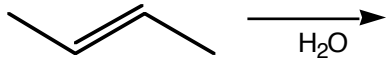
Name _____ Test 3

PHYS 0201 (Organic) Fall 2005

1. (4 pts. each) Identify whether the following reactions occur via a syn addition, an anti addition or both.

a. 

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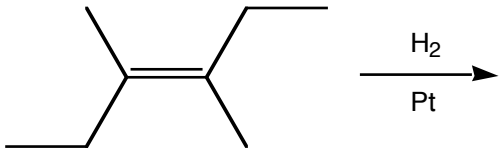
b. 

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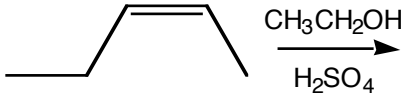
c. 

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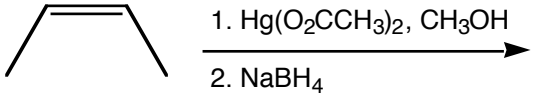
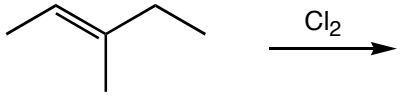
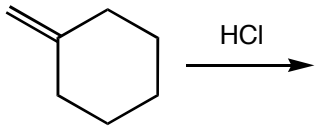
d. 

_____

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

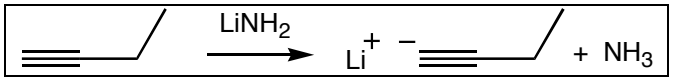
2. (8 pts. each) Draw all of the products of the following reactions. Remember to indicate the stereochemistry of the products by using wedge (◀) and dash (····|||||) bonds where necessary.

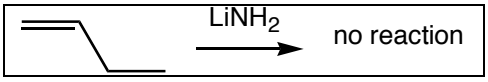
a. 

b. 

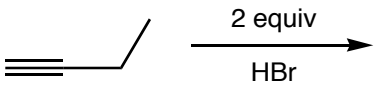
7. _____
8. _____
9. _____
10. _____

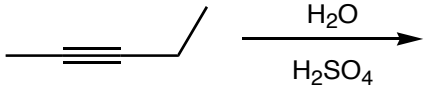
3. (6 pts.) Explain why a terminal alkyne can be deprotonated by $LiNH_2$ whereas a terminal alkene cannot.

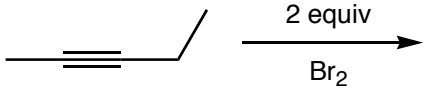




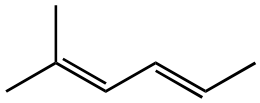
4. (6 pts. each) Predict the products of the following reactions.

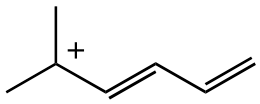
a. 

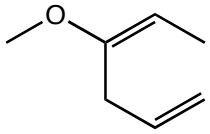
b. 

c. 

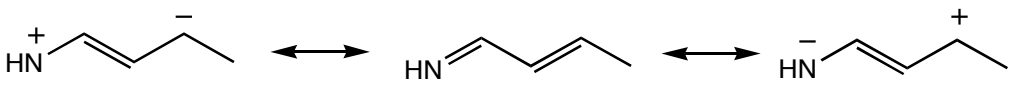
5. (6 pts. each) Draw resonance structures for the following molecules.

a. 

b. 

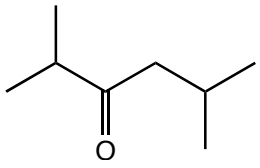
c. 

6. (8 pts.) Three resonance structures are drawn below. Determine which structure is the highest in energy and which is the lowest in energy and indicate which structures (if any) aren't significant contributors to the resonance hybrid.

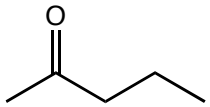


7. (6 pts. each) Choose the best alkyne for making each of the following molecules.

a.

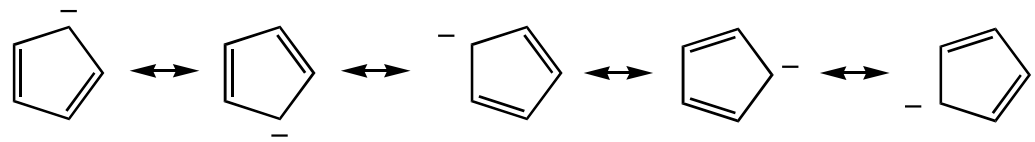


b.

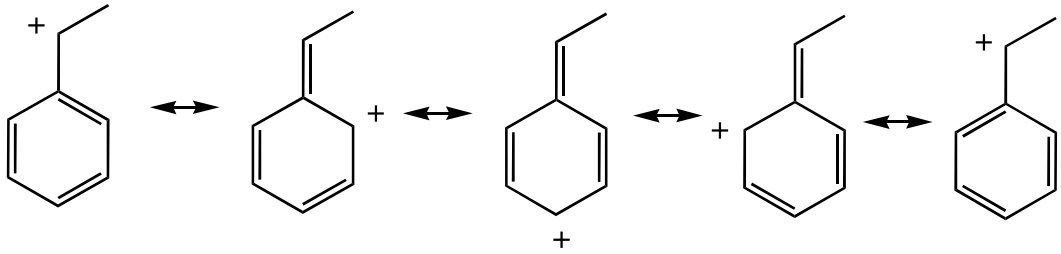


8. (6 pts. each) Draw the resonance hybrid for the following molecules.

a.

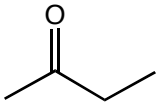


b.



9. a. (6 pts.) Draw an enol tautomer for the following molecule.

b. (6 pts.) Draw a mechanism for the conversion of the following carbonyl to the enol tautomer drawn in part a.



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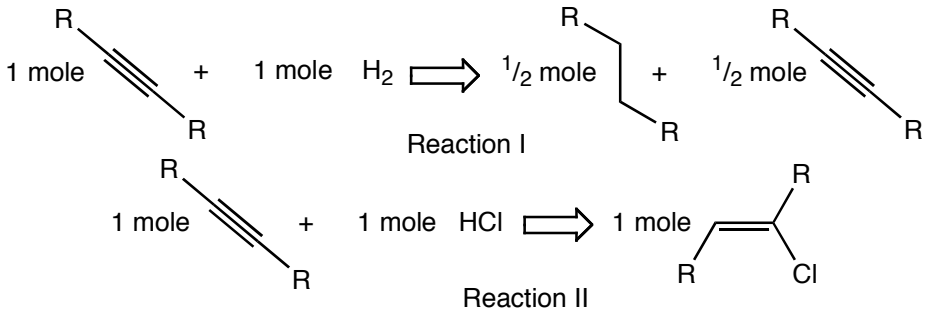
Take home question to be answered **on your own** with the help of your textbook or notebook if you wish. Please write your answer as a brief essay.

10. (10 pts) The reaction of 1 mole of an alkyne with one mole of H_2 in the presence of a pure platinum catalyst produces half a mole of the requisite alkane and half a mole of the initial alkyne remains as shown in Reaction I. Yet, when 1 mole an alkyne reacts with one mole of HCl, one mole of the requisite vinylic chlorine compound is produced as shown in Reaction II.



Explain why the reactions behave differently. That is, explain why Reaction II cleanly produces an alkene whereas Reaction I does not.