Cl_2(g) + 2KI(aq) \rightarrow 2KCl + I_2(g)$
- $I_2(aq) + 2Na_2S_2O_3(aq) \rightarrow Na_2S_4O_6(aq) + 2NaI(aq)$

Procedure:

Dissolve 1g bleaching powder in 1 lt of distilled water in a volumetric flask, and stopper the container. (This can be done by first making a paste of the bleaching powder with pestle & mortar.)

Teacher's Signature : _____

$$CaOCl_{2(aq)} + 2CH_3COOH_{(aq)} \rightarrow Ca(CH_3COO)_2 + Cl_{2(g)} + H_2O_{(l)}$$

$$Cl_{2(g)} + 2KI_{(aq)} \longrightarrow 2KCl_{(s)} + I_{2(g)}$$

$$I_{2(aq)} + 2Na_2S_2O_{3(aq)} \rightarrow Na_2S_4O_{6(aq)} + 2NaI_{(aq)}$$

Calculations:

Equivalents of $Na_2S_2O_3$ = Equivalents of I_2 = Equivalents of Cl_2

mg of Cl_2/ml of bleaching powder = $(N \times V)\ Na_2S_2O_3 \times \frac{\text{Equivalent weight of } Cl_2}{\text{Volume of bleaching powder}}$

$$= (V_1 - A_1) \times N(Na_2S_2O_3) \times \frac{\text{Equivalent weight of } Cl_2}{\text{Vol of bleaching powder}}$$

$$= \frac{8.8 \times 0.025 \times 35.46}{25}$$

$$B = 0.312 \text{ mg/ml}$$

% of chlorine available in given sample of bleaching powder = $\frac{B \times 100}{\text{Weight of bleaching powder}}$

$$= 31.2\ \%$$

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Place 5 mL acetic acid in an flask and add about 1 g potassium iodide crystals. Pour 25 ml of bleaching powder solution prepared above and mix with a stirring rod. Titrate with 0.025 N sodium thiosulphate solution until a pale yellow colour is obtained. (Deep yellow changes to pale yellow.). Add 1 mL of starch solution and titrate until the blue colour dissapears. Note down the volume of sodium thiosulphate sol added (V_1). Take a volume of distilled water corresponding to the sample used. Add 5 ml acetic acid, 1 g potassium iodide and 1 ml starch solution. If blue colour accures, titrate with 0.025 N sodium thiosulphate solution until blue colour disappears. Record the volume of sodium thiosulphate solution added (A_1). If no blue colour appears, titrate with 0.025 N iodine solution until a blue colour appears. Note down the volume of iodine (A_2). Then, titrate with 0.025 N ~~sodium~~ thiosulphate solution till the blue colour disappears. Record the volume of sodium thiosulphate solution added (A_3). Note down the difference between A_2 & A_3 as A_4. ($A_4 = A_2 - A_3$)

Note: Blank titration is necessary to take care of the oxidising or reducing reagents' impurities.

Results:

Percentage of available Cl_2 in the given sample of bleaching Powder = 31.2%

5/5 + 5/5 + 5/5 (15/15)

Teacher's Signature: 25/4/24

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