

Standard Buffers and pH Measurement

Experiment 19 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To prepare two assigned buffer compositions and measure their pH with a calibrated meter.

Principle

A buffer contains a suitable conjugate acid-base system and resists moderate pH change. Composition, activity, temperature and measurement conditions influence the pH; calibration checks the measurement system.

Requirements

- Two assigned buffer master compositions, appropriate chemicals and purified water.
- Calibrated balance, volumetric glassware, pH meter and approved calibration buffers.

Procedure

1. Calculate

Record acid/base identities, molecular forms and amounts for each assigned composition.

2. Prepare

Dissolve as prescribed, adjust to the assigned final quantity and mix thoroughly.

3. Calibrate the meter

Use the approved calibration points and temperature basis appropriate to the expected pH range.

4. Measure

Rinse and handle the electrode as instructed. Measure each buffer after the reading stabilises and record temperature.

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5. Evaluate

Compare measured pH with the assigned target and permitted tolerance; explain any observed change without replacing the actual reading.

Observations and Record

Buffer	Target pH / temperature	Measured pH
1	_____	_____
2	_____	_____

Worked Example

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

- For an appropriate dilute conjugate system, $\text{pH} \approx \text{pKa} + \log_{10}(\text{base/acid})$. A ratio of 1 gives $\text{pH} \approx \text{pKa}$; a ratio of 10 gives $\text{pH} \approx \text{pKa} + 1$. This approximation does not replace meter calibration.

Result

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

Precautions

- Use the exact chemical forms in the assigned composition.
- Avoid contamination between solutions and do not rub the glass electrode.

Viva Questions and Answers**1. What creates buffer action?**

A conjugate acid-base pair consumes added acid or base within its capacity.

2. Why record temperature?

Both electrode response and buffer pH can vary with temperature.

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