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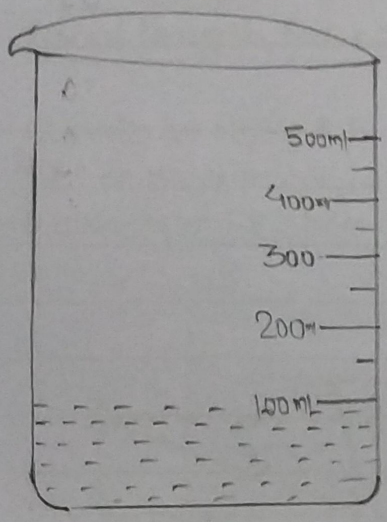
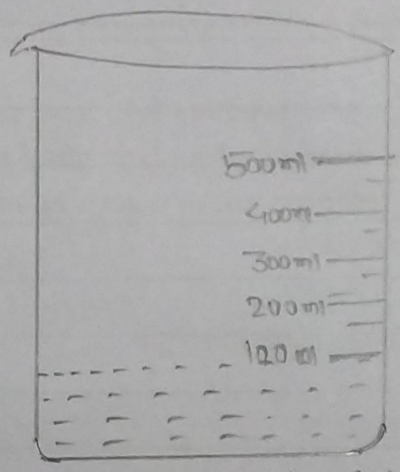
03.	Prepration of 250ml N/10 Sodium Carbonate Solution.	09 to 12			
04.	To determine the Strength of Sodium hydroxide Soln by titrating against oxalic acid Solution.	13 to 16	13/05/21		

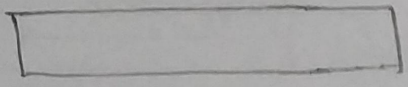


(i) Acidic Solution of H_2SO_4.

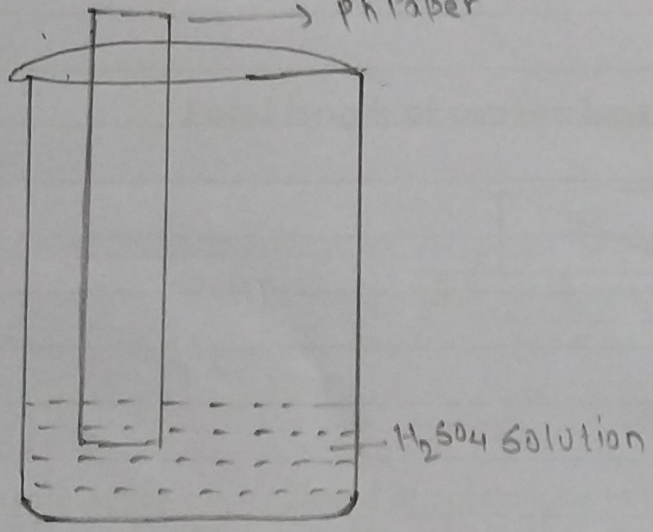


(ii) Basic Solution of NaoH

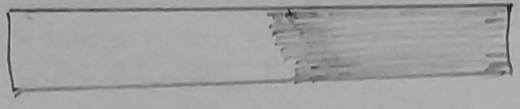
Take a Ph Paper & dipped into one by one each beaker.



→ Ph paper



(iii) Ph paper dipped into H_2SO_4 Solution, Now take out from the beaker.



→ The colour of Ph paper turns organge its indicate the Ph value of acid solution lies between 2-4.

(iv) {Comparing colour of Ph Paper after dipped into solution with Ph colour chart.}

Ph = Potenz of Hydrogen (Power of Hydrogen)

Negative logarithm of hydrogen ion concentration is called Ph.

$$Ph = -\log[H^+]$$

$$= \log \frac{}{[H^+]}.$$

Ph is inversely proportional to hydrogen ion concentration.

Name of Experiment :- Determination of Ph of given solution with the help of Ph paper.

