

Chemistry 12B: Midterm 1, Tuesday February 20, 2018

Name: _____

UCSID: _____ GSI: _____

There are a total of 9 pages on this exam including this one. Time for the exam 8:10AM –9:30 AM. By writing your name on this exam, you have acknowledged that you have all 9 pages and written your answers only on the designated pages with page numbers (*answers written on the back pages will NOT be graded*).

Question 1 _____ (4 pts)

Question 2 _____ (12 pts)

Question 3 _____ (15 pts)

Question 4 _____ (9 pts)

Question 5 _____ (12 pts)

Question 6 _____ (15 pts)

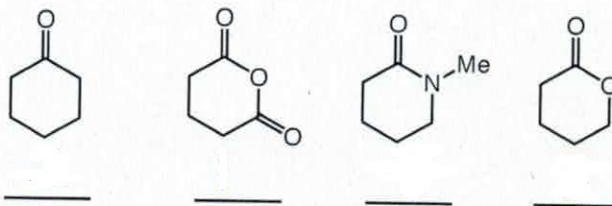
Question 7 _____ (16 pts)

Question 8 _____ (17 pts)

Total -----/100 points

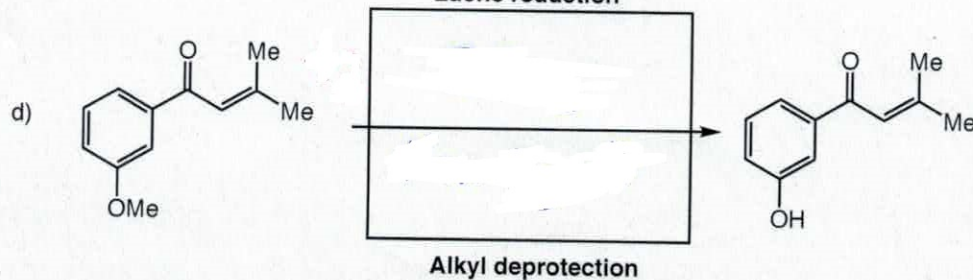
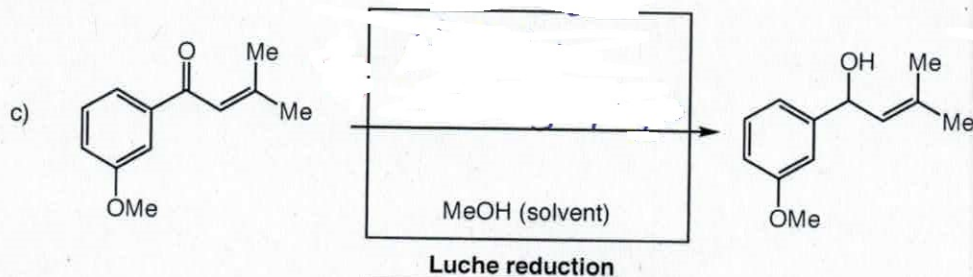
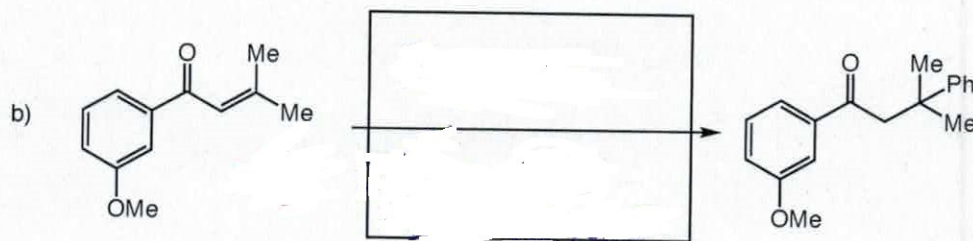
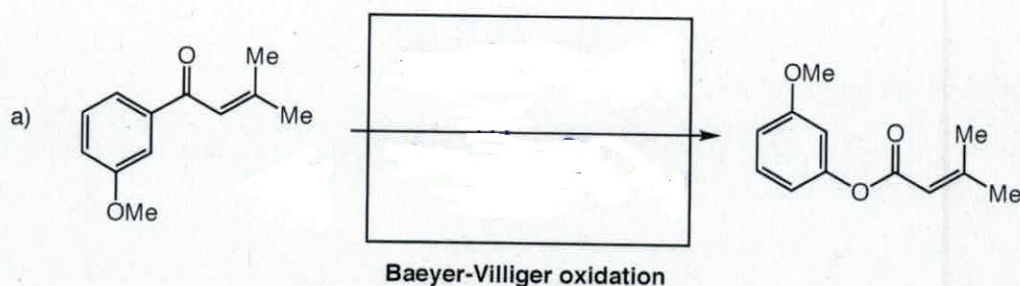
Question 1

- (a) Rank the following carbonyl groups from 1–4 with the most electrophilic as 1 (1pt each)



