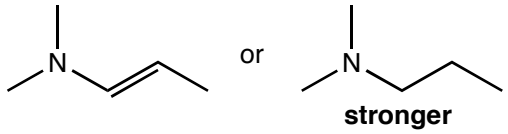
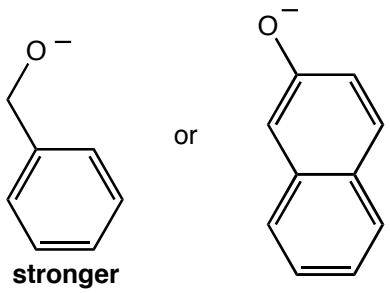
Name _____ Test 4
PHYS 0201 (Organic) Fall 2005

1. (6 pts. each) For each of the following pair of molecules, determine which molecule is the stronger base.

a.

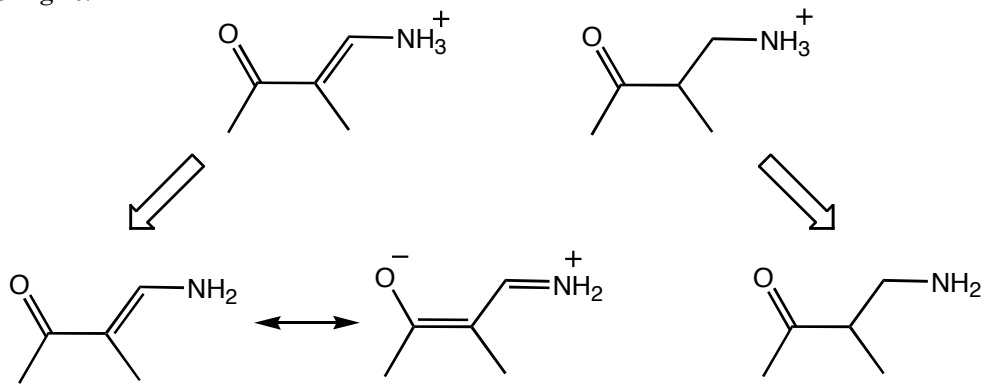



b.




1. _____
2. _____
3. _____
4. _____

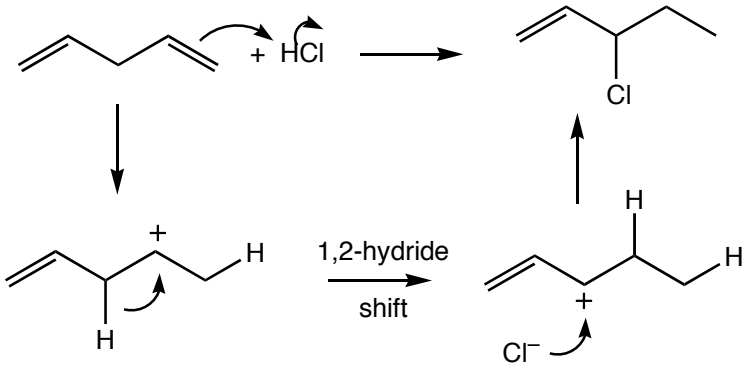
2. (10 pts.) Explain why the molecule on the left is a stronger acid that the molecule on the right.




Because the lone pair of electrons is more spread out on the conjugate base of the molecule on the left, it does not attract its proton as well as the molecule on the right, which has its lone pair of electrons concentrated on the N atom.

5. _____
6. _____
7. _____
8. _____
9. _____

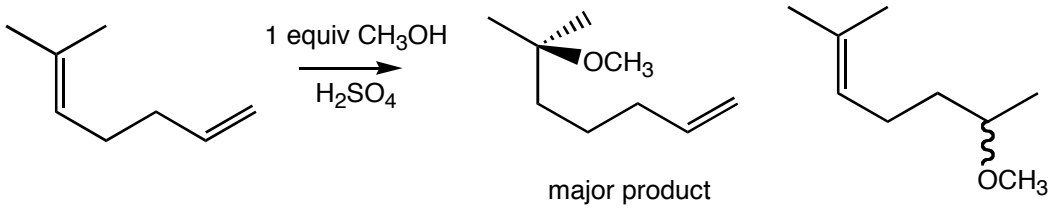
3. (10 pts) Explain why the addition of HCl to 1,4-pentadiene can produce 3-chloro-1-pentene.



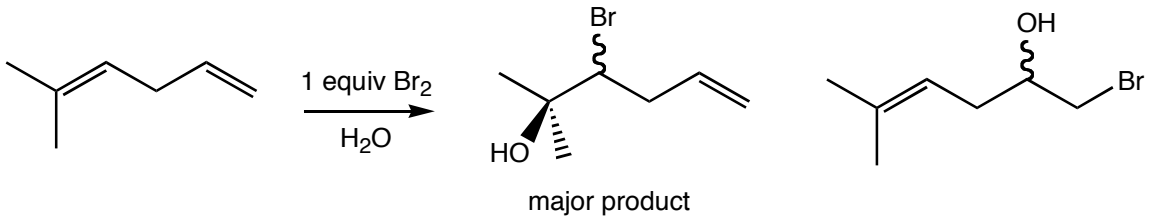

The 2° carbocation that forms initially can be converted to a more stable 2° allylic carbocation by a 1,2-hydride shift. One the 1,2-hydride shift occurs, the chloride reacts with the new carbocation to form 3-chloro-1-pentene

4. (6 pts. each) Predict the major and minor products of the following electrophilic addition reactions. Remember to label the major and minor products. Ignore the stereochemistry of the products.

