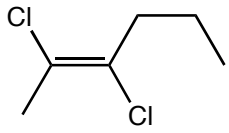
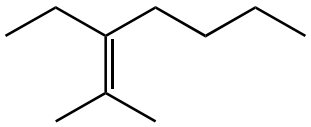
Name _____ Test 2 (10/30)
CHEM 0201 (Organic) Fall 2009

1. (6 pts. ea.) Provide IUPAC names for the following structures. Use the *Z*/*E* nomenclature where appropriate.

a. 

b. 

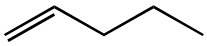
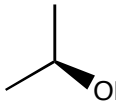
_____ _____

2. (6 pts. ea.) Draw skeletal structures for the following molecules. Make the structure three dimensionally accurate using wedges (◄) and dashes (⋯) where appropriate.

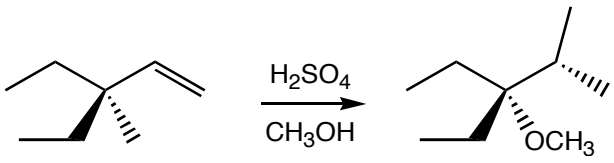
a. *E*-3-chloro-4-methyl-2-pentene

b. 2-methyl-2-butene

3. (10 pts.) Determine whether the following ions/atoms/molecules are nucleophilic, electrophilic, or neither.

$(CH_3)_2CHCH_2CH_3$	HI			Br^-
	HSO_4^-	Cl_2	CH_3CH_2SH	H_2O

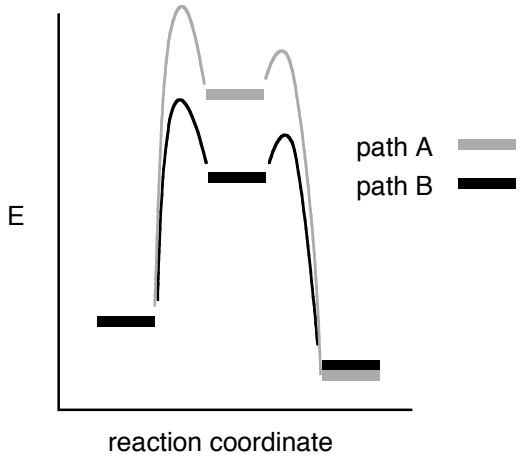
4. (10 pts.) Suggest (draw) a mechanism that accounts for the formation of the product draw below.



1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

5. (10 pts) Explain why a 3° carbocation is more stable than a 2° carbocation.

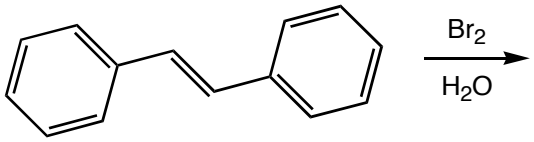
6. a. (8 pts.) Path A and path B represent two possible electrophilic addition reactions that could theoretically occur on a given alkene. Which path will produce the major product in this reaction? Explain your response.



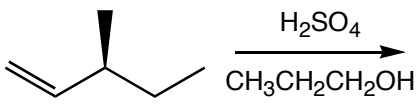
b. (4 pts.) One path involves the production of a 1° carbocation and the other involves the production of a 2° carbocation. Label the portions of the diagram that represent the 1° and 2° carbocations.

7. (6 pts. ea.) Predict the major products for the following reactions. Consider only the organic products.

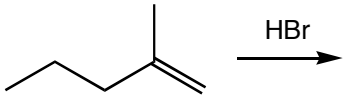
a.



b.

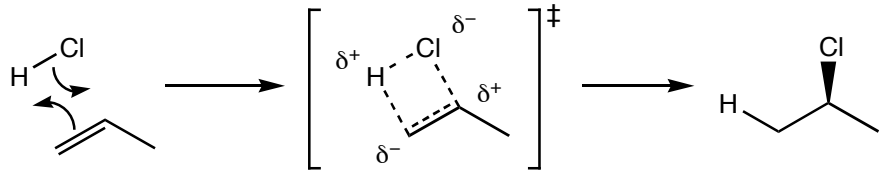


c.



8. (10 pts.) Using the valence bond/hybridization model of bonding, describe the orbitals used to make a carbon to carbon double bond and explain why *cis* and *trans* alkenes cannot be easily interconverted. In your description remember to indicate the names of the orbitals (hybrid or unhybridized as the case may be) that overlap to allow the sharing of electrons between the atoms.

9. An alternate hypothesis for the mechanism of an electrophilic addition reaction is drawn below. The transition state (the highest energy molecule on the path from reactant to products where the bond breaking and bond formation hasn't been finished yet) for the one step mechanism is also drawn. Dotted lines indicate partial/incomplete bonds.



a. (4 pts.) What prediction(s) would this mechanism make that is(are) consistent with the mechanism we have been using in class.

b. (4 pts.) What prediction(s) would this mechanism make that is(are) **not** consistent with the mechanism we have been using in class.