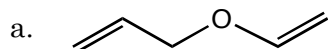


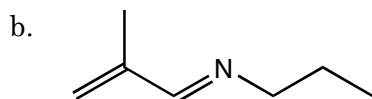
1. (6 pts. each) Draw resonance structures for the following molecules. Do not draw any structures that would be considered insignificant contributors to the resonance hybrid



1. _____

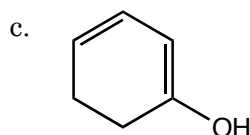
2. _____

3. _____



4. _____

5. _____



6. _____

7. _____

8. _____

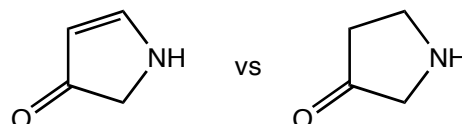
2. (12 pts) For each pair of molecules below, determine which is the stronger base (circle it).

9. _____

a.



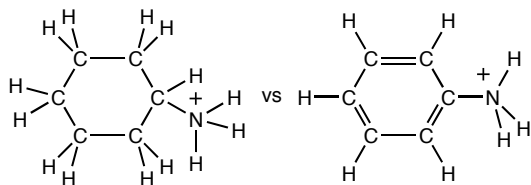
b.



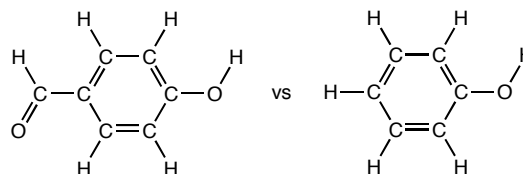
3. a. (4 pts.) For each molecule drawn below, determine which proton is the most likely to be lost during an acid base reaction, and

b. (8 pts.) For each pair of molecules identify (and circle) the stronger acid.

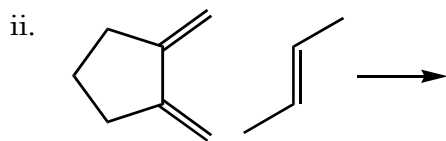
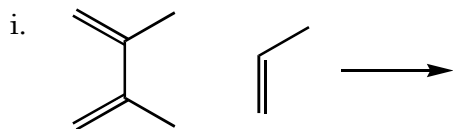
a.



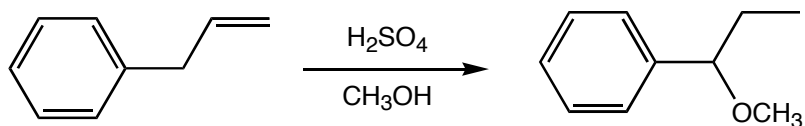
b.



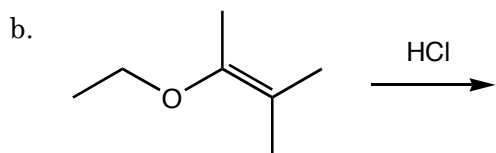
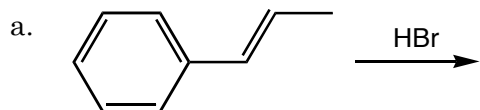
4. (12 pts.) Predict the products of the following Diels-Alder reactions. Use wedge and dash bonds to indicate the stereochemical outcome of the reactions.



5. (8 pts.) Provide a mechanism that explains the formation of the product shown in the following reaction.

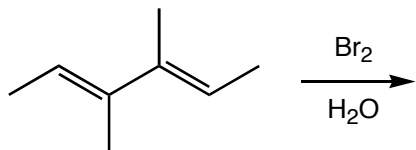


6. (12 pts.) Predict the major product(s) for the following electrophilic addition reactions.

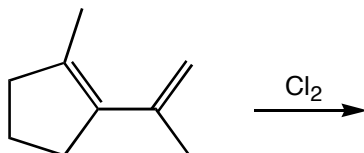


7. (a) Predict the major products of the reaction, (b) label the 1,2- and 1,4-addition products, and (c) label the thermodynamic and kinetic products

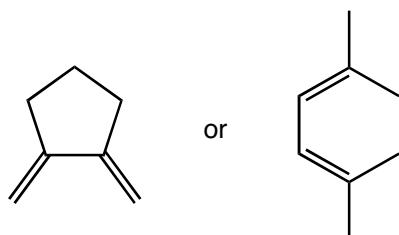
i.



iii.



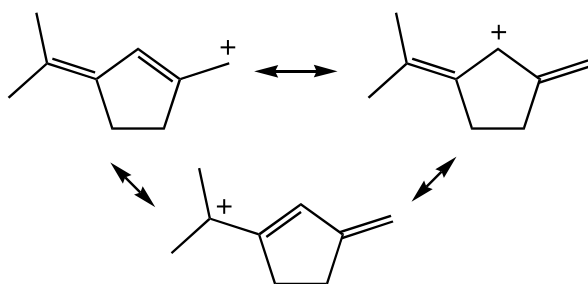
8. (8 pts.) Which of the following molecules would make the better diene for a Diels-Alder reaction. Explain your choice.



9. a. (6 pts. each) Draw the resonance hybrid for the following resonance structures, and

b. (6 pts. each) Rank the resonance structures in order of decreasing stability. In the event of a tie, assign the structures the same rank. (1 for most stable, followed by 2, etc.)

i.



ii.

