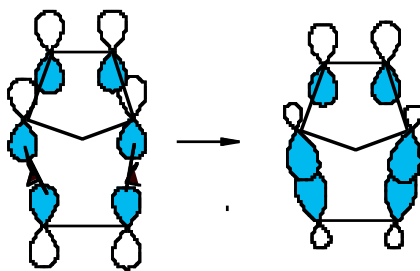
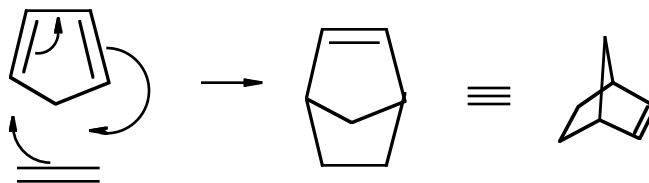


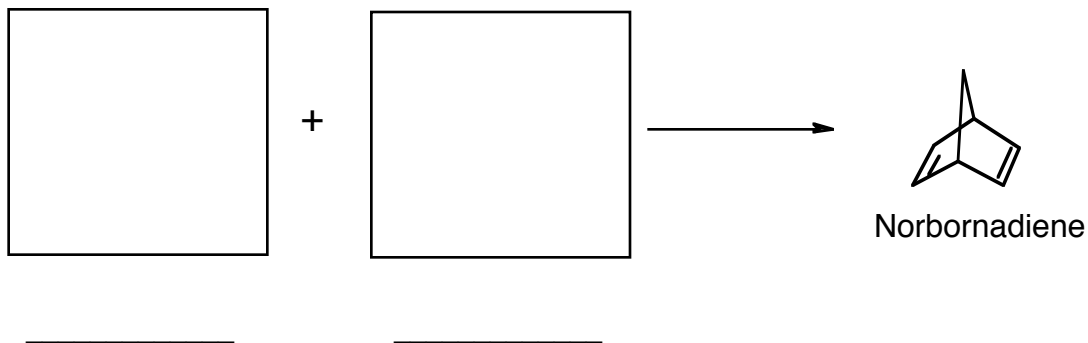
Name _____
Chem 226 / Dr. Rusay

Diels Alder Worksheet

The following reaction of ethene and cyclopentadiene illustrates the *Diels Alder* concerted cyclo-addition of an alkene or alkyne (the dienophile) to a diene. It is a concerted, stereospecific reaction that involves conservation of orbital symmetry, i.e. each orbital of the starting material must be converted to an orbital of the same symmetry. The products formed follow predictions based on molecular orbitals interacting where there is orbital overlap of like colored (shaded) orbital lobes combining to form new bonds.

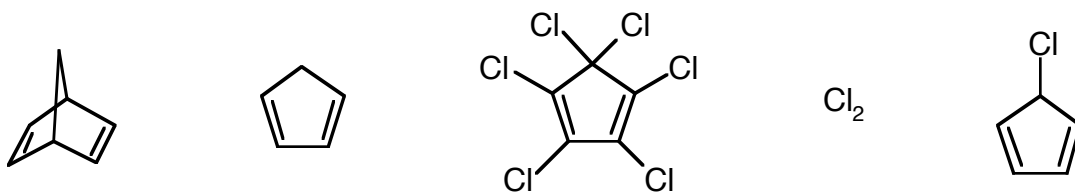


1. Draw structures for the reactants that produce norbornadiene, a key starting material for several pesticides. Identify the respective reactants as either the *diene* or the *dienophile*.

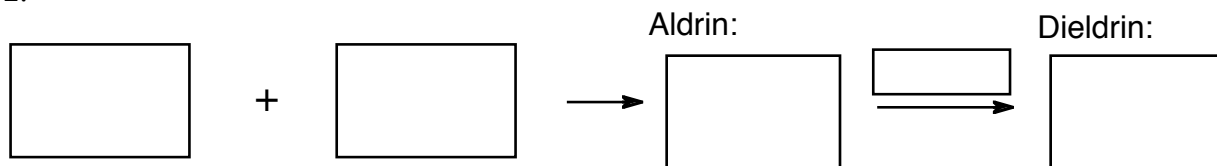


The Diels Alder reaction has been used commercially to produce a large number of highly chlorinated insecticides. Questions that relate to several of those compounds, Aldrin, Dieldrin, Chlordane, and Heptachlor follow.

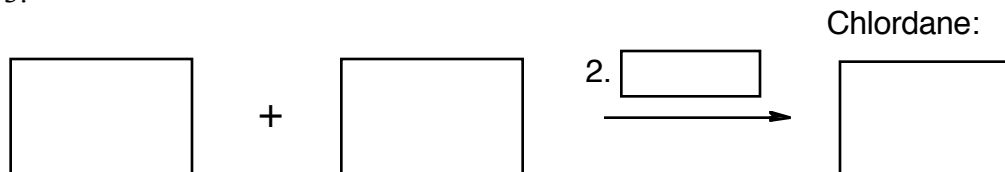
Draw structures for each of the products and complete the missing information for the respective reactions. The five compounds/ molecules listed below will assist you in your answers.



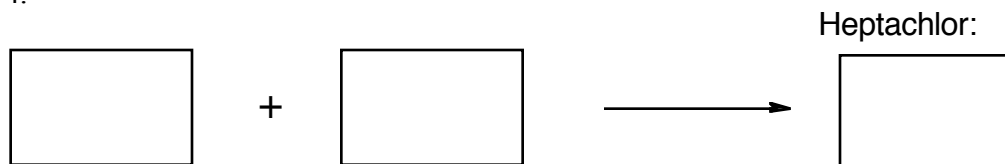
2.



3.



4.



5. Show the electron movements for the formation of the bonds in Heptachlor through the use of arrows from the starting materials as in the previous example for ethene and cyclopentadiene.

6. Briefly describe what these pesticides were / are used for and why they have been banned from use in most countries. Which of them is one of the best termite control agents and has a homeowner black market in California?