CHEM 3311-100 Fall 2007

Exam 2

Professor R. Hoenigman

I pledge to uphold the CU Honor Code:

Signature_____

Name (printed)_____

Last four digits of your student ID number_____

Recitation TA_____

Recitation number, day, and time_____

You have 1 hour to complete this exam.
No model kits or calculators allowed.
Periodic table and scratch paper are attached.

DO NOT TURN THIS PAGE UNTIL INSTRUCTED TO DO SO.

Recitation Sections:

#	Day	Time	TA
111	Monday	8 am	Noel
151	Monday	2 pm	Noel
191	Monday	5 pm	Noel
113	Tuesday	8 am	Noel
193	Tuesday	5 pm	Noel
112	Wednesday	8 am	Doug
152	Wednesday	11 am	Jon
192	Wednesday	5 pm	Doug
153	Thursday	8 am	Noel

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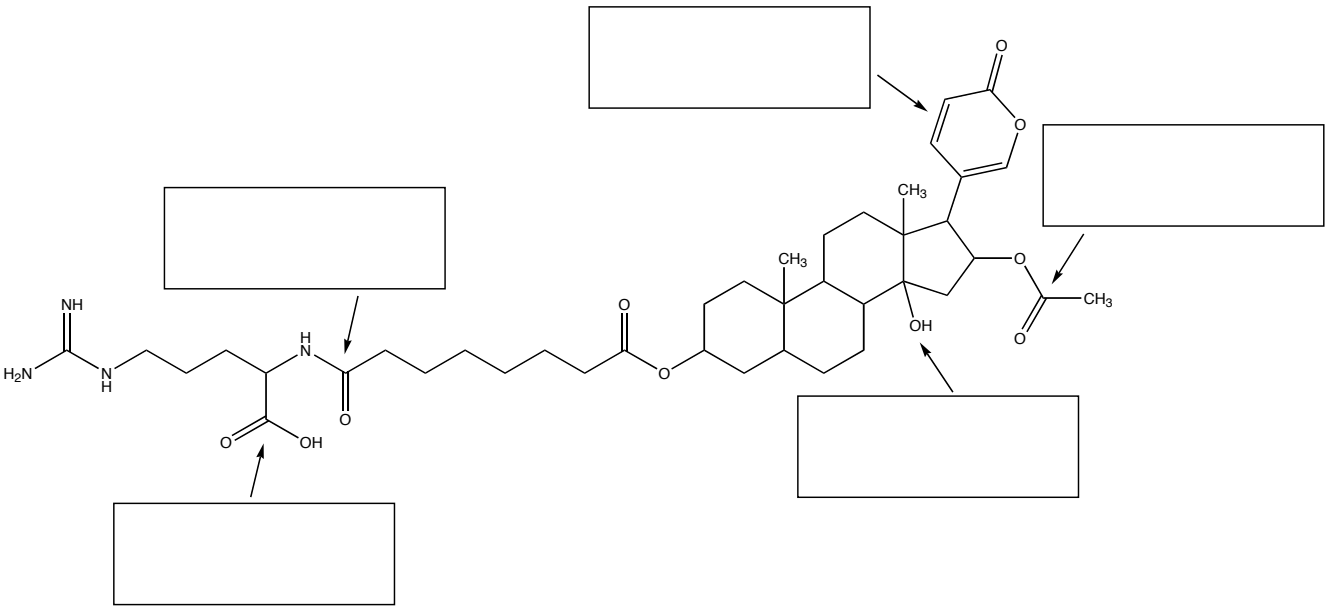
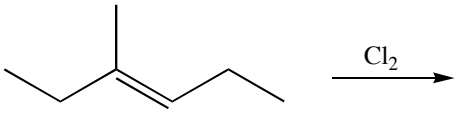
TOTAL_____/100

1. (10 pts) On Exam 1, you saw the structure of Bufotoxin (shown below). In the boxes below, write the name of each indicated functional group. Spelling counts!



2. (10 pts) Draw bond line structures for (*E*)-1-chloropropene, 1,1-dichloro-2-methylpropene, and (*E*)-2,3-dichloro-2-butene. Circle the alkene that has the greatest dipole moment. Draw a box around the alkene that has the smallest dipole moment.

3. (11 pts) Fill in the organic product of the following reaction and, using arrows to show the flow of electrons, draw a mechanism to account for its formation. Be sure to show the appropriate stereochemistry of the reaction and product.



4. (10 pts) Deuterium oxide (D_2O) is water in which the protons (^1H) have been replaced by their heavier isotope deuterium (^2H). When D_2O is added to an alcohol (ROH), deuterium replaces the proton of the hydroxyl group.

$$ROH + D_2O \rightleftharpoons ROD + DOH$$

The reaction takes place extremely rapidly, and if D_2O is present in excess, all the alcohol is converted to ROD. This hydrogen-deuterium exchange can be catalyzed by either acids or bases. If DO^- is the catalyst in base, write a reasonable mechanism for the conversion of ROH to ROD under basic conditions.

5. (24 pts) Draw the major organic product(s) for the following reactions. If necessary, clearly show the stereochemistry of the products. If no reaction occurs, write NR.

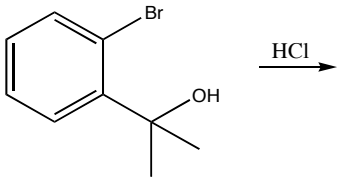
A.

2,3,3-trimethyl-2-butanol $\xrightarrow{H_2SO_4}$

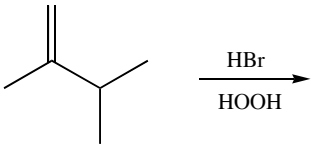
B.

2,2,4-trimethylpentane $\xrightarrow[\Delta]{Br_2}$

C.



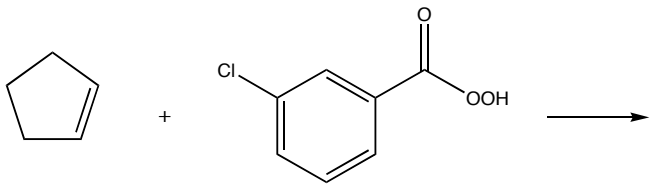
D.



E.

(*E*)-3-ethyl-4-methyl-2-pentene $\xrightarrow[2)\ HOOH]{1)\ OsO_4}$

F.



G.

2-bromobutane $\xrightarrow{KOC(CH_3)_3}$

H.

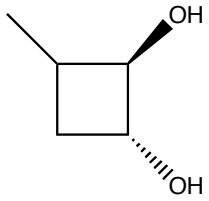
2,2-dimethylcyclopropanol $\xrightarrow{HCl}$

6. (35 pts) Propose an efficient synthesis for each of the following transformations. You may use any reagents you like.

A.

cyclopentyl iodide from cyclopentane

B.



from methylcyclobutane

C.

1-propanol from 2-propanol