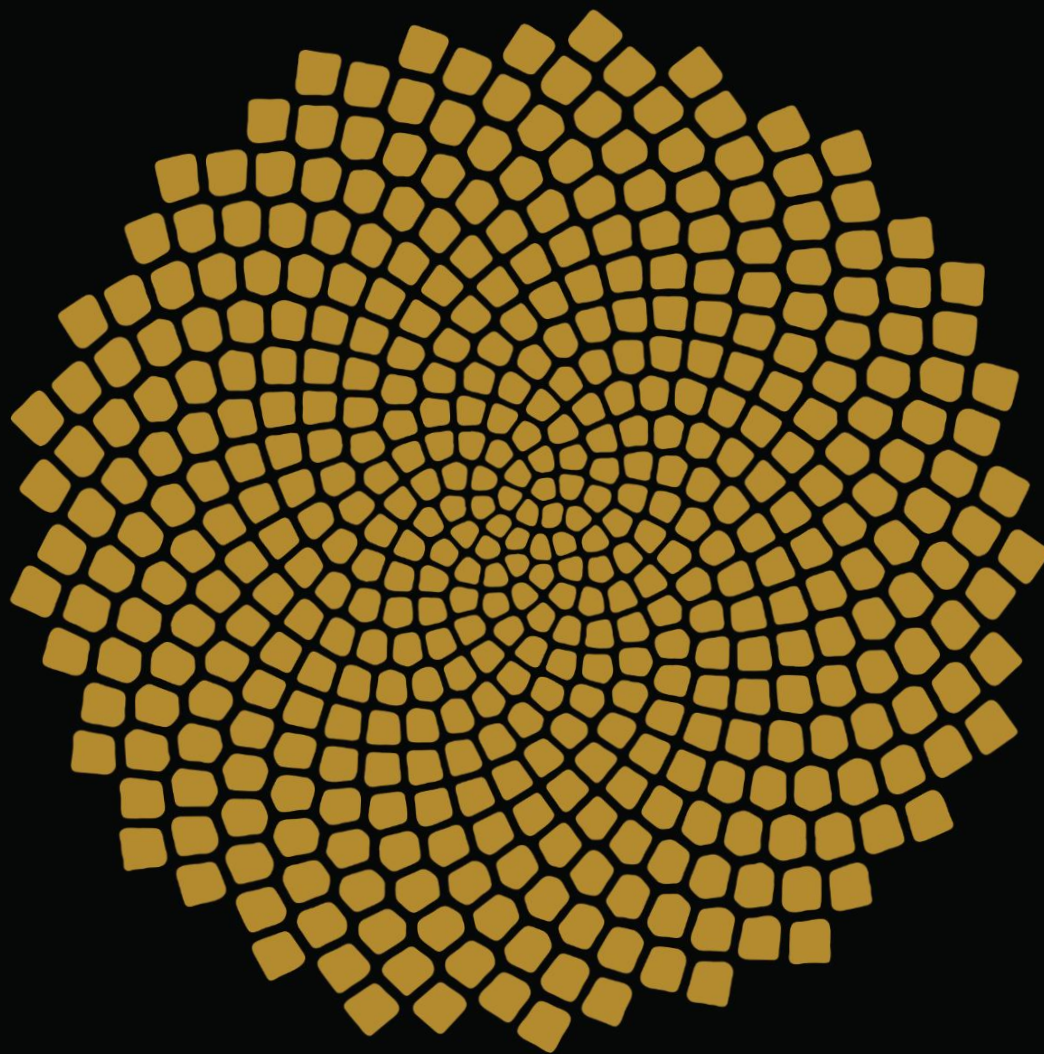


Student Solutions Manual

for use with

Organic Chemistry MECHANISTIC PATTERNS



Prepared by Neil Dryden and Nathan Ackroyd

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Chapter 1

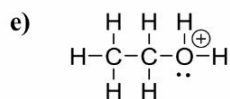
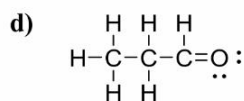
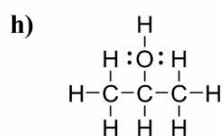
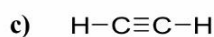
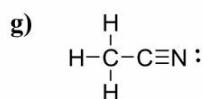
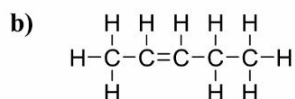
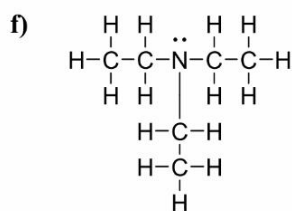
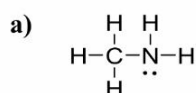
Carbon and Its Compounds

PROBLEMS

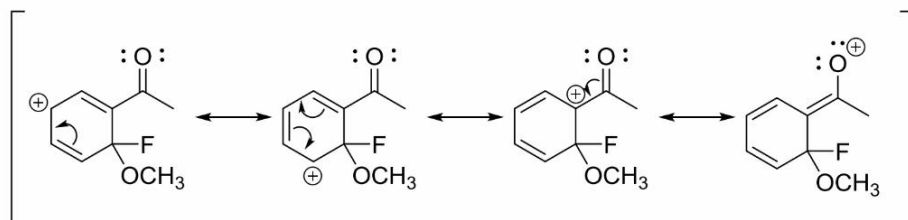
1.13

- 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.