Apparatus :- (i) Beaker
(ii) Ph Paper
(iii) Measuring Cylinder
(iv) Funnel
(v) Wash bottle
(vi) Aqueous Solution of Acid & Base.

Procedure :- (i) Two solutions of Acid & base of known concentration was taken in two different beaker.

(ii) Now Ph strips was successively dipped into Aqueous Solution of Acid & base by which colour of ph-strips changes.

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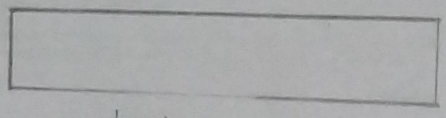
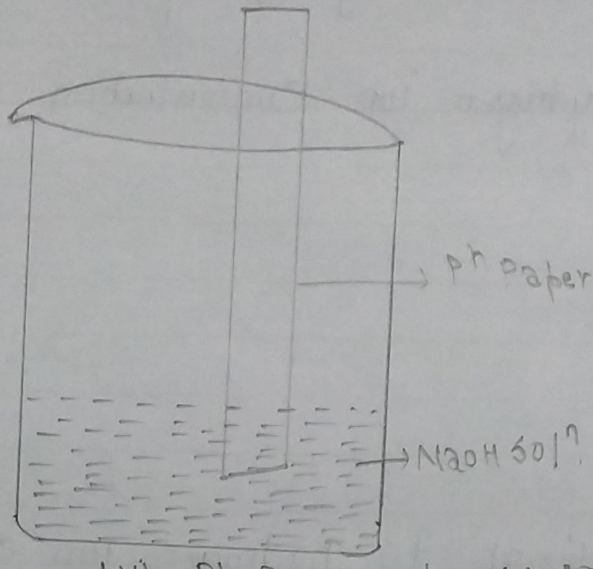
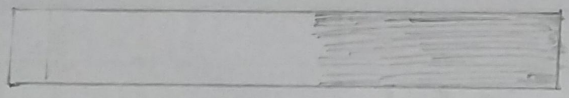


— Ph Paper (Take another Ph Paper)

(v)



(vi) Ph Paper dipped into NaOH solution, Now take out from the beaker



(vii)

→ The colour of Ph Paper turns green. it's indicates Ph value of base solution lies between 10-12.

(iii) The resulting colour of ph-strips was compared with colour code indicated on ph-paper.

Inference:- Colour of ph strips on treatment with acid becomes orange. It indicates that the ph value of aqueous solution of acid lies between 2 & 4.

The resulting colour of ph-strips on treatment with base becomes green this incidates that its ph values lies between 10 to 12.

Date 27/4/21

Expt. No. 02 Page No. 04

Aim:- Prepration of 250ml N/10 Oxalic acid Solution.

Theory:-

Crystalline oxalic acid is a primary standard, its standard solution can be prepared directly. The formula for crystalline oxalic acid is $COOH\ 2H_2O$. The ionic equation for the oxidation of oxalic acid is.

$$\begin{matrix} COOH \\ | \\ COOH \end{matrix} \longrightarrow 2CO_2 + 2H^+ + 2e^-$$

It is clear from the equation that two electrons are given out during oxidation of one molecule of oxalic acid.

$$\therefore \text{Eq. mass of oxalic acid} = \frac{\text{Molecular mass of oxalic acid}}{\text{No of electrons lost by one mole of it.}}$$

