Aim: To determine the concentration of the given hydrochloric acid (HCl) solution by titrating it against a standard sodium carbonate (Na_2CO_3) solution.

Apparatus and Chemicals Required:

Apparatus:

• Burette • Pipette (10 mL)

Procedure:

1.Preparation of Sodium Carbonate Solution:

- o Weigh a known mass of anhydrous sodium carbonate (Na_2CO_3) and dissolve it in distilled water.
- o Transfer the solution to a volumetric flask and make up the volume to a known mark.

2.Filling the Burette:

- o Rinse the burette with distilled water and then with hydrochloric acid.
- o Fill the burette with hydrochloric acid and record the initial reading.

3. Pipetting the Sodium Carbonate Solution:

o Rinse the pipette with distilled water and then with sodium carbonate solution.

o Use a pipette to transfer 10 mL of sodium carbonate solution into a conical flask.

o Add 2-3 drops of methyl orange indicator (solution turns yellow).

4. Performing the Titration:

o Slowly add hydrochloric acid from the burette to the conical flask while swirling it continuously.

o Near the endpoint, add acid dropwise until the color changes from yellow to orange pink.

o Record the final burette reading.

5. Repeating the Experiment:

o Perform at least three titrations and take the average volume of hydrochloric acid used.

Result: The concentration of the given hydrochloric acid solution is determined using the titration data. Balanced Chemical Equation: $NaCO_3+2HCl \rightarrow 2NaCl+CO_3+H_2$