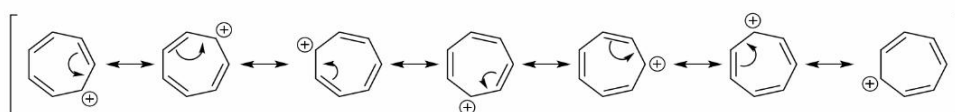
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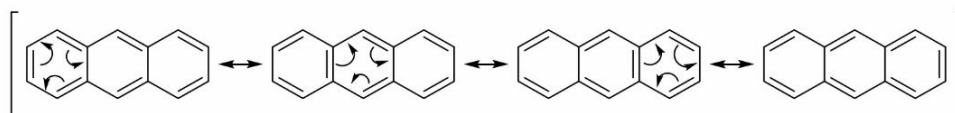
c) Four structures expected



d) Seven structures expected

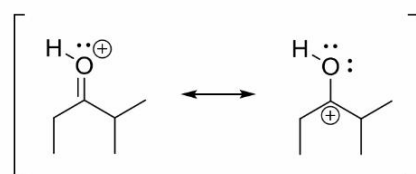


e) Four structures expected



5.31

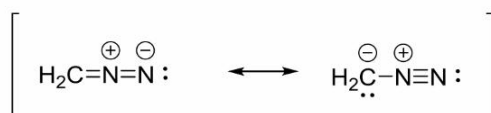
a) Resonance forms having atoms with all valence orbitals filled will contribute more to the resonance hybrid than those in which atoms have an empty orbital.



Rank: 1

2

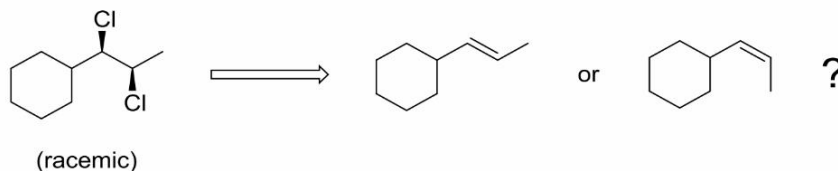
b) The resonance form with the negative formal charge on the electronegative nitrogen atom is a greater contributor than the one with the negative charge on carbon.



