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AIM OF THE EXPERIMENT :-

To determine the strength of unknown acid using standard alkali (Acidimetry).

APPARATUS REQUIRED :-

1. Burette (50ml)
2. Burette stand with clamp
3. Pipette (20ml)
4. Conical flask (100ml)
5. Measuring flask (250ml)
6. Glazed porcelain.

CHEMICALS REQUIRED :-

1. Oxalic acid solution (Unknown strength)
2. $N/10$ Sodium hydroxide solution (Known strength)
3. Indicator: Phenolphthalein.

THEORY :-

A known volume of standard alkali; sodium hydroxide solution is titrated against the supplied oxalic acid solution of unknown strength in the presence of Phenolphthalein indicator till the colour of the resultant solution just changes from pink to colourless. The volume of the acid required for neutralization is determined. Knowing the volume of both the solutions and the strength of oxalic acid solution can be calculated by using the principle of equivalency.

$$N_A V_A = N_B V_B$$

Where,

N_A = Normality of oxalic acid solution

V_A = Volume of oxalic acid solution

N_B = Normality of alkali solution

V_B = Volume of alkali solution.

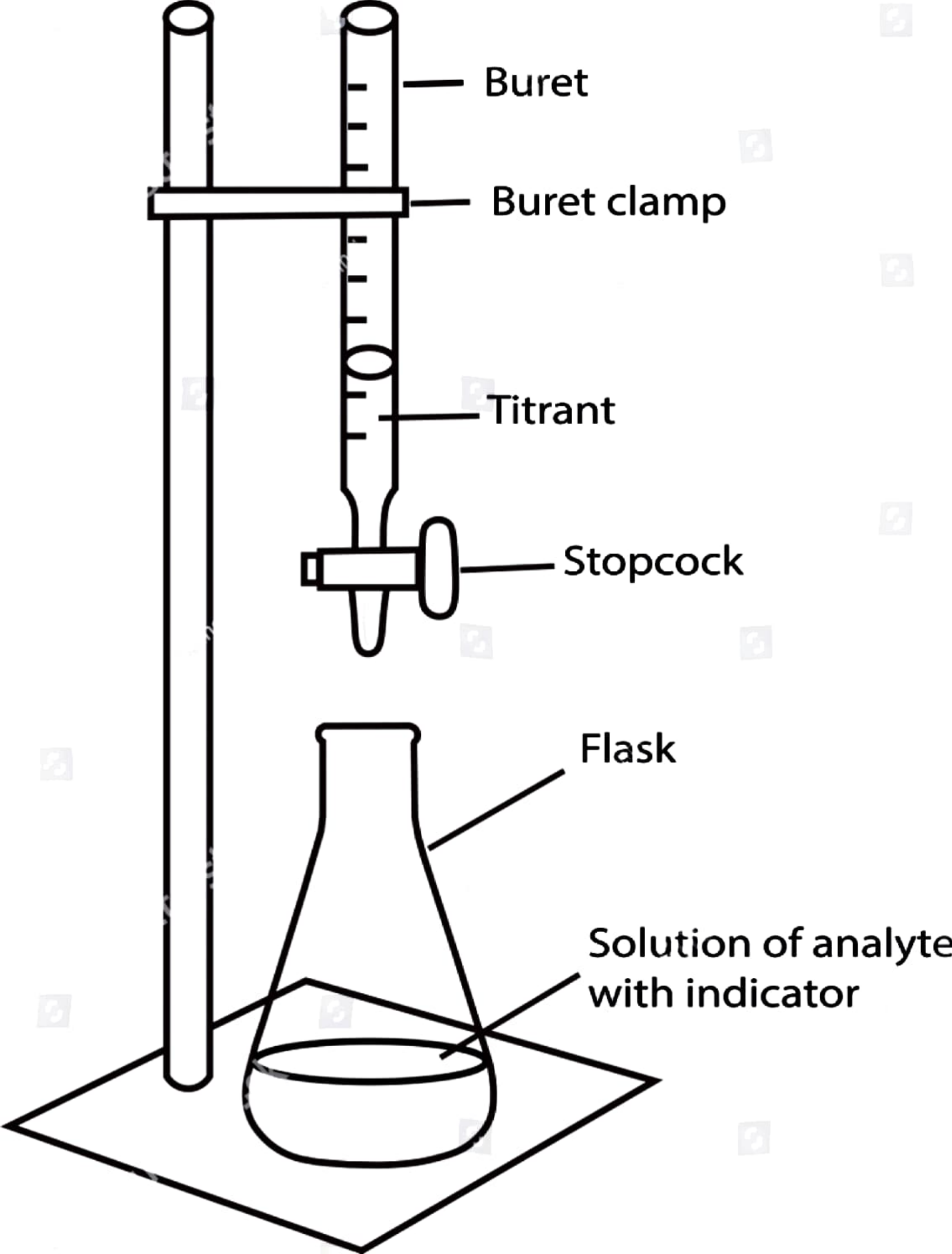
PROCEDURE :-

Preparation of Standard Solution :-

$N/10$ Sodium hydroxide solution (NaOH) was prepared.

So, Equivalent wt. of NaOH = $\frac{23+16+1}{1} = 40$

$$\Rightarrow \frac{1}{10} = \frac{W}{40} \times \frac{1000}{250} \Rightarrow \boxed{W = 1 \text{ gm}}$$



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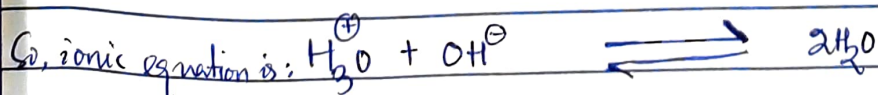
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∴ To prepare 250ml solution of N_{10} sodium hydroxide, 1 gm of NaOH is required.

Experimental Procedure :-

1. The burette, pipette and conical flask were washed thrice with tap water and then rinsed with distilled water.
2. The burette was rinsed thrice with a few ml. of given oxalic acid solution and the washings was rejected.
3. The burette was filled with the given acid solution to a convenient level without air bubbles.
4. The air bubble present in it was removed.
5. The pipette was rinsed with the alkali solution thrice and the washing was rejected.
6. 20ml of alkali solution was pipetted out into the conical flask.
7. After transferring the acid solution, the tip of the pipette was touched to the inner side of the conical flask thrice. The inner sides of the conical flask was washed with a little distilled water.
8. One drop of Phenolphthalein indicator was added to it. The conical flask was kept over a white glazed porcelain tile under the burette.
9. The initial burette reading was noted avoiding parallax error.
10. The titration was carried out by running alkali from the burette with constant stirring till the colour of the solution just changes from pink to colourless.
11. The final burette reading was noted. The titration was repeated till three concordant values were obtained.

Equations :-



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TABULATION :-

No. of Observations	Volume of $\text{K}_2\text{Cr}_2\text{O}_7$ (ml.)	Initial burette reading (ml)	Final burette reading (ml)	Difference (ml)	Remarks
1.	20				Rough Three Concordant reading
2.	20				
3.	20				
4.	20				

CALCULATION :-

We know that, $N_A V_A = N_B V_B$

Since $N_A = ?$ $V_A = \text{ml}$

$N_B = \frac{N}{10}$ $V_B = 20 \text{ ml}$

$$\therefore N_A = \frac{N_B V_B}{V_A} = \frac{1 \times 20}{10 \times}$$

CONCLUSION :-

From the above titration, the strength of unknown acid solution is found to be