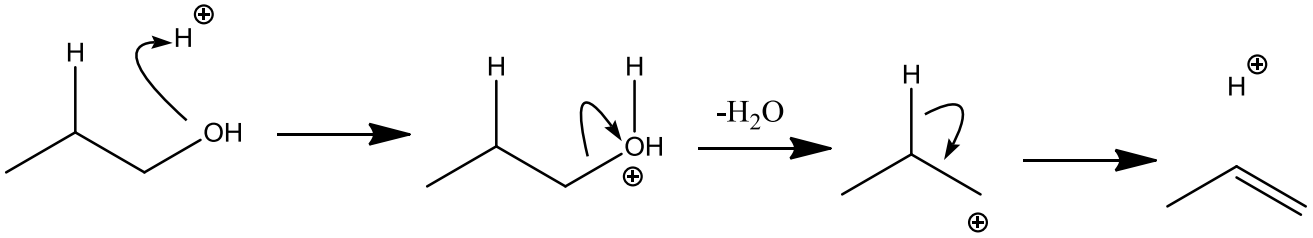
CHEM1102 Worksheet 6 – Answers to Critical Thinking Questions

The worksheets are available in the tutorials and form an integral part of the learning outcomes and experience for this unit.

Model 1: Elimination Reactions

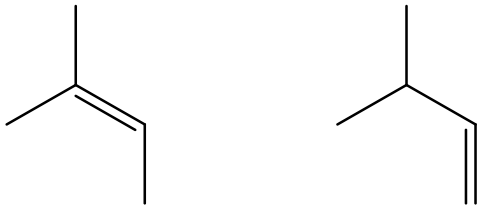
1. See below.



2. H_2O is a better leaving group than OH^-.

3. Catalyst.

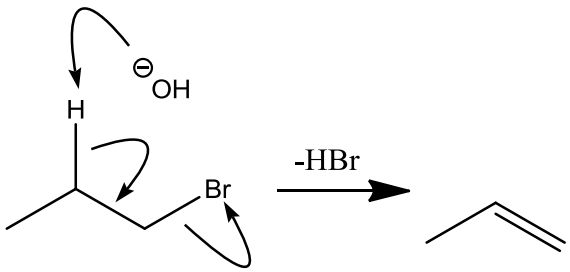
4. See below.



major minor

5. See above.

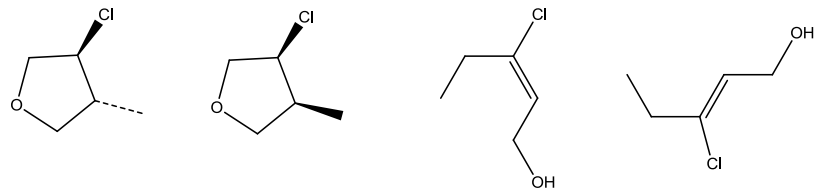
6. See below.



7. E = elimination. S_N = nucleophilic substitution.
   1 = one molecule involved in key reaction step. 2 = two molecules involved in key reaction step.

Model 2: Enantiomers and Diastereomers

1.



trans *cis* (*E*) (*Z*)

2. See class.

3. Same as each other.

4. Mirror images.

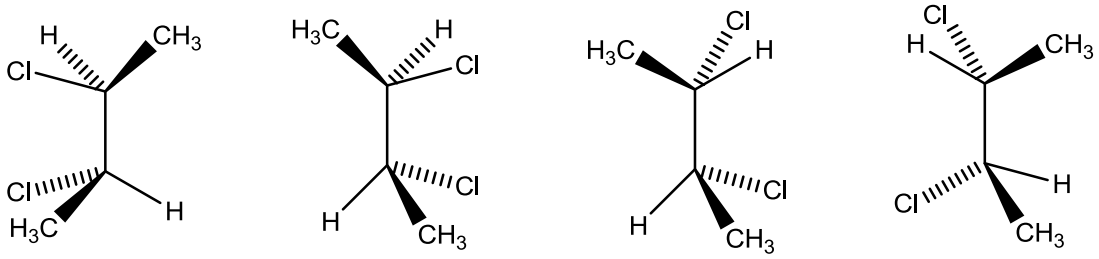
5. The molecules are the same.

6. 4 different groups around a tetrahedral carbon atom. In general, lack of an internal reflection plane or centre of symmetry.

7. Chiral, achiral, achiral, chiral and achiral.

8. (*R*), (*S*), (*S*) and (*R*).

9. See below.



A **B** **C** **D**

10. **A** and **B** are identical. This is the *meso* form.
C and **D** are enantiomers.
{**C**, **D**} and **A** (≡ **B**) are diastereomers.

11. No. Two pairs of enantiomers result.

Model 3: Stereochemistry and Reactions

1. Reactant – achiral. Carbocation intermediate – achiral. Product – chiral.

2. From above: From below:

(*S*) (*R*)

3. Either is equally likely.

4. Product will be chiral, with the same (*R*) configuration as the reactant. The reaction does not involve the chiral centre so its configuration is maintained.

5. The configuration is inverted: