Winter 2000, Dr. Hunter

Chemistry 506: Mid-Term Exam

Name:_____,_____
Last name **First** name

Student Number (your social security number): _____

Signature: _____

In addition to this cover page, this midterm exam consists of 5 pages of questions for 6 pages in total. Please make sure you place your name (last name first) and your student number (i.e., your Social Security number) in the spaces above and sign on the line. *Initial each page in the top right hand corner* (i.e. near the page number) in case your exam pages get separated.

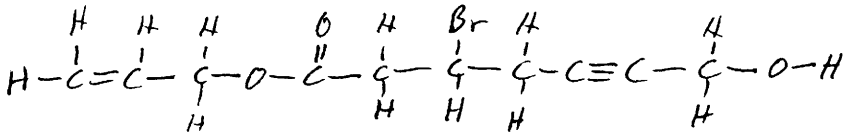
To obtain maximum credit for each question, show your work in detail. Partial credit for questions will not be assigned if no work is shown. **Be sure and indicate the positions and bonding of all atoms!** On some questions, full credit will not be granted if work is not shown. Feel free to use short text explanations to explain your drawings if your pictures are ambiguous. If you have to make guesses, assumptions, etc., write me a short note with your reasoning so I can follow your thinking and assign part marks.

You may use molecular models to help you answer questions. Feel free to ask me questions. On those pages where you are given a choice about which parts to answer, be sure that you circle those parts you want me to grade.

This midterm is worth 150 points out of the 450 for this quarter. /150

1. [30 points maximum] For ***three out of four*** of the following parts, give an answer in the space provided. **Clearly show which ones you want me to grade by circling its letter.** Show your reasoning and/or your work.

(a) For the following molecule, circle each non-Alkane functional group and name it.

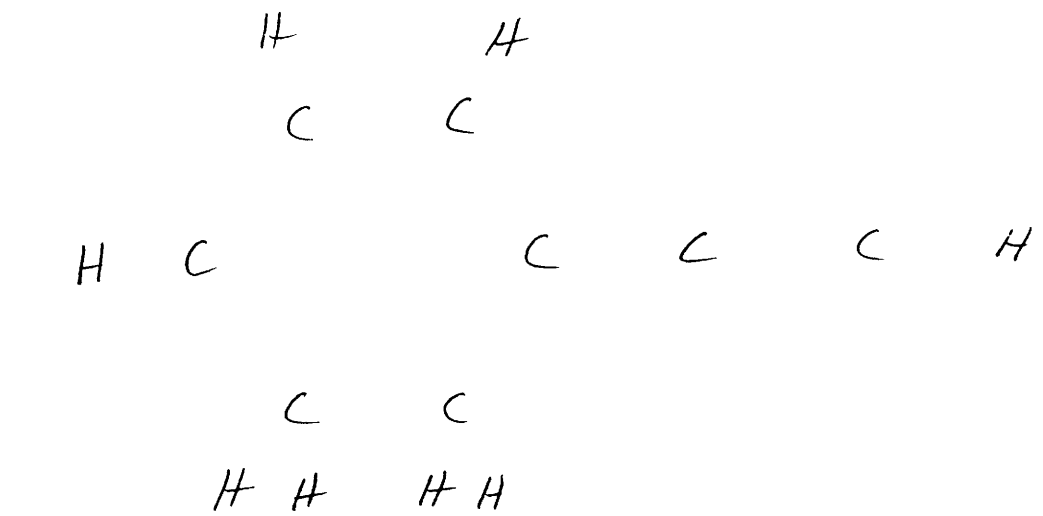


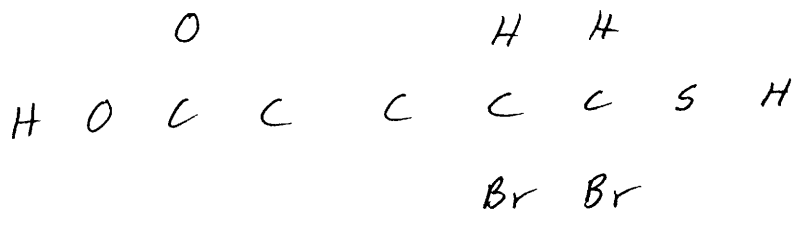
(b) Draw the structures of each and then clearly describe why 1-butanol has a higher boiling point than does ethyl ether.

(c) Clearly describe what is meant by the term "addition polymerization" and give one example.

(d) Clearly describe the bonding of a carbon-carbon double bond.

2. [20 points maximum] For each of the following molecules, draw the correct Lewis structure.



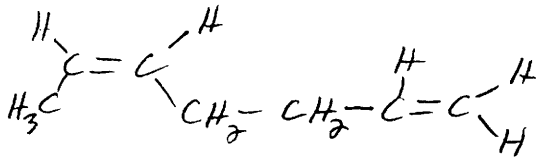


3. [20 points maximum] For following molecular formulae, draw all of the structural isomers (up to a maximum of 5). Be sure that you show **all** atoms and bonds for each.

$C_4H_8O_2$

4. [40 points maximum] For each of the following structures or names, give an IUPAC name or draw the correct structure (including all atoms), as required.

a) Acetone

b) 

c) 3,3-dibromo butanoic acid

d) Phenol

5. [40 points maximum] For each of the following reactions, fill in the correct product (clearly indicating all atoms around the reacting centers).

1) $H_3C-CH_2-CH_2-CH_2-OH \xrightarrow[\text{pyridine}]{CrO_3}$ _____

2) $H_3C-\overset{O}{\overset{\|}{C}}-CH_3 \xrightarrow{NaBH_4}$ _____

3) $H_3C-C\equiv C-H \xrightarrow{HBr}$ _____

4)  $\xrightarrow[Fe]{Cl_2}$ _____

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57+1 wrote

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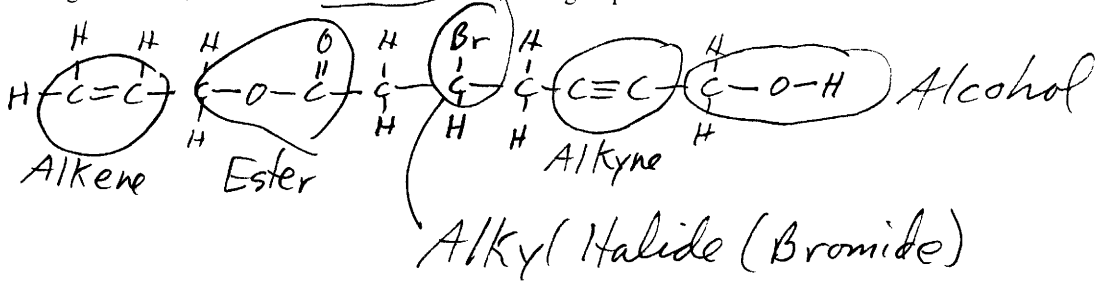

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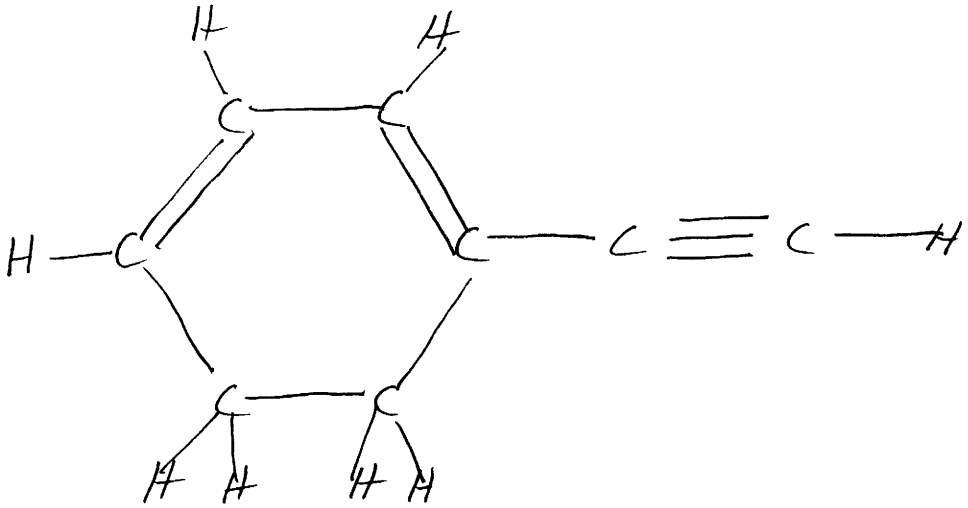

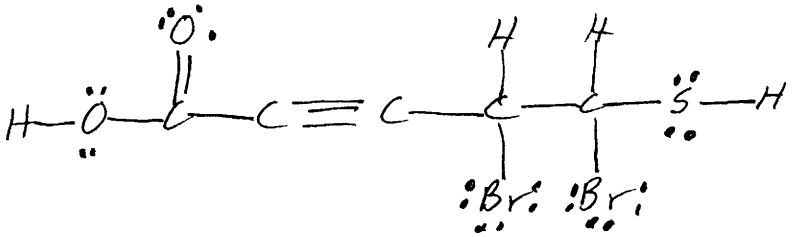

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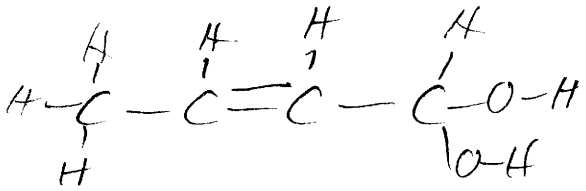

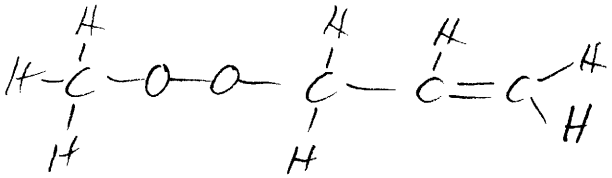

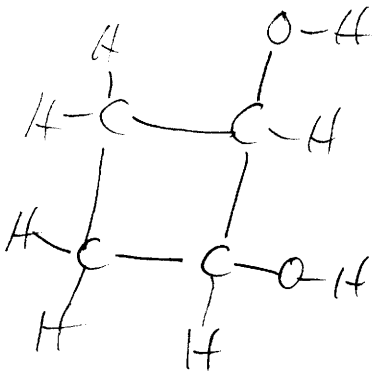

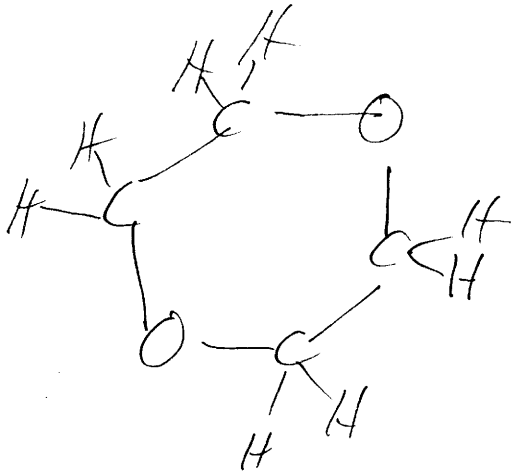

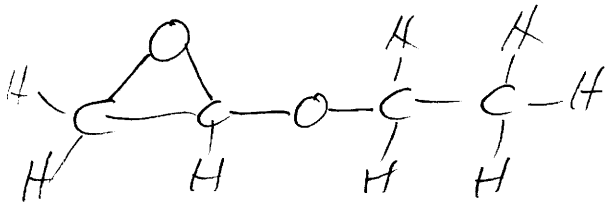

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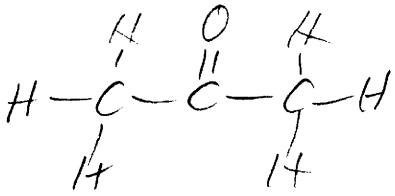
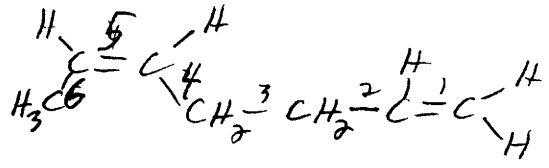
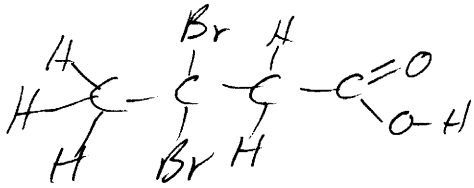


b)

