

Homework - Chapter 16  
Chem 2320

Name \_\_\_\_\_

1. Draw a structure for each of the following ethers.

a) ethyl propyl ether

b) dicyclopentyl ether

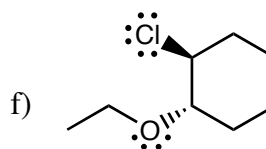
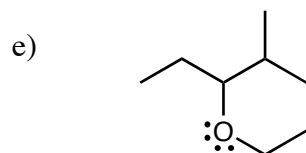
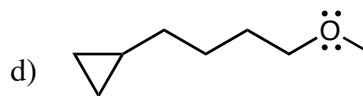
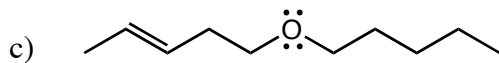
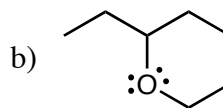
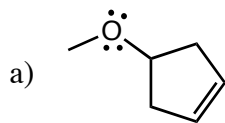
c) 5-ethoxy-3,4-dimethoxy-2-methylheptane

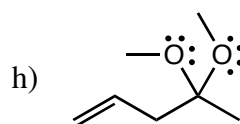
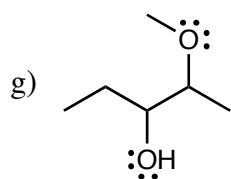
d) vinyl phenyl ether

e) (1R,3S)-1-chloro-3-methoxycyclohexane

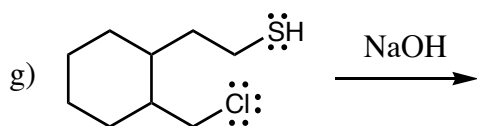
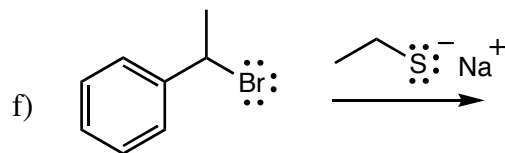
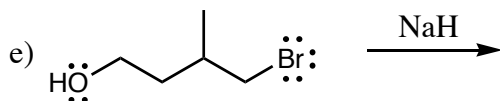
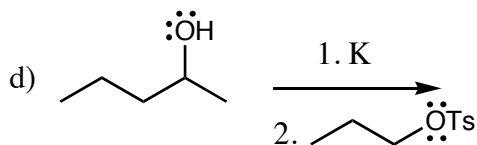
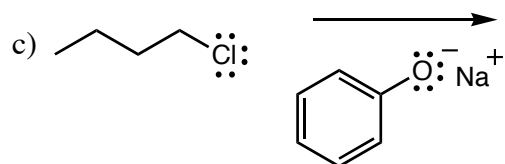
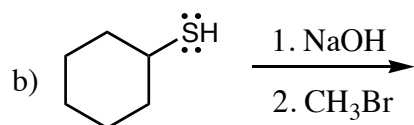
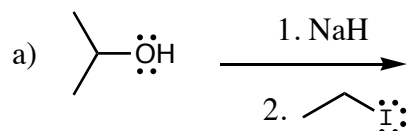
f) 1-propoxy-2-propanol

2. Name each of the following ethers.

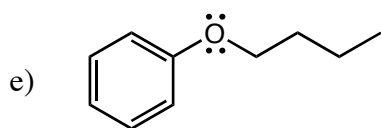
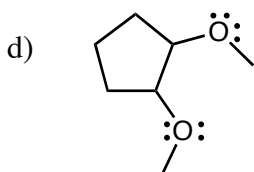
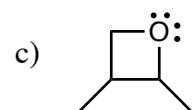
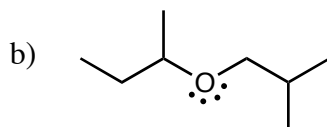
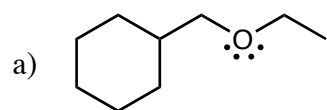




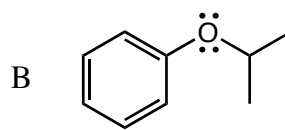
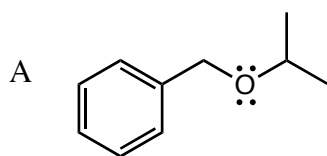
3. Complete the following reactions. Draw the intermediate anion (if it is not shown) and show how it attacks the electrophile. Give all inorganic products as well.



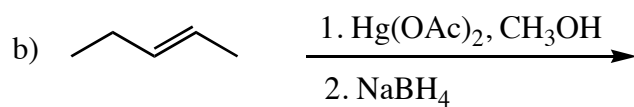
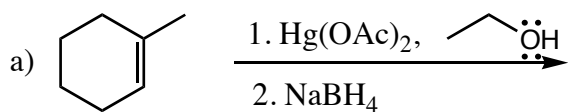
4. Synthesize each of the following ethers using a Williamson ether synthesis or explain why it can't be done.