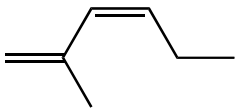
a.




b.

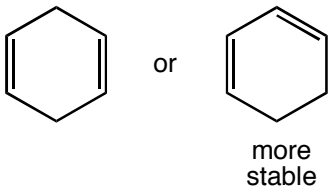



5. (6 pts.) Draw a skeletal structure for *Z*-2-methyl-1,3-hexadiene.

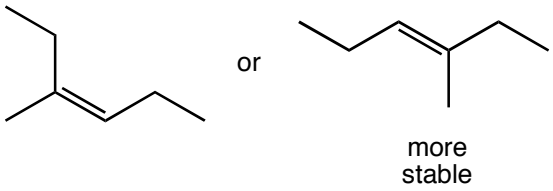


6. (4 pts. each) For each of the following pairs of alkenes determine which alkene would be more thermodynamically stable.

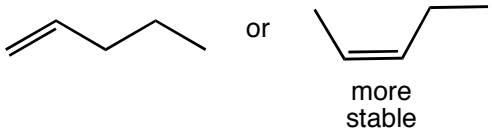
a.




b.

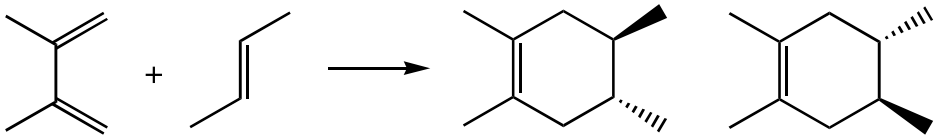



c.

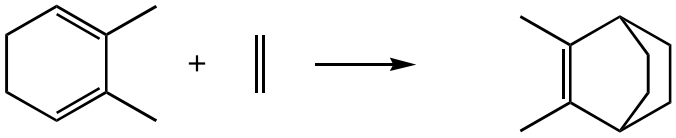



7. (4 pts. each) Determine the products of the following reactions. Remember to consider the stereochemistry of the product(s) where appropriate.

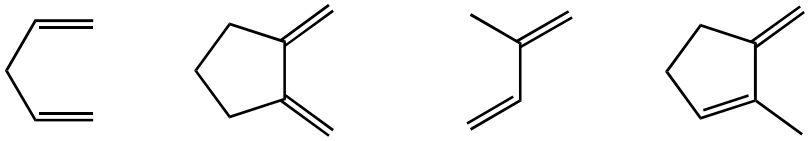
a.



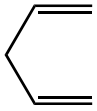

b.



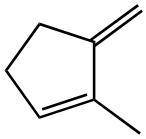
8. Four dienes are drawn below.



a. (6 pts.) Which of these molecules drawn above cannot play the role of the diene in a Diels-Alder reaction? Explain you choice(s).

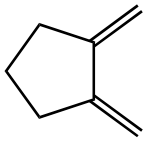


This diene is not a conjugated diene; thus, it cannot play the role of dien in a Diels-Alder reaction.



This diene cannot assume the correct s-cis geometry—the double bonds cannot be made to point in the same direction); thus, it cannot play the role of the diene in a Diels-Alder reaction.

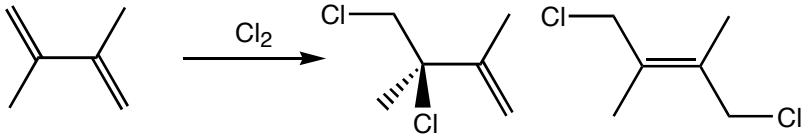
b. (4 pts.) Which would be the most reactive diene for a Diels-Alder reaction? Explain.



This diene has its double bonds locked in the correct s-cis geometry (the ring forces the double bonds to point in the same direction). The other reagent must rotate into the s-cis form, which will take time. Thus, the molecule pictures to the left is the more reactive molecule.

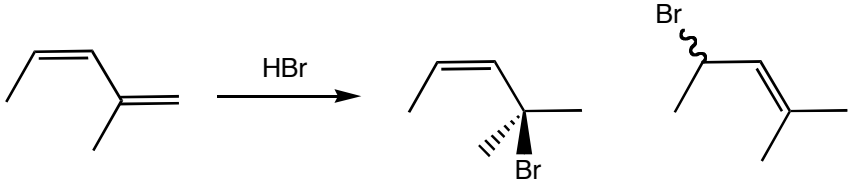
9. (4 pts. each) Determine the products of the following reactions, and label the kinetic and thermodynamic products of the reactions.

a.



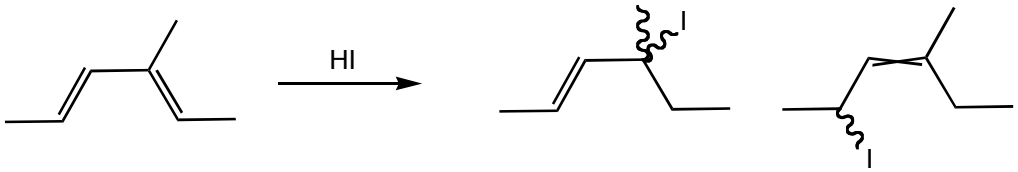

kinetic thermodynamic

b.




kinetic thermodynamic

c.




kinetic thermodynamic