$$= \frac{126}{2} = 63.$$

$$\text{Strength (g/l)} = \text{Normality} \times \text{Eq. mass}$$

$$\frac{1}{10} \times 63 = 6.3\ g/l.$$

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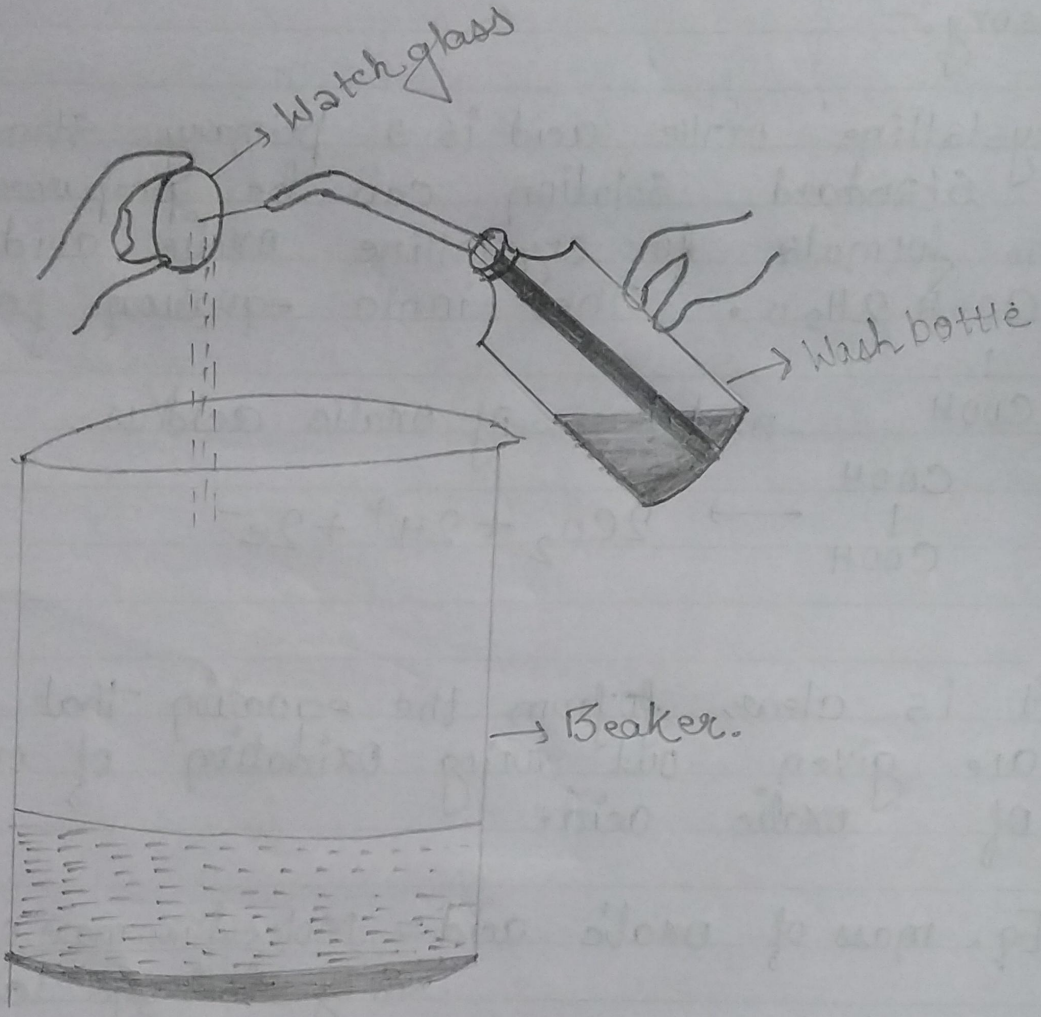

fig (i):- Washing to watch glass to transfer sticking particles to beaker.

∴ For preparing 1 litre of N/10 oxalic acid solution 6.3g of it have to be dissolved.

∴ For preparing 250ml of N/10 oxalic acid.

Oxalic acid crystals required

$$= \frac{6.3}{1000} \times 250 = 1.575\,g.$$

Apparatus :-

1. Watch glass
2. Analytic Balance
3. Weight Box
4. Fractional Weight box.
5. 250 ml beaker
6. Glass Rod
7. 250 ml measuring flask
8. Wash bottle.

Chemical Required :-

Oxalic acid crystals and distilled water.

