

Edexcel International Chemistry

A-level

Practical 3

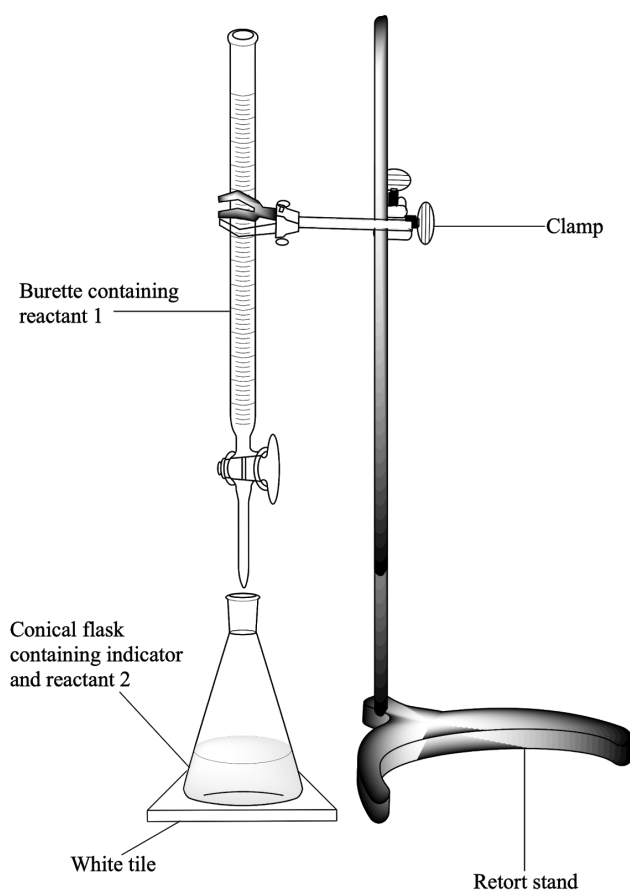
Titration to find the Concentration of a Solution of
Hydrochloric Acid



Method

1. Set up the apparatus as shown below with 25 cm³ of the unknown solution of hydrochloric acid in the conical flask and the burette filled with a known concentration of sodium hydroxide solution.
2. Add a few drops of a suitable indicator.
 - Phenolphthalein is **pink** in basic solutions and **colourless** in acidic and neutral solutions.
 - Methyl orange is **yellow** in basic solution, **orange** in neutral solution, and **red** in an acidic solution.
3. First carry out a quick trial titration to find the approximate end-point. Note down the value of this titre.
4. Carry out a more accurate titration, adding the titrant drop by drop when approaching the end-point.
 - When titrating, wash down the walls of the conical flask with a bit of distilled water from time to time. This will ensure that all the titrant ends up reacting with the analyte.
5. Repeat accurate titrations until you have at least two concordant (within 0.10 cm³) titres.
6. Find a mean titre using these concordant values.

Diagram



Key Points

- Use a **pipette filler** to draw a little solution of your analyte into the pipette to **rinse** it.
- **Calibrate** the pipette by ensuring there are no **air bubbles** in the tip.
- Rinse and fill the burette with the solution of your titrant using a **funnel**.

Errors

- Allow the titrant enough time to drain down the walls of the burette before reading the burette.
- Swirl the conical flask so it mixes properly with the analyte.
- Use a **white tile** to make the colour change more noticeable.
- **Diluting** your solutions may produce a reading with a **smaller percentage error** (i.e. 10 cm³ titre has a smaller percentage error than a 30 cm³ titre).
- **Phenolphthalein** used in this titration may turn colourless at the end point if you leave the solution to stand. This because NaOH reacts with CO₂ from the air to form Na₂CO₃.

