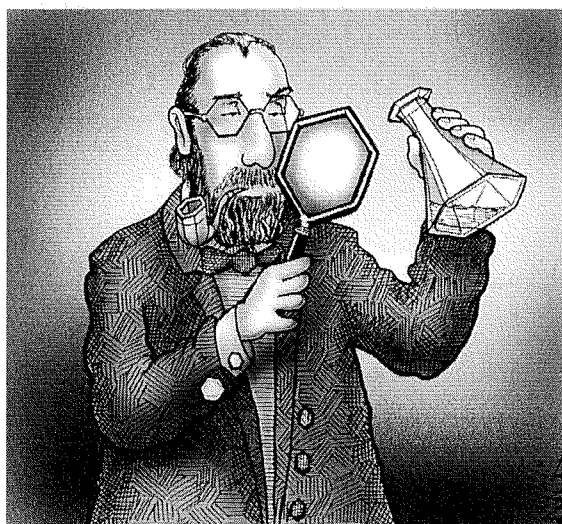


Organic Chemistry I
SI Review: Exam II
Tuesday, October 16
Stevens Auditorium
6:00-8:00 PM

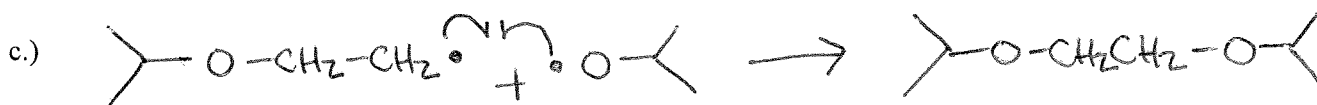
Great events in Chemistry...



1865: Kekulé, moments before his brilliant insight into the structure of benzene.

www.nearingzero.com

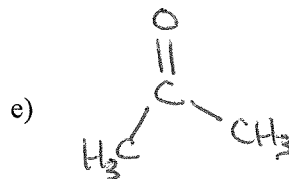
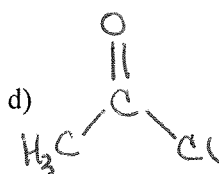
1. Identify each of the following steps of a free radical reaction as initiation, propagation or termination.



2. How many unique products could result from the monochlorination of the following alkanes? What are they?

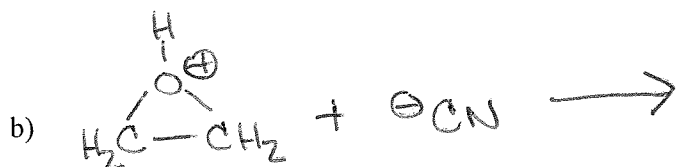
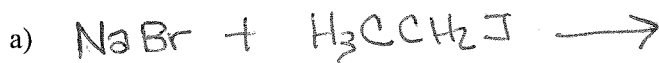


3. Identify whether each of the following is a nucleophile or electrophile (or both)! Label the nucleophilic and electrophilic components of each molecule.

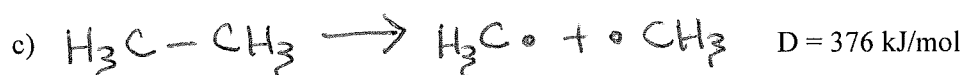
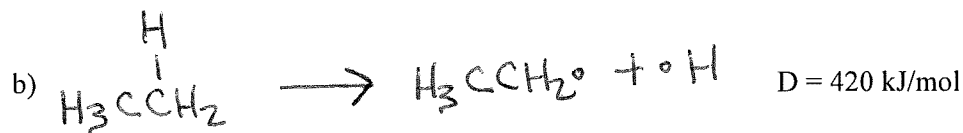


*What word do we use to describe the bond in diatomic chlorine?

4. In the following reactions, circle the nucleophile and indicate the product(s) formed. Identify each reaction as addition, elimination, substitution or rearrangement.



