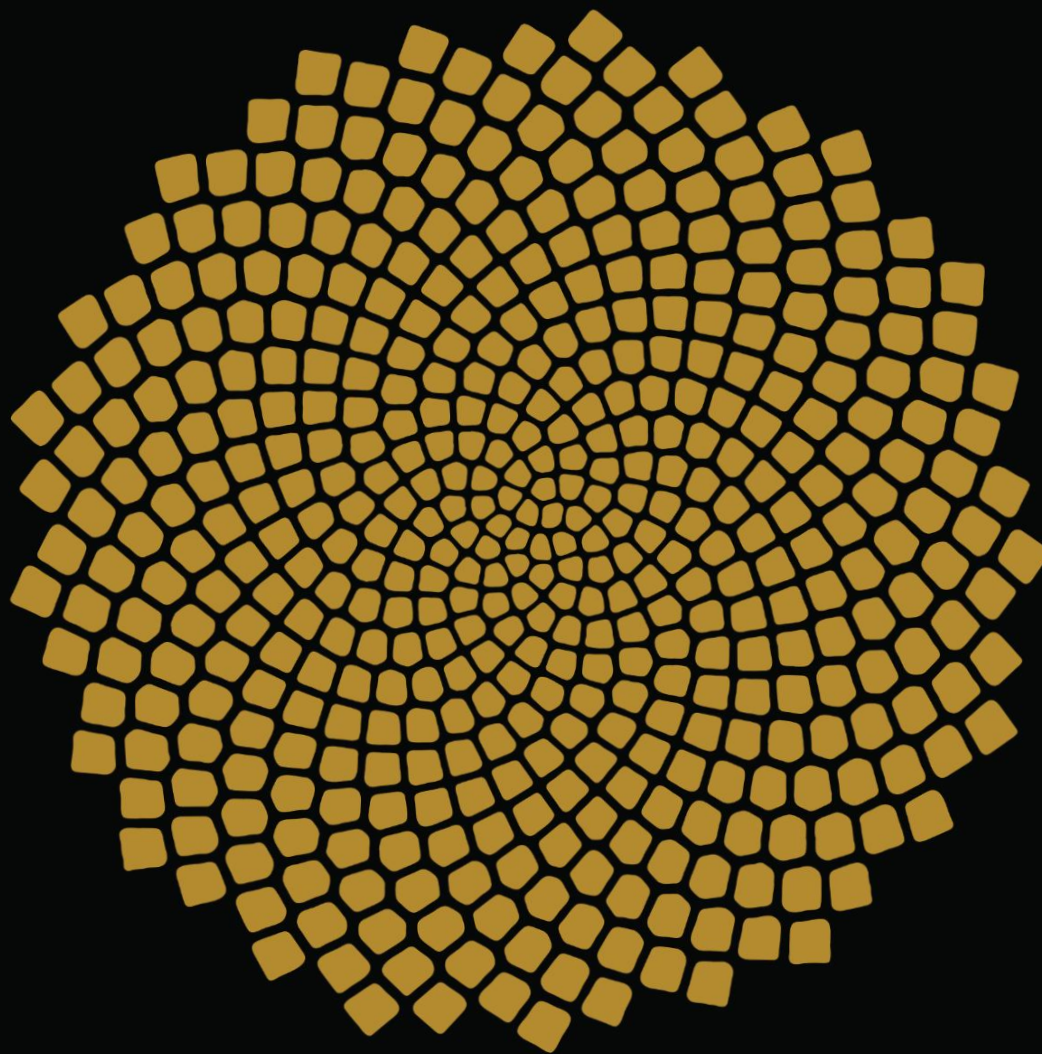


Student Solutions Manual

for use with

Organic Chemistry MECHANISTIC PATTERNS



Prepared by Neil Dryden and Nathan Ackroyd

Table of Contents

Chapter 1: Carbon and Its Compounds	1
Chapter 2: The Anatomy of an Organic Molecule	9
Chapter 3: Molecules in Motion: <i>Conformations by Rotations</i>	18
Chapter 4: Stereochemistry: <i>Three-Dimensional Structure in Molecules</i>	27
Chapter 5: Organic Reaction Mechanisms: <i>Using Curved Arrows to Analyze Reaction Mechanisms</i>	42
Chapter 6: Acids and Bases	56
Chapter 7: π Bonds as Electrophiles: <i>Reactions of Carbonyls and Related Functional Groups</i>	78
Chapter 8: π Bonds as Nucleophiles: <i>Reactions of Alkenes, Alkynes, Dienes, and Enols</i>	92
Chapter 9: Conjugation and Aromaticity	105
Chapter 10: Synthesis Using Aromatic Materials: <i>Electrophilic Aromatic Substitution and Directed Ortho Metalation</i>	114
Chapter 11: Displacement Reactions on Saturated Carbons: <i>S_N1 and S_N2 Substitution Reactions</i>	127
Chapter 12: Formation of π Bonds by Elimination Processes: <i>Elimination and Oxidation Reactions</i>	137
Chapter 13: Structure Determination I: <i>Nuclear Magnetic Resonance Spectroscopy</i>	144
Chapter 14: Structure Determination II: <i>Mass Spectrometry and Infrared</i>	160
Chapter 15: π Bond Electrophiles Connected to Leaving Groups: <i>Carboxylic Acid Derivatives and Their Reactions</i>	165
Chapter 16: π Bonds with Hidden Leaving Groups: <i>Reactions of Acetals and Related Compounds</i>	176
Chapter 17: Carbonyl-Based Nucleophiles: <i>Aldol, Claisen, Wittig, and Related Enolate Reactions</i>	207
