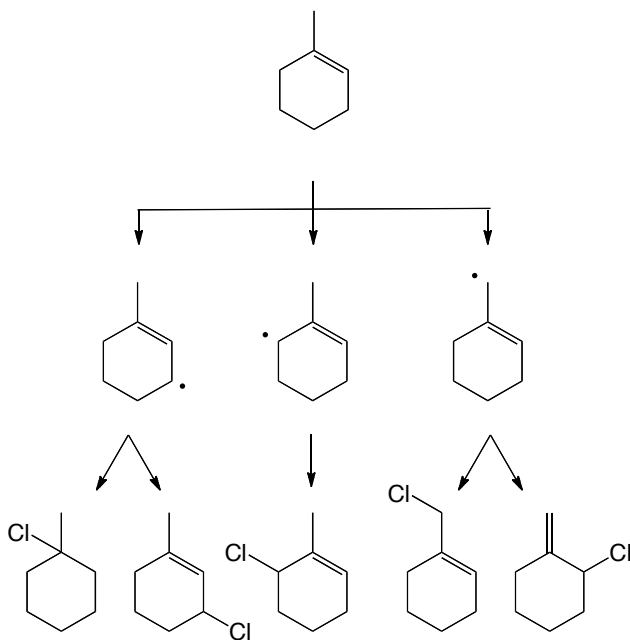


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14-1 The starting alkene is unsymmetrical and, therefore, two different radicals are formed by abstraction of a hydrogen. Because these radicals are allylic, each can form two different, regio isomeric product bromides. See the answer in the book for the structures.

14-2 Unlike the alkene in Exercise 14-1, the alkenes in parts a) and b) are symmetrical and only a single allylic radical results from hydrogen abstraction. Further, the allylic radical formed in a) is also symmetrical so only one allylic bromide results. The radical formed in b) is not symmetrical and therefore, two allylic bromides result. There are three unique allylic radicals that can be formed by hydrogen abstraction from 1-methylcyclohexene. One of these is symmetrical and results in only one allylic chloride but each of the other two is unsymmetrical and two allylic chlorides result from each. Note that the answer in the book has excluded the last answer, on the right below. Exocyclic double bonds on a six-membered ring are unusually unstable (steric interaction with the equatorial hydrogen atoms on the ring).



14-3 Because an allylic cation can be formed by loss of chloride ion, this substitution reaction proceeds by an S_N1 mechanism. Because the original center of chirality at C3 becomes planar in the cation, the chirality present in the starting material is lost.

14-4 This exercise is worked out in the book as "Working with Concepts".

14-5 The answer in the back of the book is adequate.

14-6 The key here is that initially, the reaction is under kinetic control where chloride ion adds to the initially formed cation. But over time, acetate adds and the greater strength of the C—O bond compared to the C—Cl bond makes the acetate the more stable product.

14-6 The answer in the back of the book is adequate.

14-7 The answer in the back of the book is adequate.

14-8 The answer in the back of the book is adequate.

14-9 The answer in the back of the book is adequate.

14-10 The answer in the back of the book is adequate.

14-11 The answer in the back of the book is adequate. Remember that for E2 reactions, the best all around base is $\text{KOC}(\text{CH}_3)_3$.

14-12 The answer in the back of the book is adequate.

14-13 This exercise is worked out in the book as "Working with Concepts".

14-14 The answer in the back of the book is adequate.

14-15 The answer in the back of the book is adequate.

14-16 The answer in the back of the book is adequate.

14-17 The answer in the back of the book is adequate.

14-18 The answer in the back of the book is adequate.

14-19 This exercise is worked out in the book as "Working with Concepts".

14-20 The answer in the back of the book is adequate.

14-21 The answer in the back of the book is adequate.

14-22 This exercise is worked out in the book as "Working with Concepts".

14-23 The answer in the back of the book is adequate.

14-24 The answer in the back of the book is adequate.

14-25 The answer in the back of the book is adequate.

14-26 The answer in the back of the book is adequate.

14-27 This exercise is worked out in the book as "Working with Concepts".

14-28 The answer in the back of the book is adequate.

14-29 All other things being equal, the more double bonds in conjugation, the longer the wavelength of the absorption.