Potentiometric Acid-base Titration

Experiment 7 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To locate an acid-base equivalence point from measured pH or potential.

Principle

An electrode measures a potential related to the solution state. A titration curve and its slope locate an equivalence region without relying on a visual colour endpoint.

Requirements

- Calibrated pH/potential system, assigned analyte, standardised titrant and volumetric equipment.

Procedure

1. Calibrate and record

Use the prescribed electrode calibration, temperature and test aliquot.

2. Titrate

Add the assigned titrant portions, mix and record a stable pH/potential at each cumulative volume.

3. Plot

Plot reading against volume and examine the first-derivative or prescribed endpoint plot.

4. Find equivalence

Identify the endpoint from the stated analysis and compare replicates.

5. Calculate

Apply reaction stoichiometry and report concentration on the test-portion basis.

Observations and Record

Volume	pH / potential	Change per volume
_____	_____	_____
_____	_____	_____
_____	_____	_____

Worked Example

The numbers below are illustrative; enter your own observations in the record.

- For a 1:1 reaction: Ctest = Ctitrant × Veq / Vtest, using equal volume units.
- Example: 0.1 mol/L × 15.0 mL / 20.0 mL = 0.075 mol/L.

Result

Record the completed observations, calculations and conclusion with units. State any limitation of the observation.

Precautions

- Allow electrode stabilisation and record cumulative volume accurately.
- Do not confuse the largest measured pH with the equivalence point.

Viva Questions and Answers

1. How does a derivative help?

It highlights a rapid change near the equivalence region.

2. Why use stoichiometry?

The concentration relation depends on the reacting mole ratio.

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