Chapter 18: Selectivity and Reactivity in Enolate Reactions: <i>Control of Stereoselectivity and Regioselectivity</i>	218
Chapter 19: Radicals: <i>Halogenation, Polymerization, and Reduction Reactions</i>	233
Chapter 20: Reactions Controlled by Orbital Interactions: <i>Ring Closures, Cycloadditions, and Rearrangements</i>	240

Chapter 1

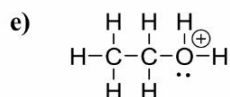
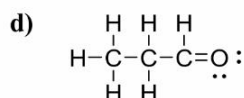
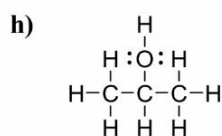
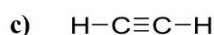
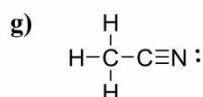
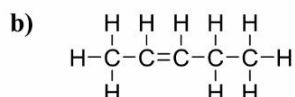
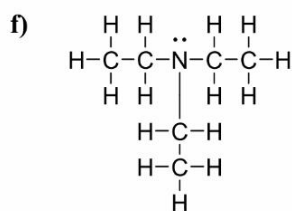
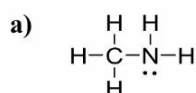
Carbon and Its Compounds

PROBLEMS

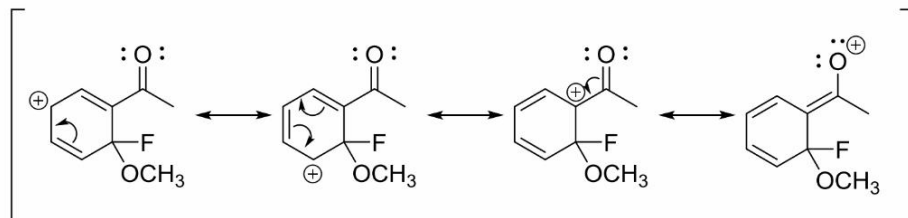
1.13

- a) Hydrogen has one electron. In the ground state, it is contained in the 1s orbital. An electron in the 2s orbital would have to be an excited state of the hydrogen atom.
- b) Carbon has six electrons. Its electron configuration is $1s^2 2s^2 2p^2$. Therefore, the valence electrons are in 2s and 2p orbitals. The 1s orbital is a core orbital.

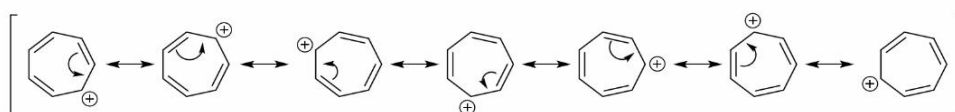
1.15



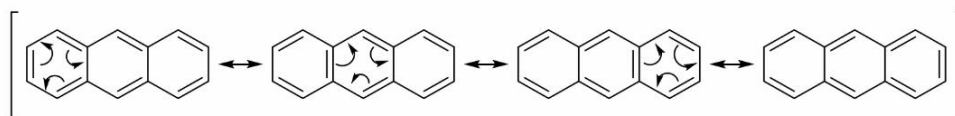
c) Four structures expected



d) Seven structures expected

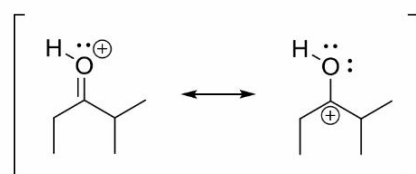


e) Four structures expected



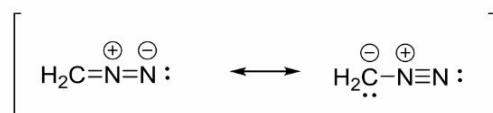
5.31

a) Resonance forms having atoms with all valence orbitals filled will contribute more to the resonance hybrid than those in which atoms have an empty orbital.