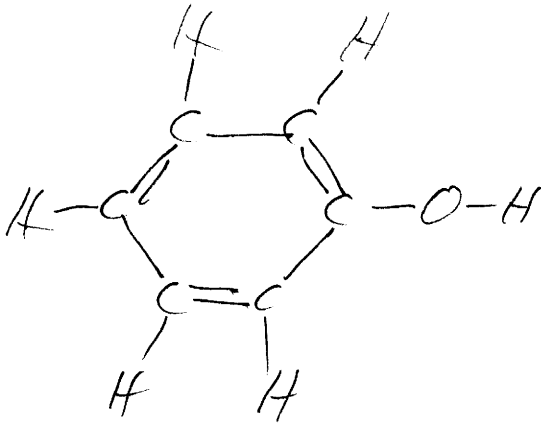


(5cis)-1,5-heptadiene

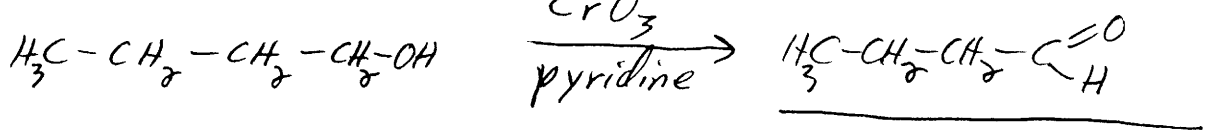
c) 3,3-dibromo butanoic acid

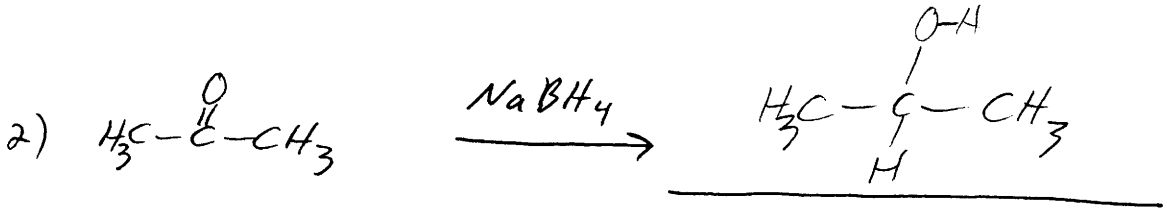


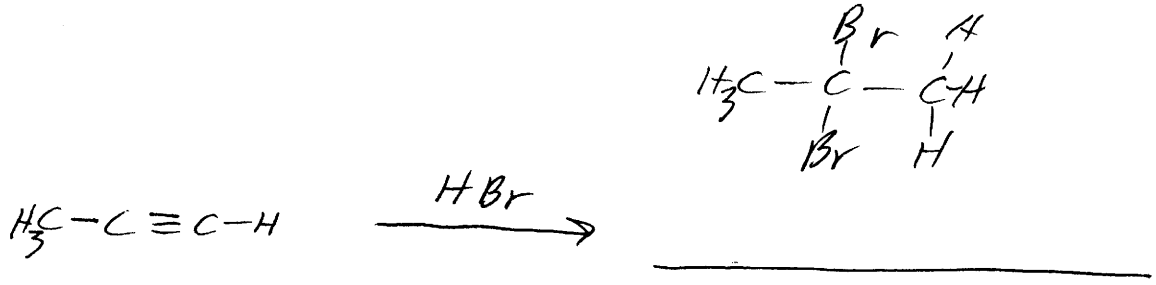
d) Phenol



5. [40 points maximum] For each of the following reactions, fill in the correct product (clearly indicating all atoms around the reacting centers).

1) 

2) 

3) 

4)