

Fall 2002, Dr. Hunter

Chemistry 1506: 2nd 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. If you do not indicate your choice, I will not grade the last part.

This midterm is worth 100 points out of the 400 points for this semester.

/100

1. [20 points maximum] For *two out of three* 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) Discuss what the nature of Hydrogen Bonds. Draw 3 specific examples of Hydrogen Bonding interactions between pairs of molecules.

(b) Terephthalic Acid and Ethylene Glycol react to give off water in a condensation polymerization to give poly(ethylene terephthalate). Draw the structure of the terephthalic acid and ethylene glycol starting materials. Draw the structure of the poly(ethylene terephthalate) product being sure to include at least 3 repeating units in your structure. Give an equation for this reaction.

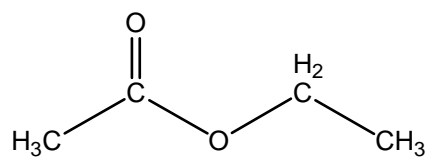
(c) Discuss the term Coal Tar, including: where we get coal tar from and its historical importance. Draw the structures of three molecules present in coal tar.

2. [20 points maximum] For each of the following structures or names, give an IUPAC name or draw the correct structure (including all atoms), as required.

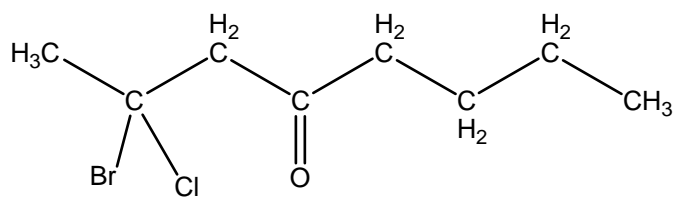
(a) *sec*-butyl ethyl ether

(b) *iso*-butyl dimethyl amine

(c)



(d)

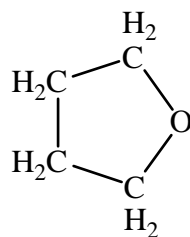


3. [20 points maximum] For each of the following structures or names, give an IUPAC name or draw the correct structure (including all atoms), as required.

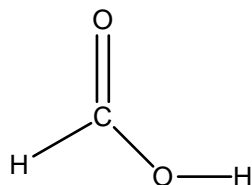
(a) glycerol

(b) benzoic acid

(c)

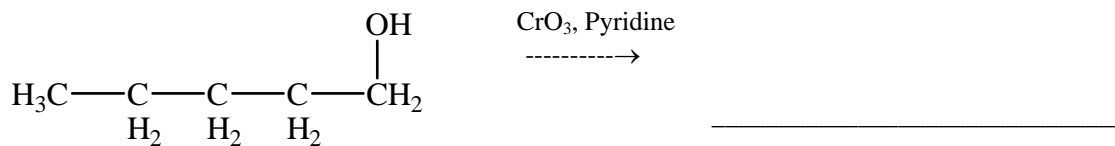


(d)

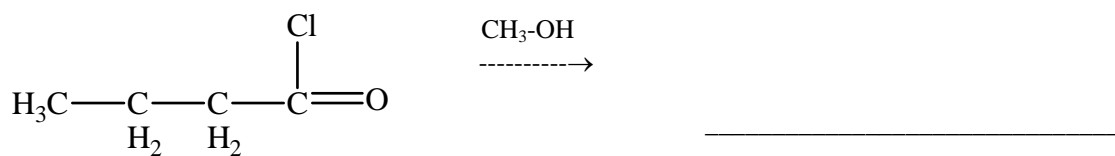


4. [20 points maximum] For each of the following reactions, fill in the correct product (clearly indicating all atoms around the reacting centers).

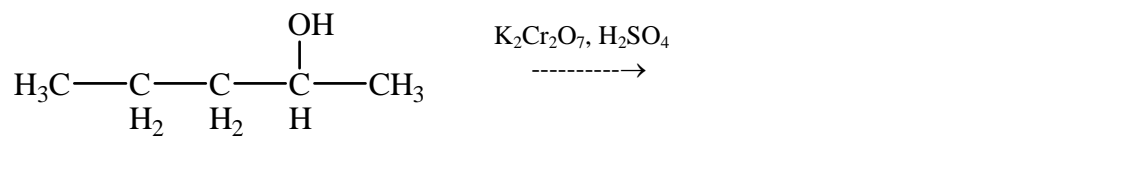
(a)



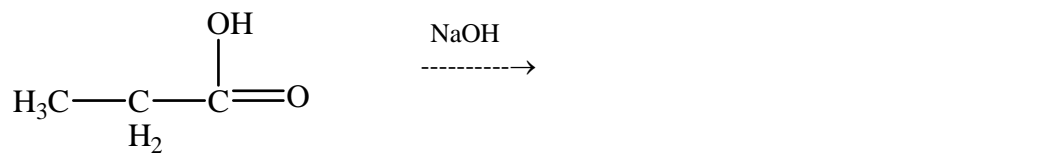
(b)



(c)

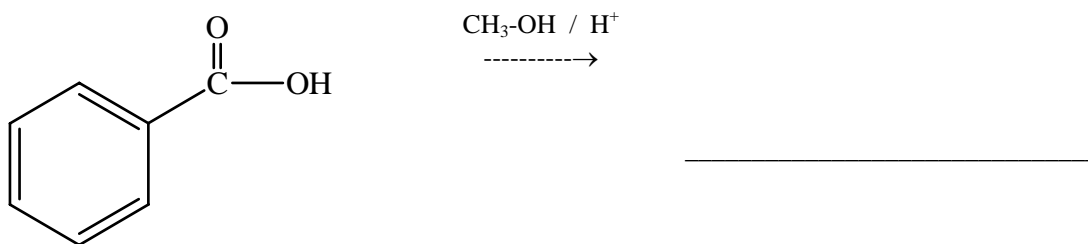


(d)

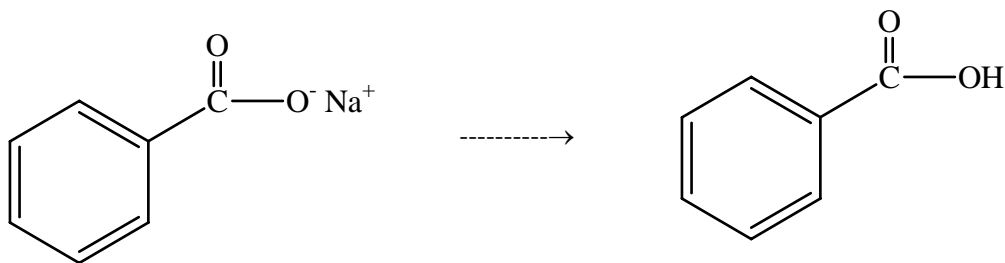


5. [20 points maximum] For each of the following reactions, fill in the correct product (clearly indicating all atoms around the reacting centers).

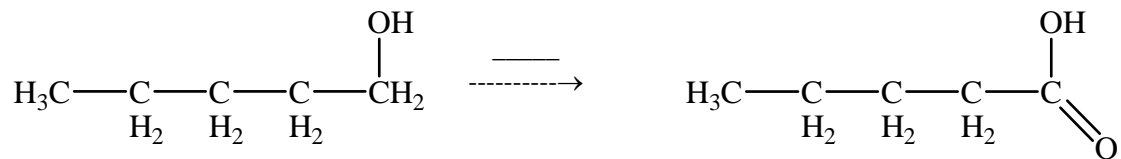
(a)



(b)



(c)



(d)

