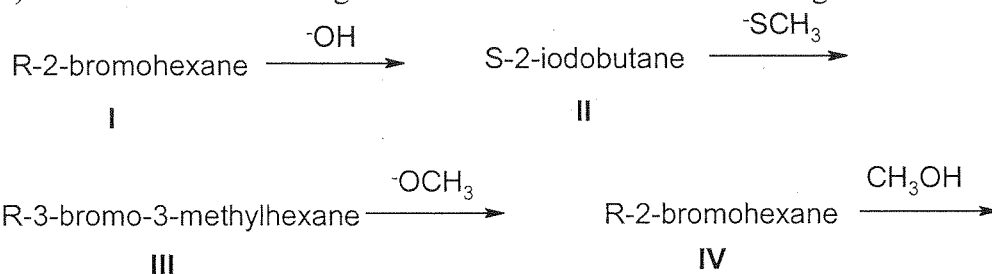


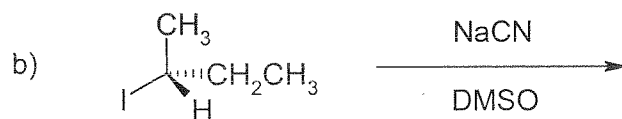
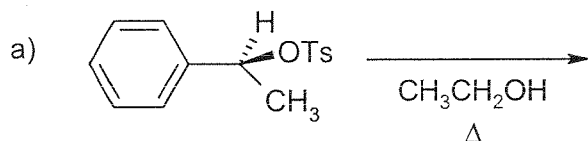
CHEM 2061 – Fall 2007 – EXAM #3 Name _____

1. (4 pts) Which of the following reactions involve inversion of configuration?

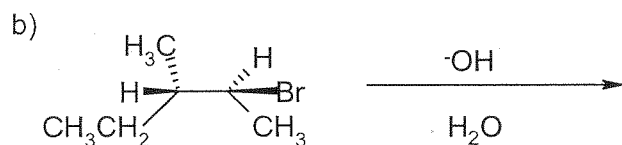
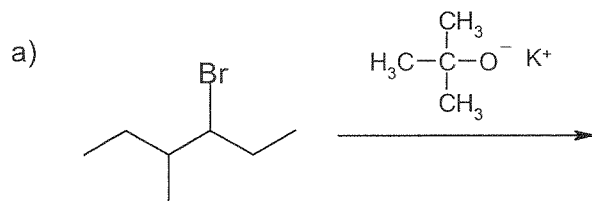


- a) I, II b) III, IV c) II, III d) I, IV e) I, II, III

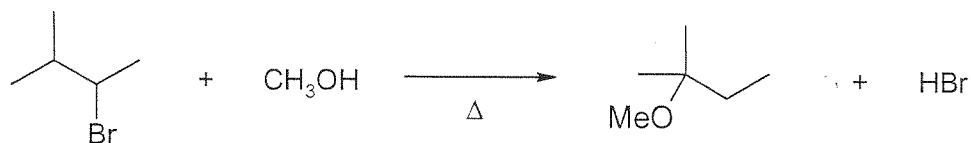
2. (10 pts, 5 each) **A)** Give the structure of the **major** organic product in each of the following **substitution** reactions, and **B)** predict whether the mechanism will be predominantly 1st order (S_N1) or second order (S_N2). Be sure to show the correct stereochemistry of the product when necessary. If the product is a racemic mixture, draw both enantiomers.



3. (10 pts, 5 each) **A)** Give the structure of the **major** organic product in each of the following **elimination** reactions, and **B)** predict whether the mechanism will be predominantly first order ($E1$) or second order ($E2$). **BE SURE TO SHOW THE CORRECT STEREOCHEMISTRY OF THE PRODUCT WHEN NECESSARY.**

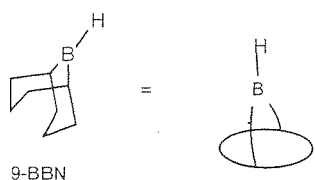
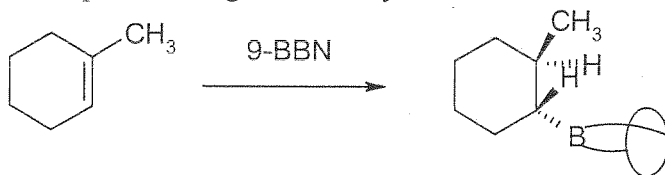


4. (10 pts) Write the **complete mechanism** for the following substitution reaction that explains the formation of the products given.



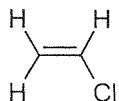
5. (8 pts) a) Explain WHY the syn addition product is the only product obtained when 1-methylcyclohexene undergoes hydroboration by 9-BBN. (Please show the mechanism of this hydroboration to aid in your explanation).

b) Please explain the regioselectivity of the 9-BBN addition.



9-BBN

6. (2 pts) The IUPAC name of the following compound is 1-chloroethene.

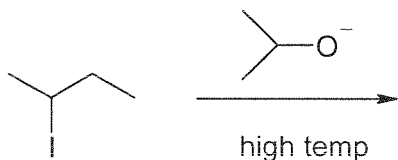


Another way to name this compound (the common name) is _____.