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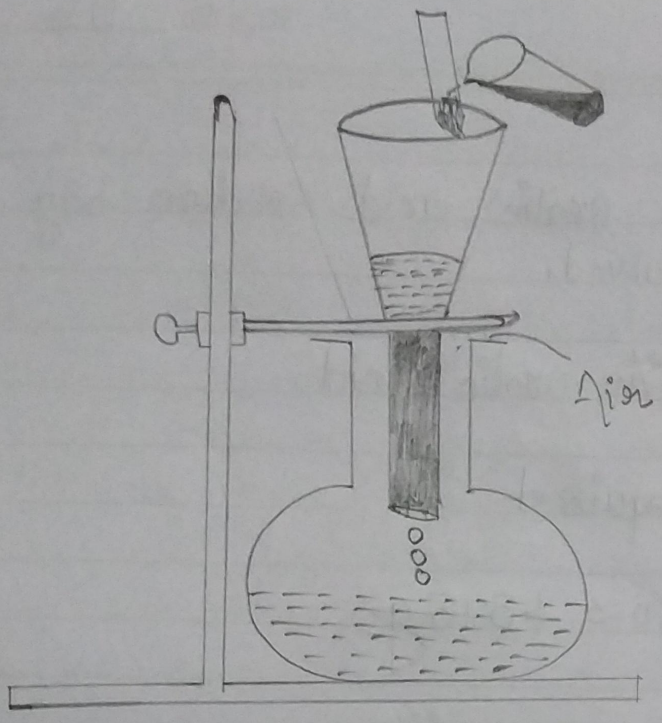
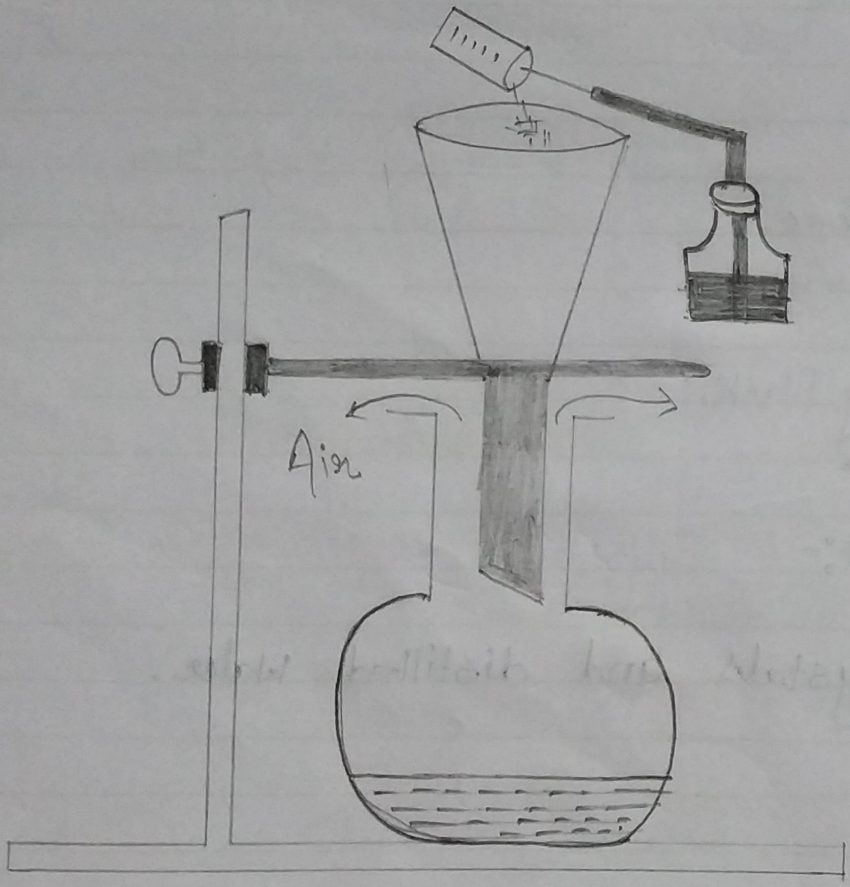