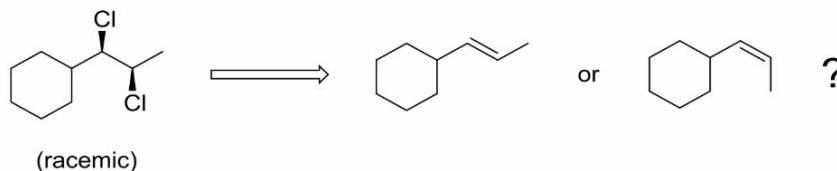
Rank: **1** **2**

b) The resonance form with the negative formal charge on the electronegative nitrogen atom is a greater contributor than the one with the negative charge on carbon.

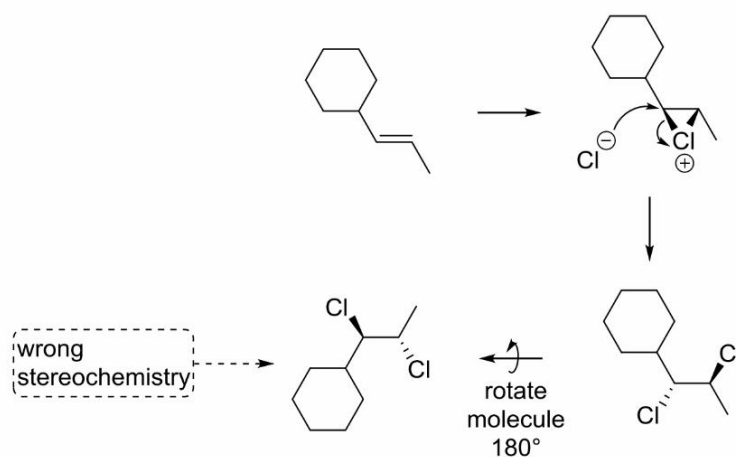


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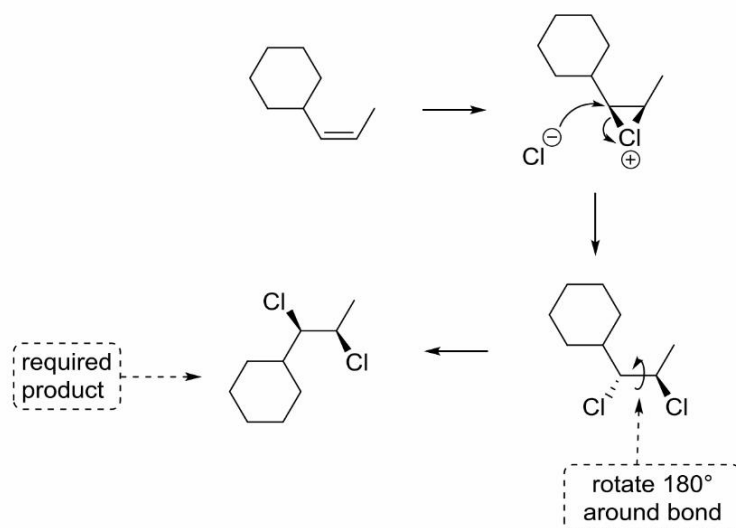
- e) There are two alkenes to consider. Using Cl_2 as reagent, the two chlorine atoms will add stereospecifically with a *trans* orientation.



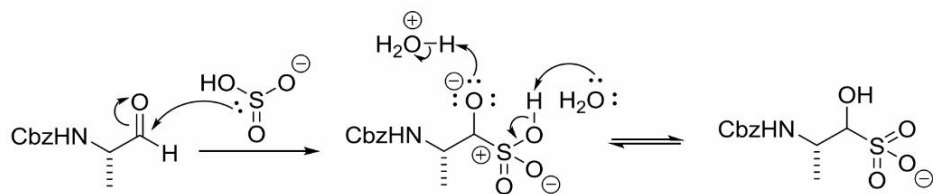
The *trans* alkene does not give the correct stereochemistry.



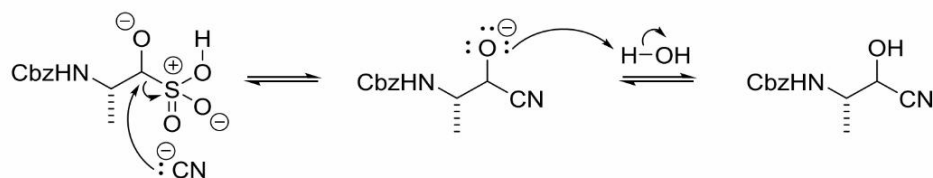
The *cis* alkene does lead to the correct final product.



b) NaHSO_3 :



NaCN :



HCl , EtOH :

