

Organic Chemistry 2
Third Examination
April 22, 2005
Prof. Malachowski

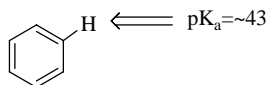
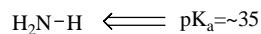
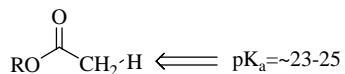
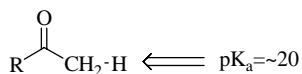
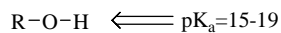
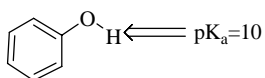
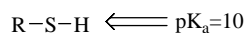
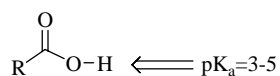
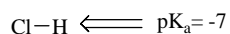
Name: _____

The examination has five questions on four pages. The point values for each question are found with the question. Partial credit where appropriate will be given.

Read each question carefully before answering. Be certain you understand everything the question is requesting. Do the easy questions first. If questions appear confusing or exceedingly complex, then you may need to rethink the question. Keep in mind the intended examination topics.

In organic chemistry, hand-drawn pictures convey specific information. Be sure the drawing you have made conveys the essential information required to answer the question. Make certain that three-dimensional pictures display the correct atom arrangements. Don't forget to include lone pairs of electrons and formal charges when appropriate.

pK_a information:



Portion of the Periodic Table:

C	N	O	F
Si	P	S	Cl

Electronegativity values:

O=3.6

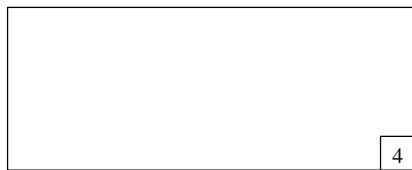
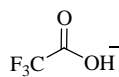
Cl=2.9

S=2.6

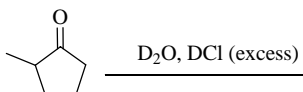
C=2.5

1. Complete the following reactions by providing the necessary information: starting material, reagent or product(s). (points listed in corner of box)

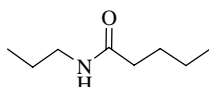
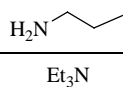
a)



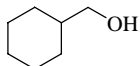
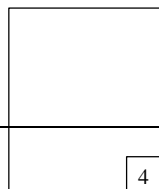
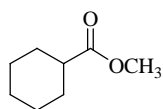
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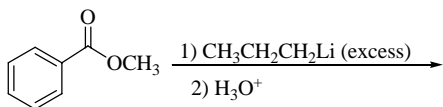
c)



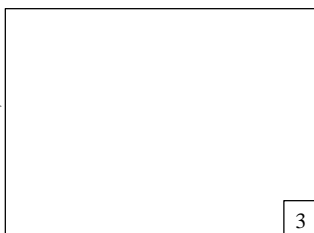
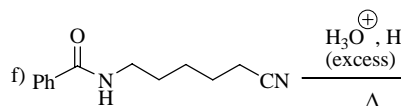
d)



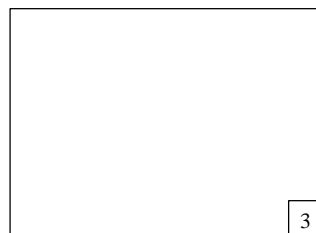
e)



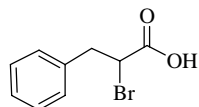
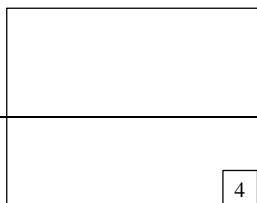
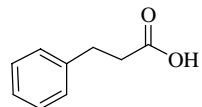
f)



+



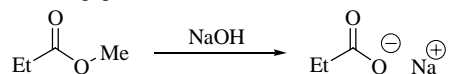
g)



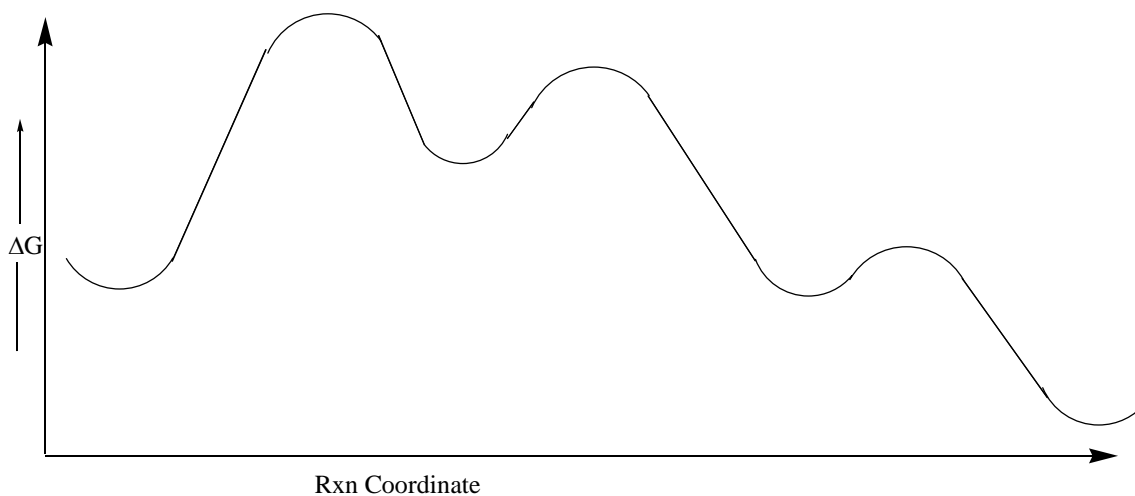
2

30 total pts.

2. Answer the following questions about the reaction shown below.



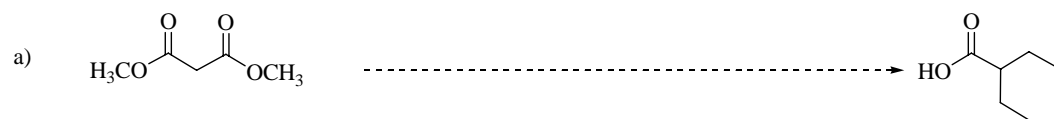
- Draw the correct structures and place the starting materials, intermediates and products in the proper well of the energy diagram shown below. (8 pts.)
- Label transition states with TS. (4 pts.)
- Label the rate limiting step with RL. (2 pts.)
- Choose one step and label it as exothermic (EXO) or endothermic (ENDO). (2 pts.)
- Label the tetrahedral intermediate with TET. (3 pts.)



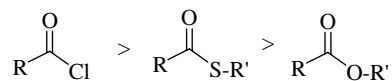
3. Draw the curved-arrow electron flow mechanism of the following reaction. (10 pts.)



4. Suggest a series of reactions to convert the molecule on the left to the molecule on the right. (11 pts. each)



5. Thioesters are nature's acylating agent and they have reactivity intermediate between acid chlorides (chemist's acylating agent) and carboxylic esters. Rationalize this reactivity trend:



(Additional information is located on the cover page of the exam)

To receive full credit you must provide at least one good reason why thioesters have less reactivity than acid chlorides and more than esters. (10 pts.)

6. Circle the products or starting materials to indicate which side of the equilibrium will be favored. (9 pts.)