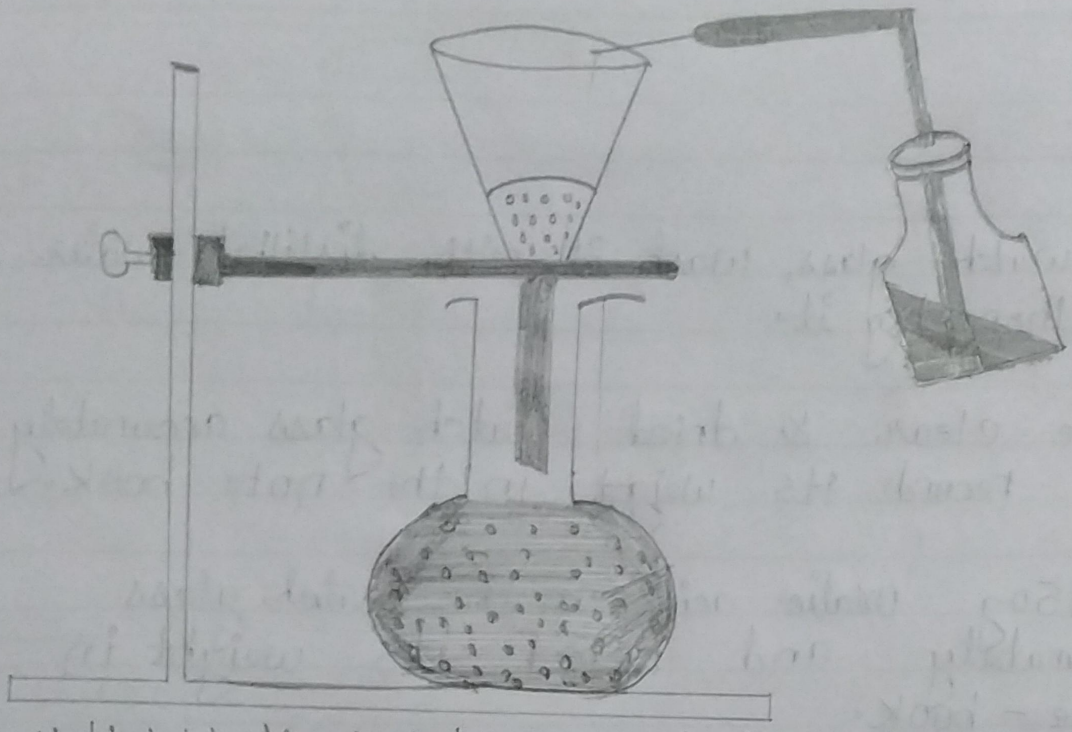
Fig[2]:- Transfering solution to measuring flask.



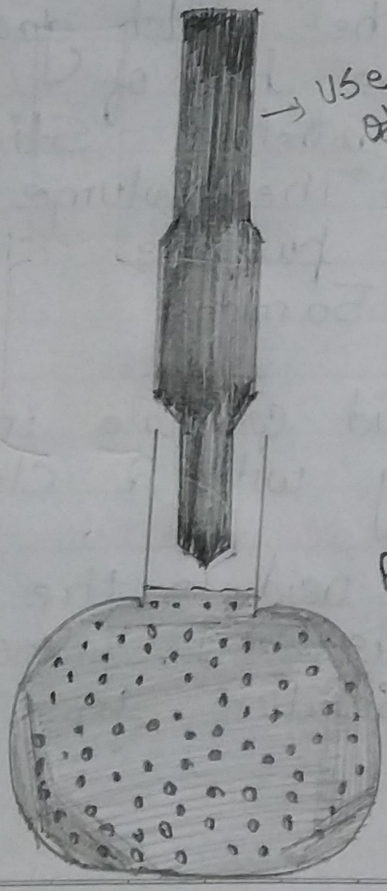
Fig(iii) Transfering last traces of solution of measuring flask.

