Experiment No.: 04(ii) Page No.: 13 Date:

AIM OF THE EXPERIMENT :-

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

APPARATUS REQUIRED :-

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

CHEMICALS REQUIRED :-

1. N/10 Sulfuric acid solution (Known strength)
2. Sodium carbonate alkali solution (unknown strength)
3. Indicator : Methyl orange.

THEORY :-

A known volume of supplied alkali solution is titrated against the standard acid solution of known strength in the presence of methyl orange indicator till the colour just changes from pale yellow / straw yellow to light pink. The volume of the acid required for neutralization is determined. Knowing the volume of both the solutions and the strength of acid, the strength of alkali solution can be calculated by using the principle of equivalency.

$$N_A V_A = N_B V_B$$

Where, N_A = Normality of the acid solution
V_A = Volume of the acid solution.
N_B = Normality of the alkali solution.
V_B = Volume of the alkali solution.

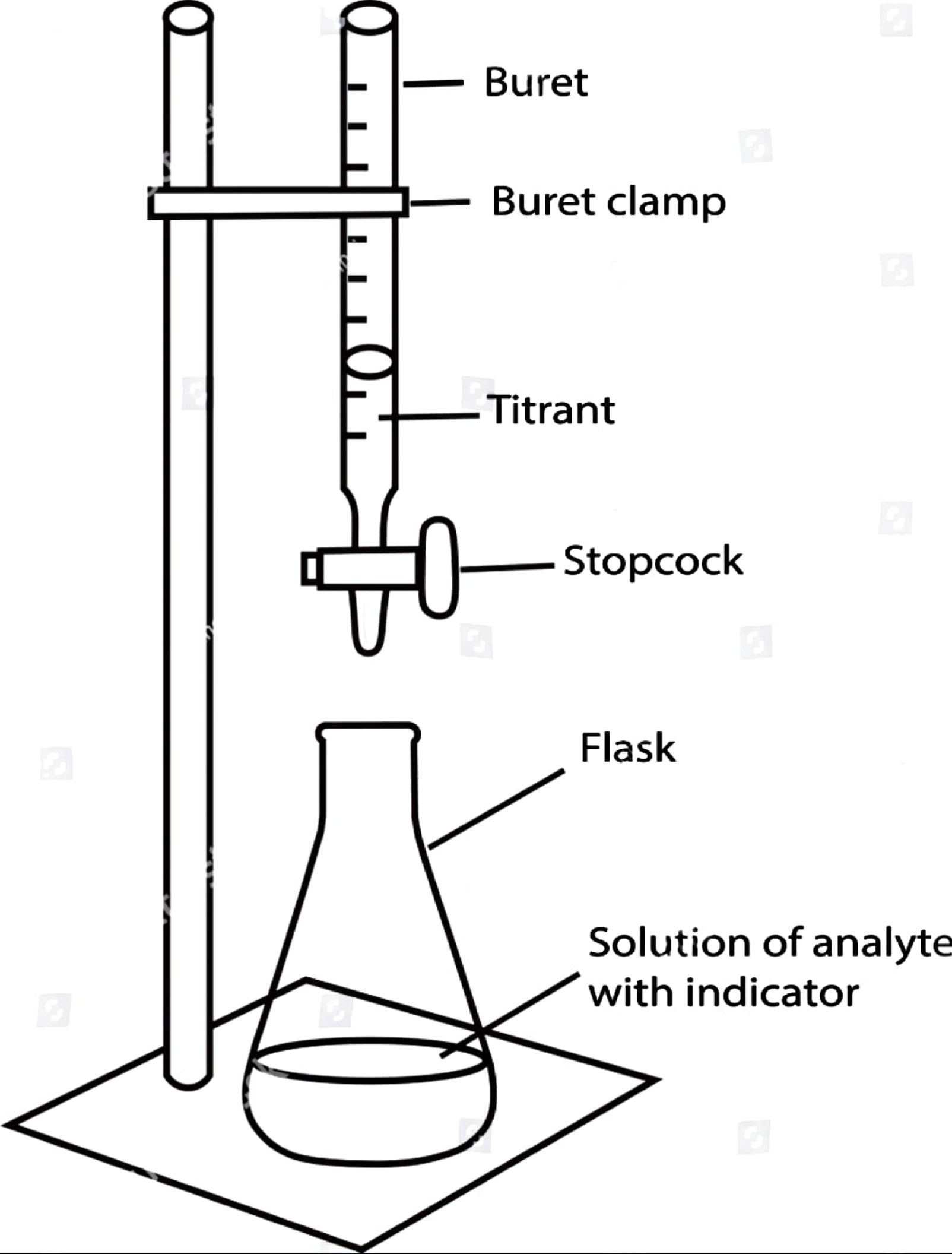
PROCEDURE :-

Preparation of standard solution :-

To prepare N/10 H_2SO_4 in 250 ml :

$$N/10 = \frac{x}{49} \times \frac{1000}{250} \Rightarrow x = \frac{49}{4 \times 10} = \frac{49}{40} = 1.225 \text{ gm}$$

Since H_2SO_4 is liquid, then 1.225 gm of $H_2SO_4 = \frac{1000}{1803.2} \times 1.225 = 0.679$ ml


Buret
Buret clamp
Titrant
Stopcock
Flask
Solution of analyte
with indicator

Experiment No. : Page No. : 14 Date :

∴ To prepare 250 ml solution of N/10 Sulphuric acid, 0.679 ml of H_2SO_4 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 prepared sulphuric acid solution and the washings was rejected.
3. The burette was filled with the prepared acid solution to a convenient level without aire bubbles.
4. The aire bubble present in it was removed.
5. The pipette was rinsed with the given alkali solution thrice and the washings was removed.
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 methyl orange 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 pale yellow/straw yellow to light pink.
11. The final burette reading was noted. The titration was repeated till three concordant values were obtained.

Equations :-

$$Na_2CO_3 + H_2SO_4 \longrightarrow Na_2SO_4 + H_2O + CO_2$$

So, the ionic equation is:

$$2H^+ + CO_3^{2-} \longrightarrow H_2O + CO_2$$

Experiment No. : Page No. : 15 Date :

TABULATION :-

No. of Observations	Volume of alkali (ml)	Initial burette reading (ml)	Final burette reading (ml)	Difference (ml)	Remarks
1.	20				Rough
2.	20				Three concordant reading
3.	20				
4.	20				

CALCULATION :-

We Know that, $N_A V_A = N_B V_B$

Since $N_A = N/10$ $V_A =$ ml

$N_B = ?$ $V_B = 20$ ml

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

CONCLUSION :-

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