5. The following molecules can be cleaved via radical mechanism at the bonds identified. Which of the following initiation steps is the least endergonic? (D = bond dissociation energy)

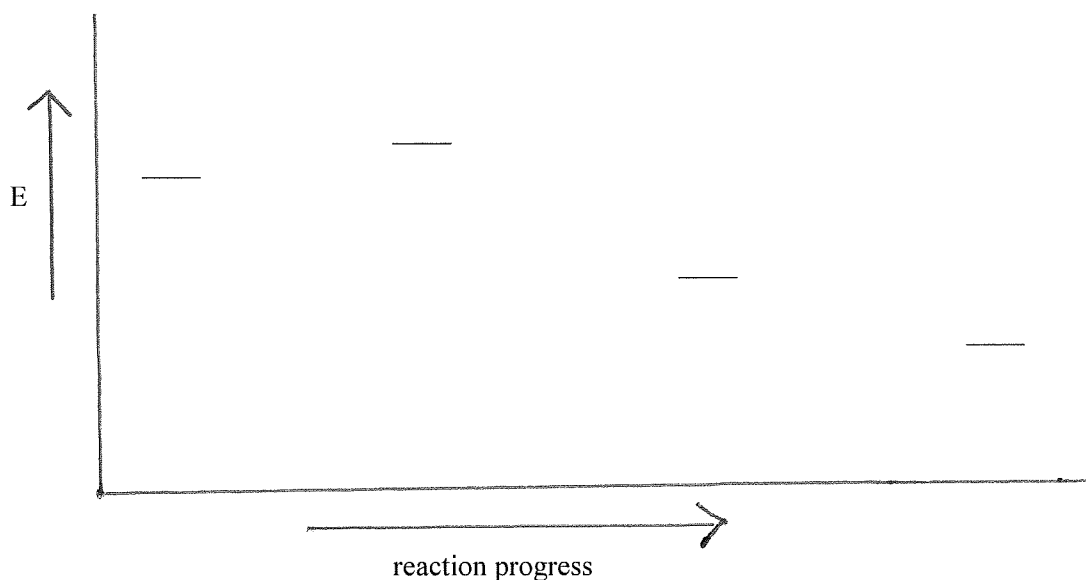


6. Draw a reaction energy diagram given the following criteria. (Starting materials, intermediates and products are identified with lines.)

i) This is a three-step reaction

ii) The second step is rate-determining

iii) The transition state of step 3 is lower in energy than the first intermediate



a) Label starting materials, intermediates and product

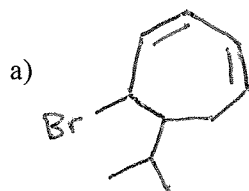
b) Indicate with arrows the Activation Energy (ΔG^\ddagger) of each step

c) Which is the most exergonic step?

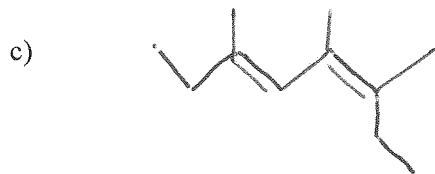
d) Which is the only endergonic step?

e) Indicate with an arrow the Gibbs Free Energy (ΔG^\ominus) of the overall reaction

7. Name the following molecules, or draw the structure corresponding with the given name.



b) *cis*-6-Bromo-4-(1-methylethyl)-1,4-hexadiene



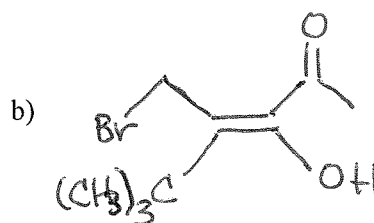
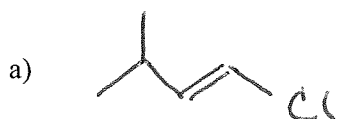
d) (E)-4-Bromo-3-(1-methylethyl)-1,3-butadiene



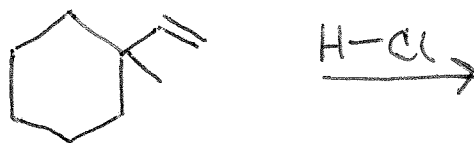
8. Identify the substituents on the following compounds as methylene, vinyl or allyl groups.



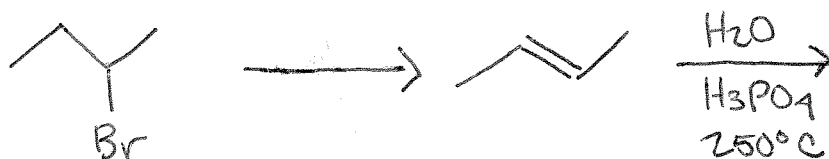
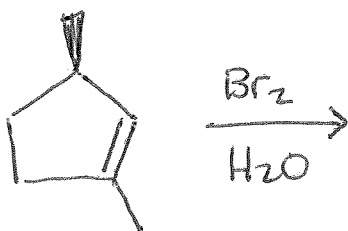
9. Label the following molecules as E or Z, *cis* or *trans*.