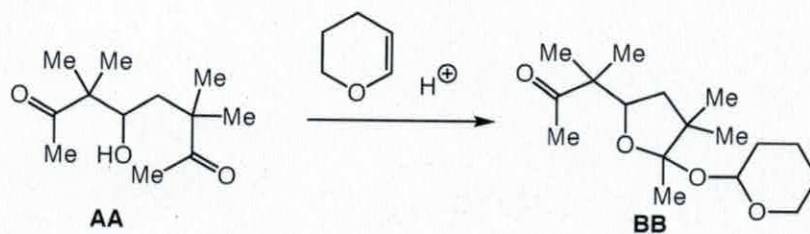
Question 2

Provide reagents for the following transformations. Indicate the workup conditions as a separate step if necessary (3 pts each)

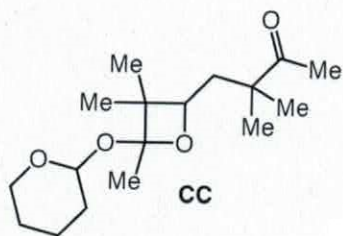


Question 3

(a) Provide a mechanism for the conversion of **AA** to **BB** using DHP and acid. (10 pts)

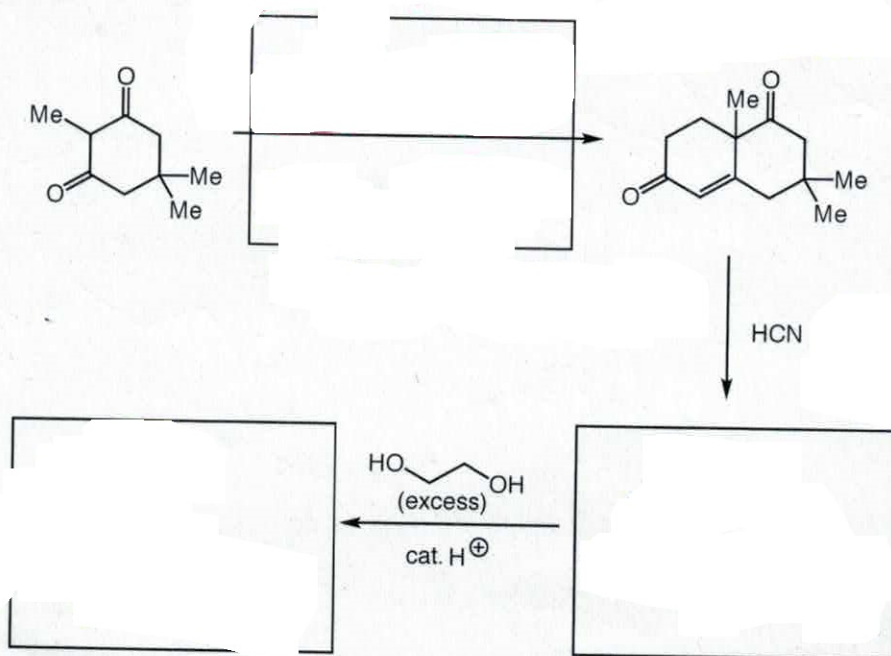


(b) In Part (a), why wouldn't **CC** (shown below) form from **AA** as the final product? Explain with no more than two figures and three sentences. (5 pts)



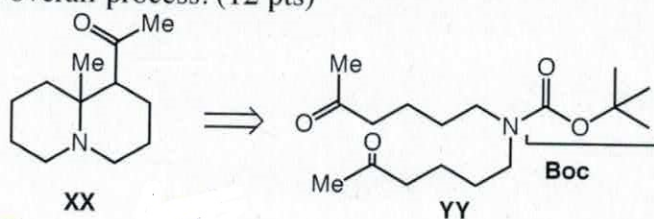
Question 4

Fill in the boxes below. Hint: The first transformation involves a Robinson annulation. (3 pts each)



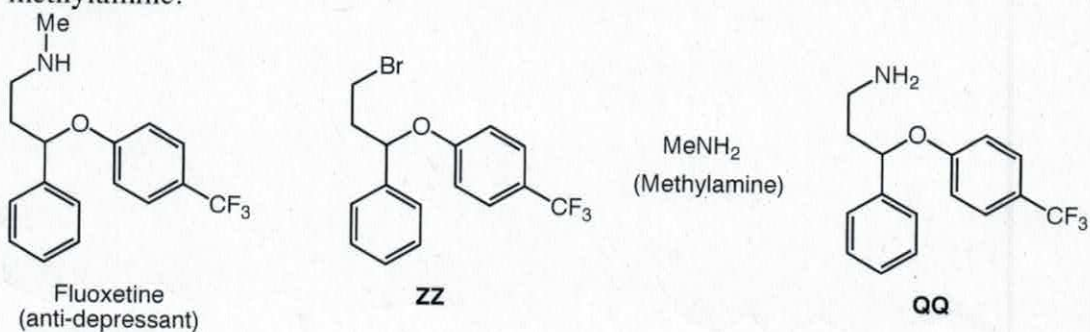
Question 5

Compound **XX** can be prepared from **YY** using the Mannich reaction. The Boc protecting group is also cleaved under the conditions for the reaction. Provide conditions and a mechanism for the overall process. (12 pts)



Question 6

Fluoxetine is an anti-depressant that can be prepared from **ZZ** by first converting it to **QQ**. Dr. KnowItAll (Stanford grad) would like to convert **ZZ** directly to Fluoxetine using methylamine.