Procedure:-

1. Take a watch glass, wash it with distilled water and then dry it.
2. Weigh the clear & dried watch glass accurately and record its weight in the note book.
3. Weigh 3.150g oxalic acid on the watch glass accurately and record its weight in the note-book.
4. Transfer gently and carefully the oxalic acid from the watch glass into a clean 250 ml beaker. Wash the watch glass with distilled water with the help of wash bottle to transfer the particle sticking to it into the beaker. The volume of distilled water for the purpose should not be more than 50 ml.
5. Dissolve oxalic acid crystals in the breaker by gentle stiring with a clean glass rod.
6. When the oxalic acid in the beaker is completely dissolved, transfer carefully the entire solution from the beaker into



fig(iv) Washing last trace of solutions from funnel to the measuring flask.



→ Use pipette to add last drop of water to make the volume upto the mark.

Fig(v) Using pipette to add last drop of water to make the volume upto the mark.

a 250ml measuring flask (volumetric flask) with the help of a funnel.

7. Wash the beaker with distilled water. Transfer the washing into the measuring flask.

8. Finally wash the funnel well the distilled water with the help of a wash bottle to transfer the solution to the funnel into the measuring flask.

9. Add enough distilled water to the measuring flask carefully, up to just below the etched mark on it with the help of a wash bottle.

10. Acid the last few drops of distilled water with a pipette until the lower level of the menisus just touches the mark on the measuring flask.

11. Stopper the measuring flask and shake gently to make the solution uniform through-out level it as oxalic acid solution.

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Date 27/4/24

Expt. No. 02 Page No. 08

Observation:-

Weight of the watch glass	W_1g
Weight of the watch glass + oxalic acid	$W_1 + 3.15g$
Weight of oxalic acid	$3.150g$
Volume of distilled water	$250cm^2$

Results :- $250\ cm^3$ of decimolar or (M/10) solution of oxalic acid is prepared.

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Date _____

Expt. No. 03 Page No. 09

Aim:- Preparation of 250 ml N/10 Sodium Carbonate solution.

Theory:-

Sodium Carbonate is essentially insoluble in nearly saturated sodium hydroxide. The insoluble Sodium Carbonate will settle to the bottom of the Container after the saturated NaOH has equilibrated for a couple of days. The Supernatant can be with drawn carefully to prepare diluted NaOH solution free of Sodium Carbonate. The water for preparing NaOH standard solution should be boiled to remove any dissolved CO_2, because dissolved CO_2 can cause a titration error. To prepare the standard solution of the Sodium Carbonate. The equivalent Weight of Sodium Carbonate = $\frac{\text{Molecular Weight}}{2}$

$= \frac{106}{2} = 53.$

Therefore, 250 ml of N/10 Sodium Carbonate requires

$= \frac{53}{1000} \times \frac{250}{10} = 1.325\text{g}.$
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Teacher's Signature _____

Date _____

Expt. No. 03 Page No. 10

* Apparatus:-

(i) Chemical balance
(ii) Watch glass
(iii) Weight box
(iv) 250ml Beaker
(v) Glass Rod
(vi) 250 ml measuring flask.
(vii) Wash bottle
(viii) Weighing tube
(ix) Sodium Carbonate
(x) Funnel
(xi) Funnel Stant
(xii) Distilled Water

Procedure:-

1. Take a watch glass, wash it with distilled water & dry it.

2. Weigh the exact amount of clean & dried watch glass & record its weight in the notebook.

3. Weigh correctly on the watch glass 1.325g. of Sodium Carbonate & record this weight in the note-book.

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4. Using a funnel, transfer Sodium Carbonate softly & carefully from the watch glass into a clean & dry measuring flask.

5. Wash the ~~water~~ watch glass with distilled water to move the particles that stick to it into the foam with the assistance of a wash bottle.

