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Systematic Analysis of an Ester

Experiment 9 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To organise an illustrative unknown-identification record and show how the assigned candidate is supported.

Principle

This is a worked teaching case, not an observation to copy into a laboratory record. An actual unknown is assigned by the instructor and may give different findings. A candidate is supported by consistent preliminary, elemental, functional and physical evidence.

Requirements

- Instructor-assigned unknown and the corresponding known control; the method notes in this subject.
- Prepared test reagents, separate test portions and calibrated physical-constant apparatus.

Procedure

1. Preliminary examination

Record the actual state and water behaviour at the prescribed quantity and temperature. Compare with the illustrative pattern below.

2. Solubility classification

Test fresh portions in the assigned acid/base reagents. Describe dissolution or effervescence before inferring a class.

3. Elements

Use the instructor-prepared extract or provided elemental report. Distinguish an element finding from a functional-group conclusion.

4. Functional confirmation

Assigned hydroxamic-acid/ferric reaction supports an ester. Controlled hydrolysis can produce a benzoate/benzoic-acid fraction

5. Physical confirmation

Use approved boiling-point data and identify the assigned hydrolysis product after purification.

6. Conclude

Write the candidate only after reviewing all evidence; list a plausible alternative and the test that distinguishes it.

Observations and Record

Evidence	Illustrative finding
State / water behaviour	Colourless liquid; Poor water solubility / immiscible at ordinary test loading
Acid-base pattern	Neutral preliminary pattern; hydrolysis changes the products
Elements	Nitrogen, sulphur and halogens negative in the teaching pattern
Functional pattern	Assigned hydroxamic-acid/ferric reaction supports an ester. Controlled hydrolysis can produce a benzoate/benzoic-acid fraction
Physical constant	Boiling region near 212°C at near-atmospheric pressure
Supported candidate	Ethyl benzoate

Worked Example

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

- Record the candidate as Ethyl benzoate only if your own results support the pattern. An anomalous physical constant should be investigated before final assignment.

Result

Complete the actual unknown record with its identification evidence and justified candidate.

Precautions

- Use instructor-assigned quantities and prepared test reagents in the designated laboratory; wear eye protection and use the required fume hood.
- Do not taste unknowns, smell containers directly, burn unknown halogenated material or heat sealed vessels.
- Use fresh separate portions for independent tests. A single colour reaction does not establish molecular identity.
- Hydrolysis requires the specific supervised laboratory method; unreacted ester is not equivalent to the isolated acid product.

Viva Questions and Answers

1. Can the title identify an actual unknown?

No. The title describes this worked case; the actual material must be analysed.

2. Why perform a confirmatory measurement?

Different molecules can share solubility and functional-group reactions.

3. What belongs in the result?

The observed evidence, proposed identity and any unresolved limitation.

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