

Chemistry 3311-100
Organic Chemistry / Dr. Barney Ellison
Thursday: April 15th @ 7:00pm → 9:00 / 3rd Exam / Math 100)

Name: _____ (please print)

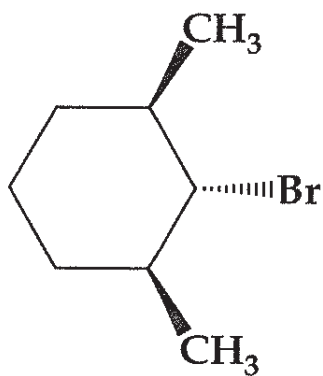
1. (10 pts) Identify the correct compound in each case. Explain your choice.
- Which compound, diethyl ether or propyl alcohol, is miscible in water?
 - Which compound, allyl methyl ether or propyl alcohol, decolorizes a solution of Br_2 in CH_2Cl_2 ?
 - Four stereoisomeric compounds, $\text{C}_4\text{H}_8\text{O}$, all optically active, contain no double bonds & evolve a gas when treated with CH_3MgI .
 - A compound believed to be either cyclohexyl methyl ether or 2-methylcyclohexanol evolves a gas when treated with NaH .

2. (10 pts)

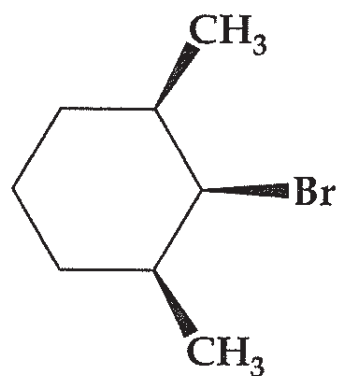
a) The bromination of isobutane in the presence of light could give two monobromination products; give their structures.

b) In fact, the products consist of more than 99% of one compound and less than 1% of the other. Show a mechanism for the bromination of isobutane.

3. (10 pts) Which one of the following stereoisomers should undergo β -elimination most rapidly with sodium ethoxide in ethanol? Why?

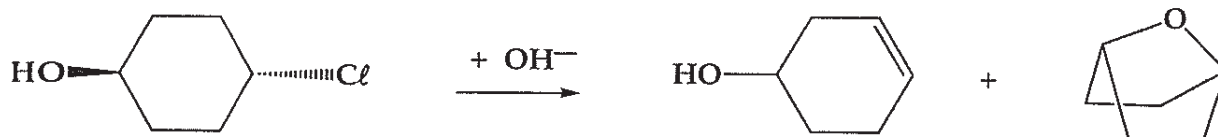
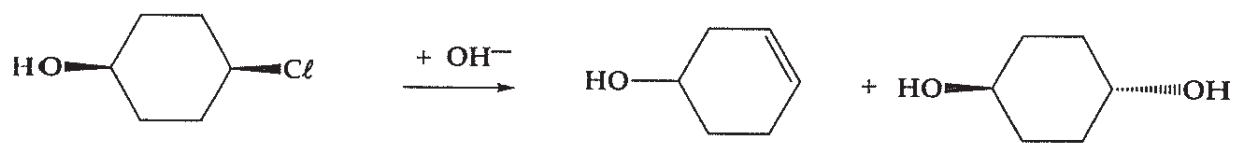


A

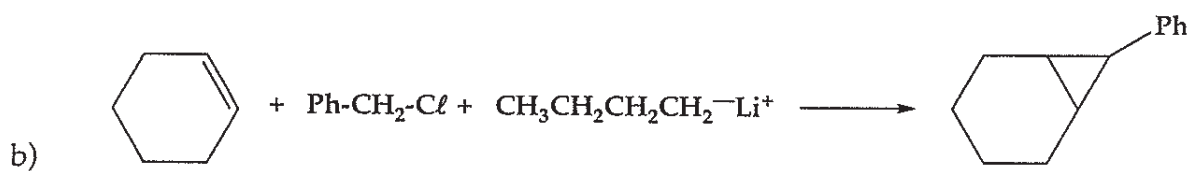


B

4. (10 pt) The cis and trans stereoisomers of 4-chlorocyclohexanol give different products when they react with OH^- . Show a mechanism for each product.



5. (10 pt) Show a mechanism for each transformation.

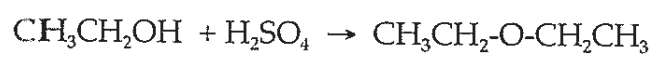


6. (10 pt) Outline a synthesis for the conversion of pure (R)-CH₃CH₂CHD-OH into the following species. You can assume you have Na¹⁸OH and ¹⁸OH₂.

a) (S)-CH₃CH₂CHD-¹⁸OH

b) (R)-CH₃CH₂CHD-¹⁸OH

7. (10 pt) When sulfuric acid is added to ethyl alcohol, diethyl ether is formed. What is the mechanism for this reaction?



8. (10 pt) Give the major product of the following reactions.

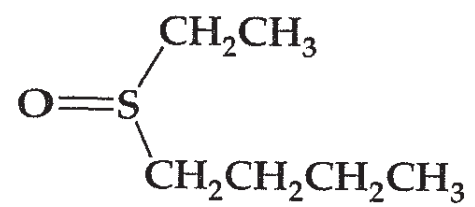
a) dibutyl sulfide with 1 equivalent of $\text{H}_2\text{O}_2 \rightarrow ?$

b) cyclohexene with *meta*-chloro-perbenzoic acid $\rightarrow ?$

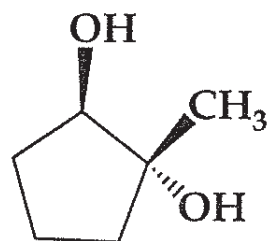
c) product of b) with $\text{H}_3\text{O}^+ \rightarrow ?$

9. (15 pt) Outline a synthesis for each of the following.

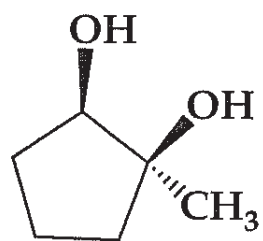
a) starting from species with 2 carbons or less prepare:



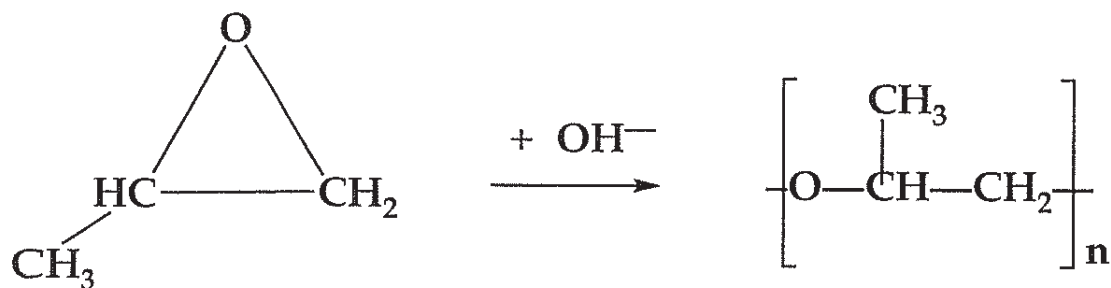
b) from an alkene, prepare the racemic diol:



c) from an alkene, prepare the racemic diol:



10. (5 pt) One of the side reactions that occur when epoxides react with HO^- is the formation of polymers.



Propose a mechanism.