6. For this purpose, the volume of distilled water should not exceed 50 ml.

7. Wash funnels several times with distilled water to move the sticking particles into the measuring flask using a wash bottle.

8. Add water in tiny quantities while washing the funnel. The distilled water quantity used for this purpose should not exceed 50ml.

9. Using a wash bottle, wash the funnel carefully with distilled water to pass the solution attached to the funnel into the measuring flask.

10. Turn the flask of measurement until the Sodium Carbonate dissolves.

Teacher's Signature _____

10. Using a wash bottle thoroughly add enough distilled waster to the measuring flask just below the etched mark on it.

11. Add the last few mL of distilled water drop into the measuring flask until the reduced menisus level just touches the mark.

12. Put the stopper on the mouth of the flask and shake softly to make the entire solution uniform. Calculate it as a solution of Sodium Carbonate N/10.

Date 13-05-2021

Expt. No. 04 Page No. 13

Aim:

To determine the strength of sodium hydroxide solution by titrating against oxalic acid solution.

Theory:-

Here, the sodium hydroxide solution is not a primary standard & is taken in a burette & a known volume of the oxalic acid is taken in the titration flask. The titration is carried out using phenolphthalain as a indicator. In an acid-base titration, the amount of acid becomes chemically equivalent to the amount of base present in the end. In case of strong base titration, the solution becomes neutral at the endpoint of the solution.

$$(COOH)_2 + 2NaOH \longrightarrow (COONa)_2 + 2H_2O.$$

* Apparatus Required:-

1. Pipette
2. Burette
3. Burette stand
4. Conical flask
5. Stirrer
6. Measuring flask
7. Oxalic acid, NaOH
8. Sodium hydroxide solution
9. Phenolphthalain solution

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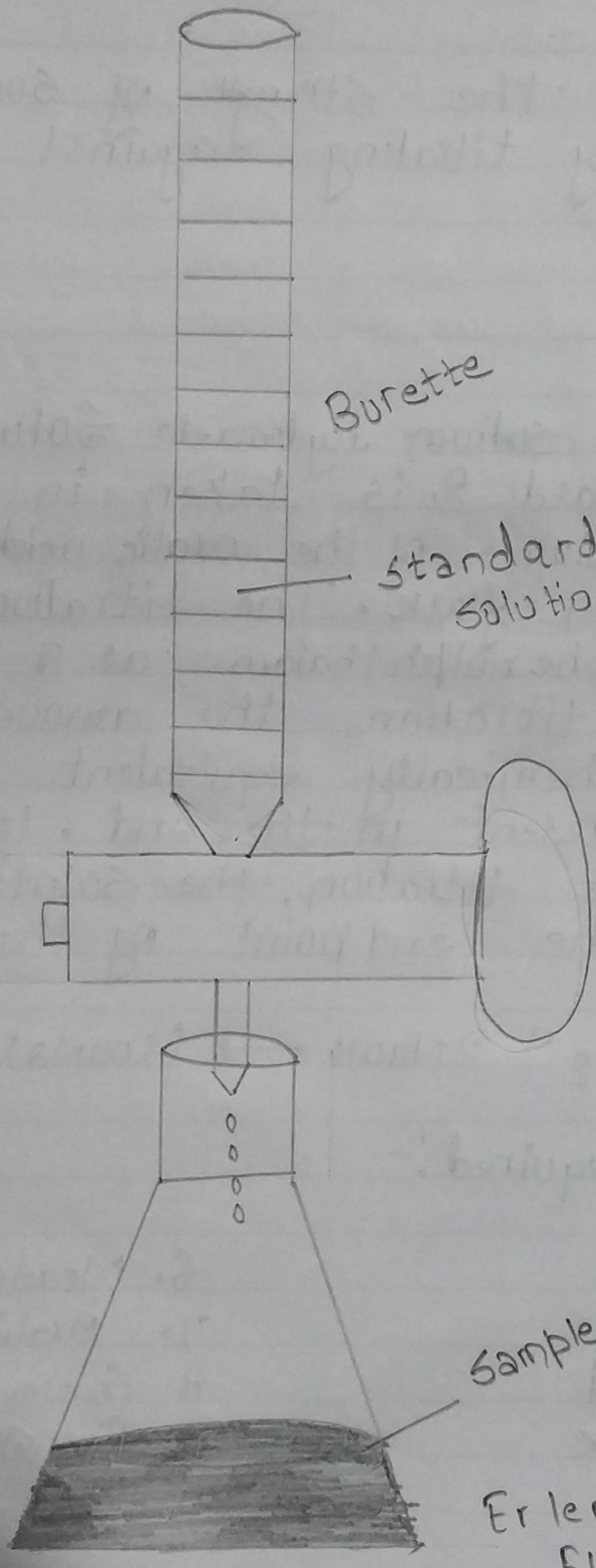
Burette
standardized solution
Sample to be titrated (with Indicator)
Erlenmeyer flask.