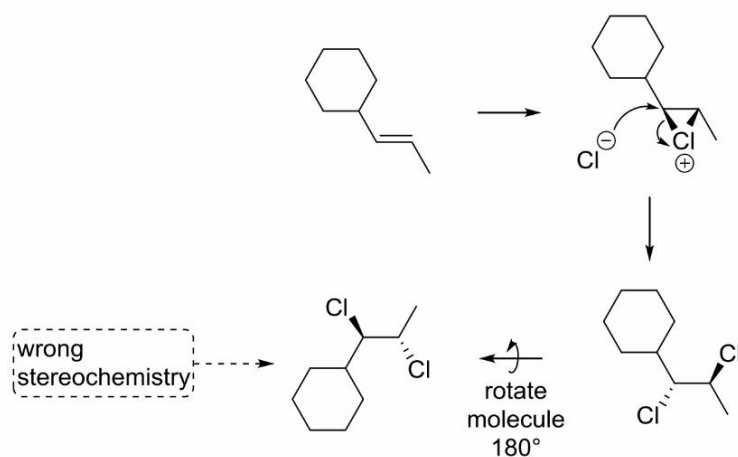
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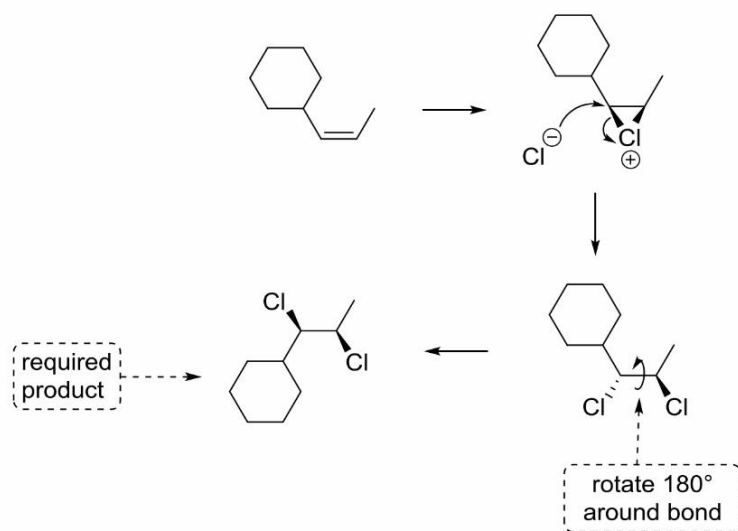
- e) There are two alkenes to consider. Using Cl_2 as reagent, the two chlorine atoms will add stereospecifically with a *trans* orientation.



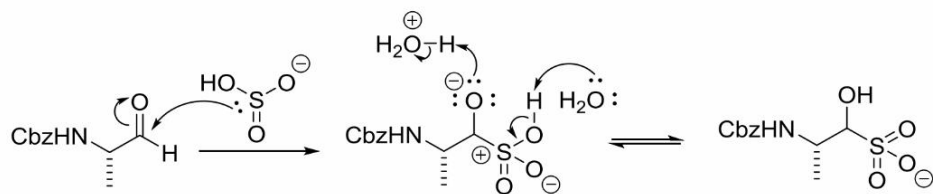
The *trans* alkene does not give the correct stereochemistry.



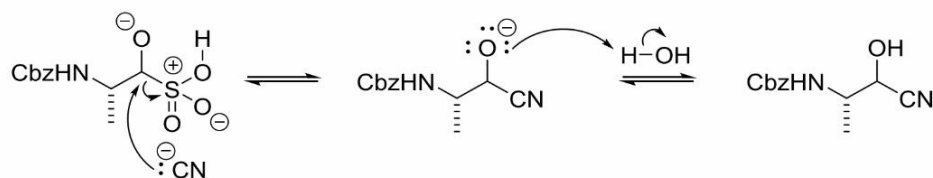
The *cis* alkene does lead to the correct final product.



b) NaHSO_3 :



NaCN :



HCl , EtOH :

