Stereochemical Models of Organic Molecules

Experiment 16 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To construct and compare the stereochemical models listed in the syllabus.

Principle

Molecular geometry and restricted rotation determine three-dimensional arrangement. Models help distinguish connectivity, conformation and configuration.

Requirements

- Instructor-provided labelled diagrams, traces or data for this activity.
- Calculator, graph paper or spreadsheet, and the activity record.

Procedure

1. Build simple molecules

Construct methane, ethane, ethene and ethyne. Record bond geometry and explain single-bond rotation versus multiple-bond restrictions.

2. Compare substituted alkenes

Use a suitable alkene with two different groups on each double-bond carbon. Build the specified cis and trans models and compare spatial arrangement.

3. Apply priority rules

For an assigned alkene, label the higher-priority group on each carbon and assign E or Z; do not assume cis/trans and E/Z are always equivalent.

4. Study tetrahedral inversion

Build the supplied stereocentre and its inverted configuration. Distinguish inversion from rotation of the whole model.

5. Record

Draw labelled models and state which pairs are identical, conformers or configurational isomers.

Observations and Record

Record item	Entry
Activity / material identifier	_____
Measurement or visible feature	_____
Comparison / calculated outcome	_____
Interpretation and limitation	_____

Result

The recorded finding is ____; the supporting observation or calculation is ____. The main limitation is ____.

Precautions

- Use the supplied teaching material; distinguish a measured observation from an assumed value.
- Keep units, axes, labels and measurement conditions consistent.
- Record limitations and seek instructor review before applying a conclusion to a live case.

Viva Questions and Answers

1. Why is methane tetrahedral?

Four bonding regions are arranged about carbon in a tetrahedral geometry.

2. Why is alkene rotation restricted?

Rotation disrupts the pi-bond overlap.

3. What is inversion at a stereocentre?

A change in the stereochemical arrangement at that centre, distinct from rotating the entire model.

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