Date 13-05-21

Expt. No. 04 Page No. 14

Procedure :-

1. Take a burette and wash it thoroughly with clean water & dry it.
2. Weigh the exact amount of dried watch glass & record its weight.
3. Using a funnel shift Oxalic acid carefully from the watch glass into a dried measuring flask
4. Wash the funnel carefully using a wash bottle with distilled water, turn the flask of measurement until the oxalic acid dissolves.
5. Wash the watch glass with distilled water, the volume of distilled water should not be more than 50 ml.
6. Thoroughly add enough distilled water to the measuring flask just below the mark.
7. Add the last few drops of distilled water into the measuring flask until the reduced meniscus level just touches the mark.
8. Put the stopper on the mouth of the flask & shake it gently to make the entire

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Initial Reading	Final Reading	The Volume of NaOH Used	Readings
$x\,cm^3$	$y\,cm^3$	$(y-x)\,cm^3$	$V\,cm^3$
$y\,cm^3$	$z\,cm^3$	$(z-y)\,cm^3$	$V\,cm^3$
$z\,cm^3$	$w\,cm^3$	$(w-z)\,cm^3$	$V\,cm^3$

Solution uniform. Calculate the Solution of oxalic Acid M/20

Estimation of Oxalic Acid by Titrating it with NaOH.

1. Revise the burette with standard oxalic Acid Solution & take 10cm^3 of oxalic acid solution in a titration flask. Fill the burette with sodium hydroxide solution & also remove the air gap if any.

2. In pipette, take out 20 ml of NaOH Solution in Conical flask. Add two drop of phenolphthalein indicator into it add place it below the noozle of burette.

3. Now, run the sodium hydroxide solution slowly & dropwise into the flask until a very faint permanent pink color is just obtained. Read the lower meniscus of the solution again in the burette and record it as the final burette reading. Reapeat this procedure two to three times.

Observation :-

Molarity of oxalic acid Solution = $\frac{M}{20}$.

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Date 13-05-21

Expt. No. 04 Page No. 16

Molarity of sodium hydroxide solution = m
The volume of oxalic acid solution = $10 cm^3$.
The indicator used = Phenolphthalein.
End point indication = light pink colour.

⇒ Mass of oxalic acid dissolved (100 ml) in standard solution = x g.

Estimation of sodium hydroxide strength of ~~oxalic~~ oxalic acid = x × 10 g/L.

Normality (N) of standard oxalic Acid = Strength / Equivalent weight.

$$= \frac{x \times 10}{63.04}.$$

Normality (N_1) of sodium hydroxide solution

$$N_1 \times V_1 = N \times V$$
$$N_1 = \frac{V}{V_1} \times N.$$

Normality (N_2) of given oxalic acid solution.

$$N_2 \times V_2 = N_1 \times V_1$$
$$N_2 = N_1 \times \frac{V_1}{V_2}.$$

Strength of given oxalic acid = $N_2 \times 63.04$ g/L.

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