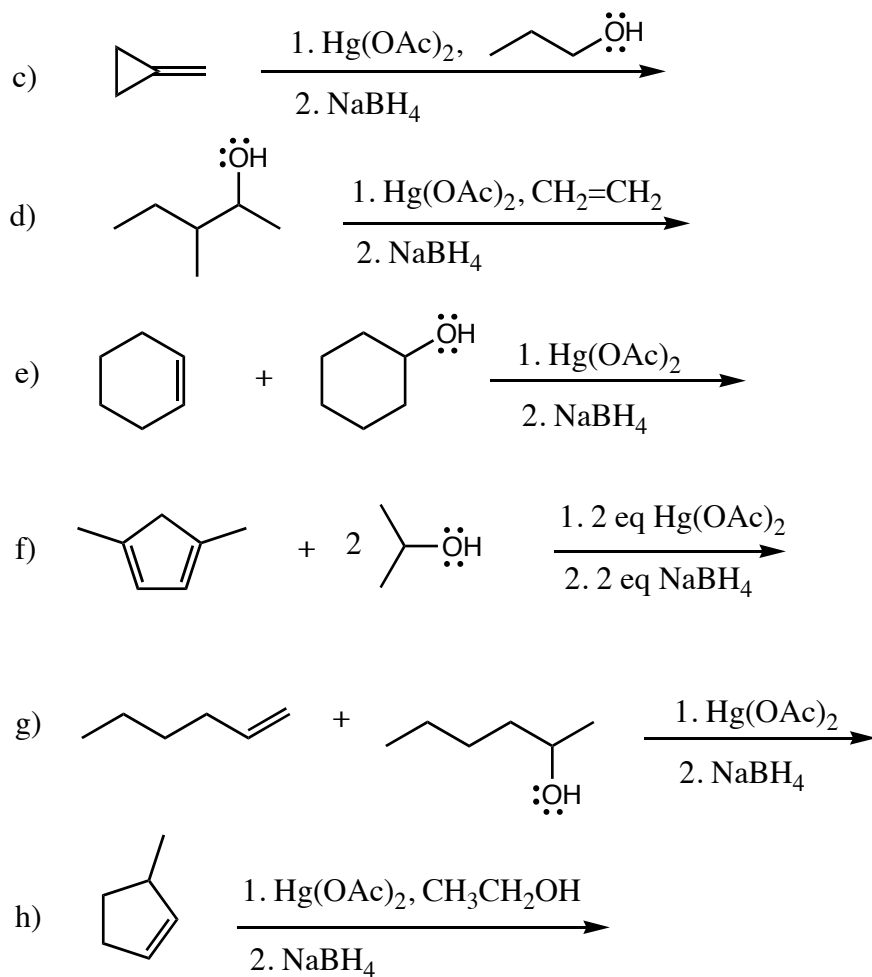


5. Explain in detail why can A be synthesized using a Williamson ether synthesis but B cannot.

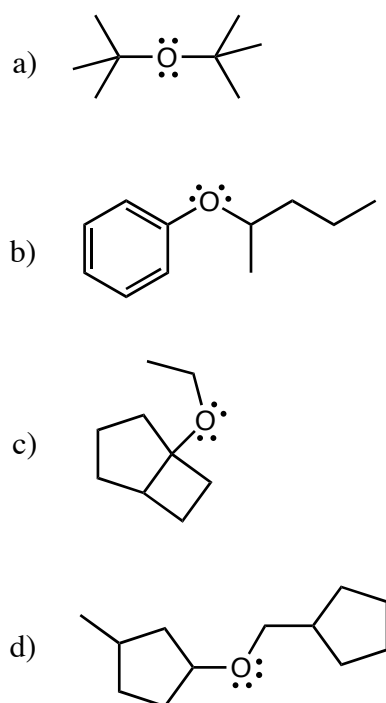


6. Give the product of each of the following reactions.





7. Synthesize the following using an alkoxymercuration-reduction.



8. Draw the reaction that would occur (starting materials and products) if each of the following ethers are treated with 2 equivalents of HI.