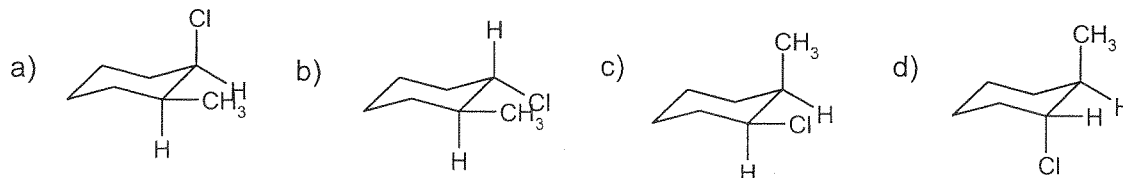
7. (3 pts) Which of the following is the optimum set of conditions for an E1 reaction of t-butyl bromide?

nucleophile/solvent	temperature (°C)
a) CH ₃ OH	25°C
b) CH ₃ OH	80°C
c) CH ₃ O ⁻ CH ₃ OH	25°C
d) CH ₃ CH ₂ O ⁻ DMSO	25°C
e) CH ₃ CH ₂ O ⁻ DMSO	80°C

8. (4 pts) Give the major product of the following reaction:



9. (3 pts) One of the isomers of 1-chloro-2-methylcyclohexane gives a single E2 elimination product upon reaction with potassium tert-butoxide. What is the reactive conformation of this isomer?



10. (5 pts) Explain WHY, in the acid-catalyzed addition of water to 2-methyl-1-propene, the major product is 2-methyl-2-propanol and not 2-methyl-1-propanol.

11. (6 pts, 3 each) Which compound in each of the following pairs will react faster in an S_N2 reaction with OH^- ? (Circle answer) **Briefly** explain why you chose your answer.

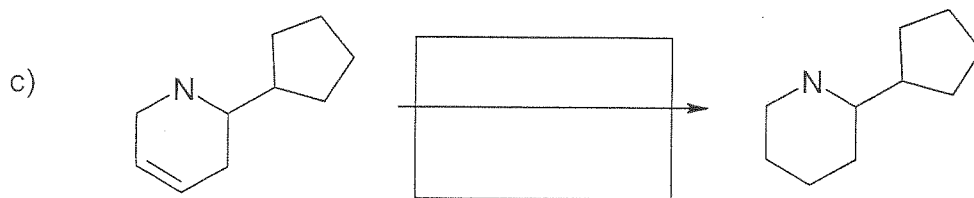
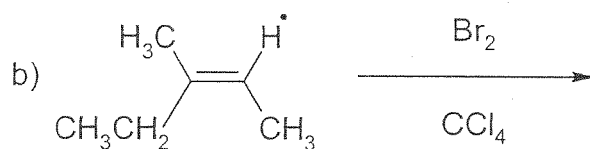
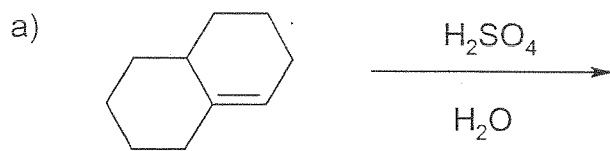
Brief explanation

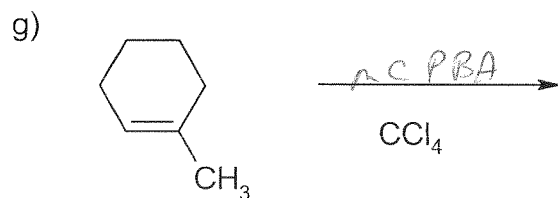
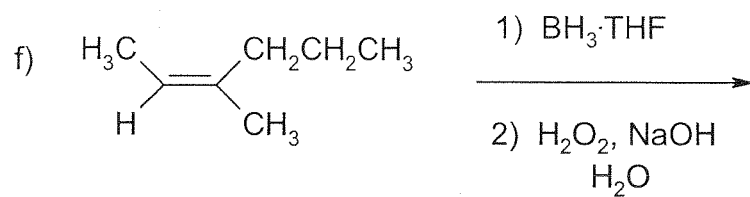
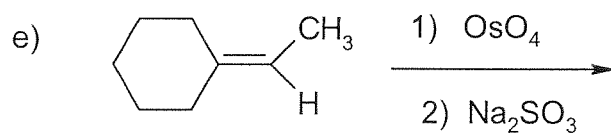
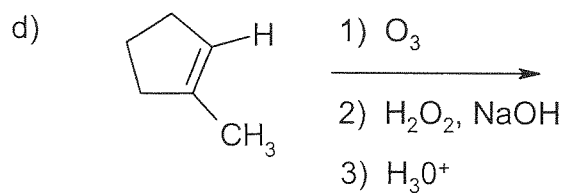
a) $\text{CH}_3\text{CH}_2\text{I}$ in ethanol *or*
 $\text{CH}_3\text{CH}_2\text{I}$ in dimethyl sulfoxide

b) $\text{H}_2\text{C}=\text{CHBr}$ *or* $\text{H}_2\text{C}=\text{CHCH}_2\text{Br}$

12. (4 pts) The name **(E)-1-isopropyl-1-butene** is incorrect. Explain why it is incorrect and give the correct IUPAC name.

13. (28 pts, 4 each) Give the structure of the **major** organic product of each of the following reactions. **Clearly indicate stereochemistry where appropriate.** If the major product is a pair of enantiomers, only draw one of the two structures.





14. (3 pts) Draw the bromonium ion intermediate formed when Br_2 reacts with 2-methyl-1-propene.