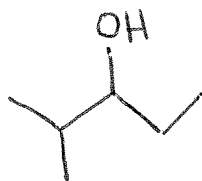
10. Show the mechanism for the following electrophilic addition reaction, and indicate all possible products:



11. Fill in missing starting materials, reagents or products. Show stereochemistry where applicable.



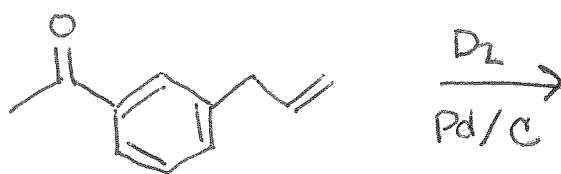
12. There are two alkenes (a and b) that could be the precursor of the following alcohol. Which alkene would serve as the better precursor, and would you use hydroboration or oxymercuration to arrive at the desired product? (Hint: Identify the two possible alkenes and perform both hydroboration and oxymercuration on each.)



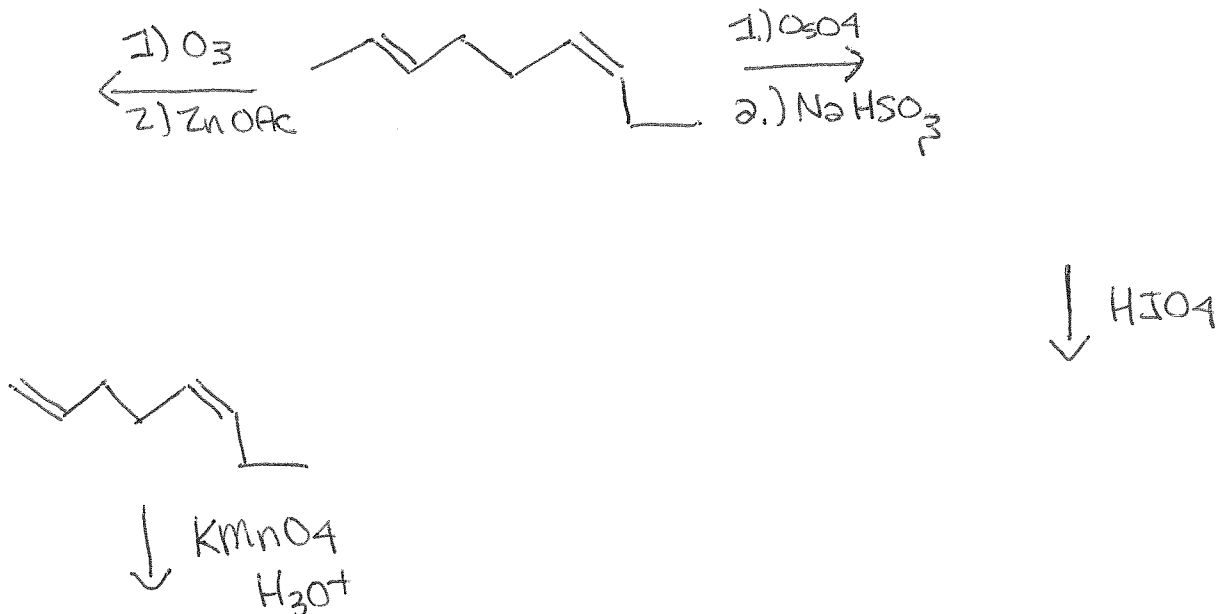
a)

b)

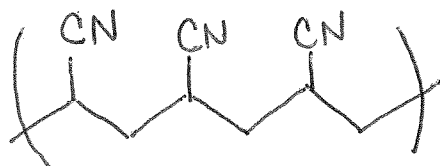
13. Identify the product of this reduction reaction:



14. Fill in missing starting materials, reagents or products in the following reactions. Circle the strongest oxidizing treatment.



15. What monomer unit would be used to prepare this polymer?



"We wish to suggest a structure for the salt of deoxyribose nucleic acid (D.N.A.)."

-J. D. Watson F. H. C. Crick (Nature April 2, 1953)