a) 2-ethoxypropane

b) butyl phenyl ether

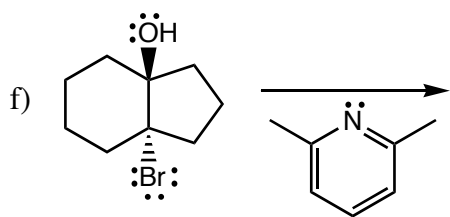
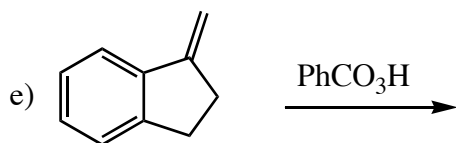
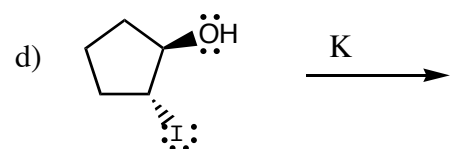
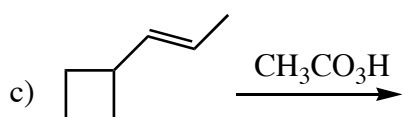
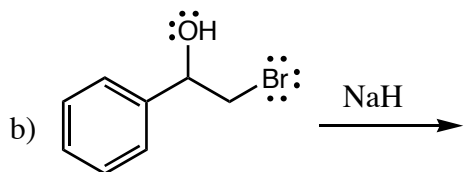
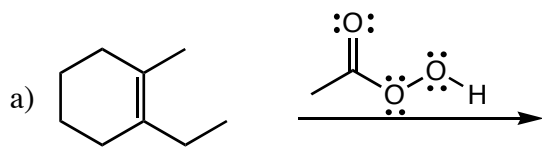
c) 1-methoxy-1-methylcyclopentane

d) diisobutyl ether

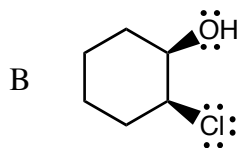
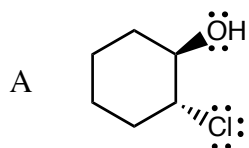
e) THF

9. Draw the entire mechanism for the first reaction in #8, showing all arrows, etc.

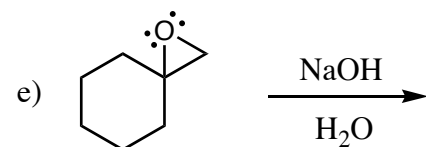
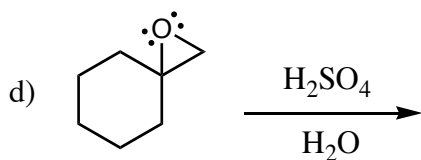
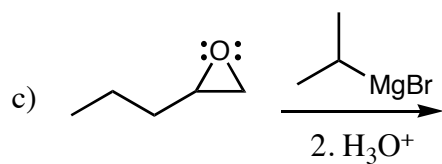
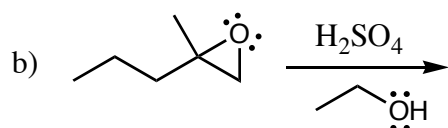
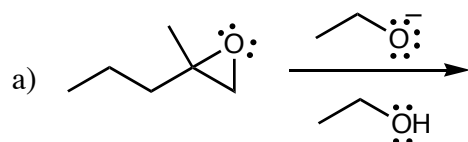
10. Give the products of each of the following reactions, showing all stereoisomers that would form.



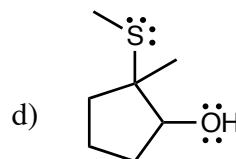
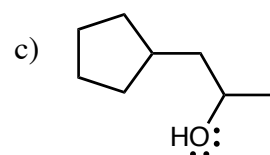
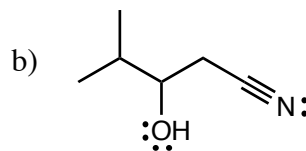
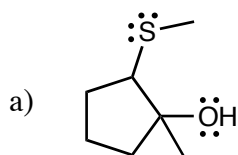
11. Make models of the following compounds. Then explain in your own words why A will react with NaH to give an epoxide while B does not.



12. Give the products of the following reactions. Draw any intermediates and draw arrows to show which side of the epoxide is attacked.



13. What epoxide could be reacted with what reagents to give the following products?



14. Draw the structure of a compound with the formula  $C_4H_8O$  which could give the following bands on an IR spectrum. (Hint: consider the unsaturation number of the formula!)

a)  $1050\text{ cm}^{-1}$

b)  $3100, 1660, 1050\text{ cm}^{-1}$

c)  $3300, 1050\text{ cm}^{-1}$

d)  $3300, 3100, 1660, 1050\text{ cm}^{-1}$

15. Give a reaction or series of reactions which could be used to accomplish the following transformations. Do not invent any new reaction! Use only ones we have discussed in this class.

a) Make phenyl butyl ether from phenol and 1-butanol.

b) Make 2-ethoxyheptane from 1-heptene.

c) Make 1-ethoxyheptane from 1-heptene.

d) Make (1R, 2R)-1,2-cyclopentanediol and (1S, 2S)-1,2-cyclopentanediol from cyclopentene.



e) Make (1R, 2S)-1,2-cyclopentanediol from cyclopentanol.

f) Make 1-phenyl-2-hexanol from 1-hexene and bromobenzene.

g) Make 1-phenyl-1-hexanol from styrene (vinyl benzene) and butyl bromide.

h) Make 2-methoxy-1-hexanol from 1-hexene.

i) Make 1-methoxy-2-hexanol from 1-hexene.