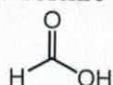
- (a) Why is Dr. KnowItAll's idea a bad one? (Use three or less sentences and three or less structures to explain) (6 pts)

B) **ZZ** is converted to **QQ** using the Gabriel amine synthesis. Provide reagents for this process. (4pts)

C) Provide reagents and a mechanism for the conversion of **QQ** to Fluoxetine. (Hint: Use formaldehyde and formic acid) (5 pts)



formaldehyde

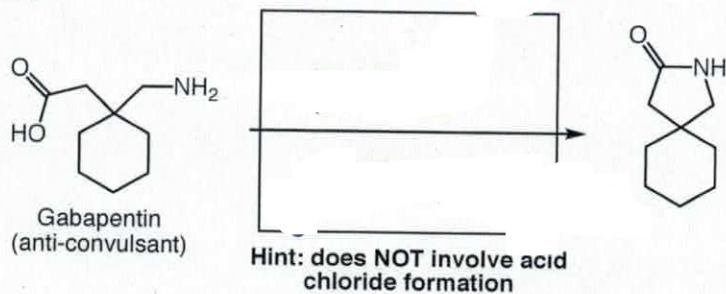


formic acid

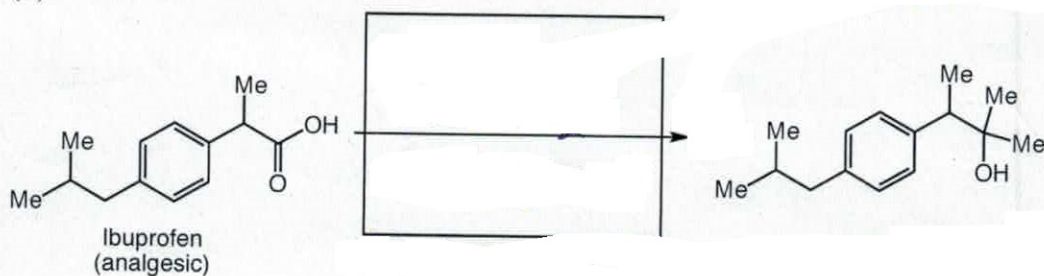
Question 7

Provide reagents (**draw out all organic reagents**) for the following transformations of the important medicines shown below. Note: Multiple steps may be required for some conversions. (4 pts each)

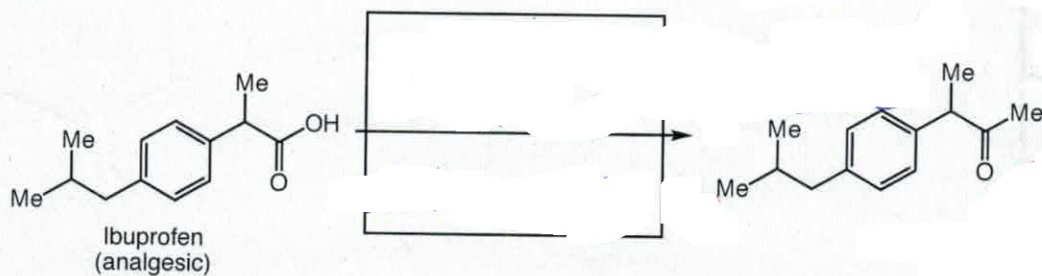
(a)



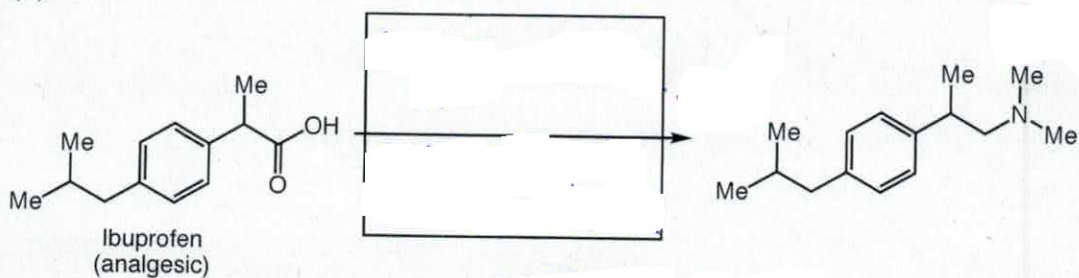
(b)



(c)



(d)



Question 8

NN can be made from two molecules of **MM**. Propose a synthesis (show reagents but NOT mechanism) for this conversion. Hint: a Claisen condensation and other named reactions we have learned are involved. (17 pts)

