Chem 12B Midterm 2

Instructor: Richmond Sarpong
March 22nd 2018
8:10-9:30 am, 100 Lewis

You have **80 minutes** to complete this exam. Please write you answers clearly only on the pages indicated *and be as detailed as possible*. Nothing written outside the numbered pages will be graded. There should be 8 total pages in this exam.

Name:_____

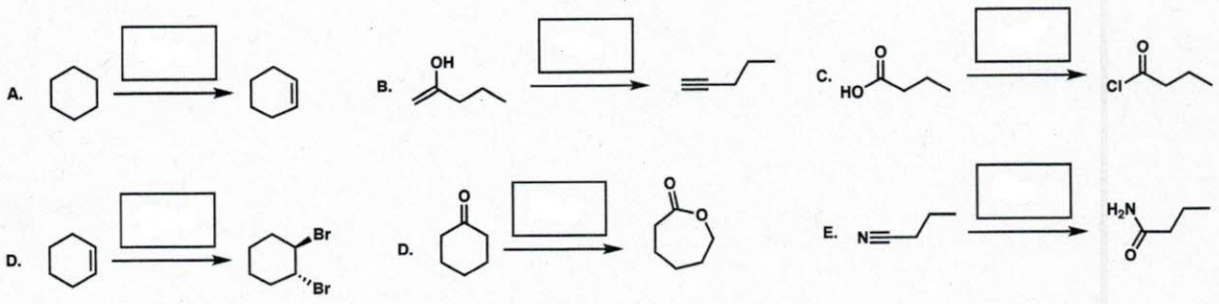
UID:_____

GSI Name:_____

Question	Score
1	_____ (12 points)
2	_____ (10 points)
3	_____ (10 points)
4	_____ (17 points)
5	_____ (12 points)
6	_____ (19 points)
7	_____ (20 points)

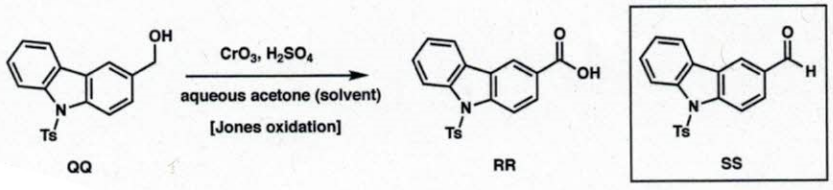
Total _____*(100)*

Question 1 (12 points):
Indicate in the boxes that are provided whether the following transformations are net oxidations (with "[O]"), net reductions (with "[H]") or neither (with "NA") (2 pts each; 12 pts total):



Question 2 (10 points):

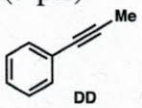
(a) Explain why **QQ** is converted to **RR** under the indicated conditions using up to four structures and three sentences. (7 pts total)



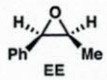
(b) The Swern oxidation can be used instead of the Jones oxidation to convert **QQ** to **SS** in Part (a) above. Provide conditions for the Swern oxidation (3 pts).

Question 3 (10 points):

(a) Propose a synthesis of **EE** from **DD** (show reagents) given that a Lindlar reduction and other reactions of your choosing are involved (5 pts)

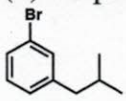


DD



EE

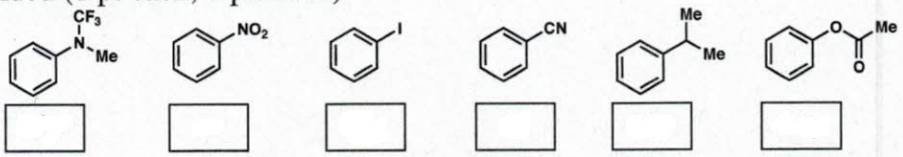
(b) Propose a synthesis of **GG** from benzene (show reagents) (5 pts)



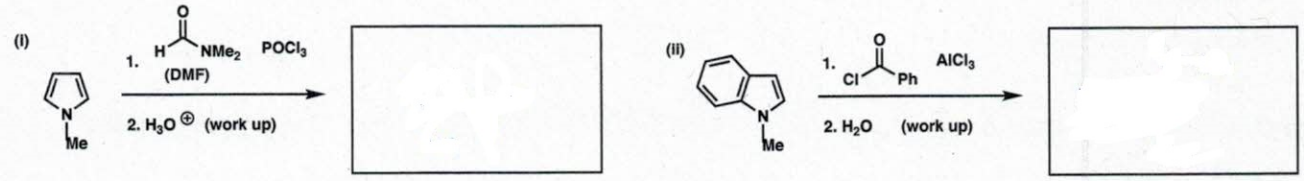
GG

Question 4 (17 Points):

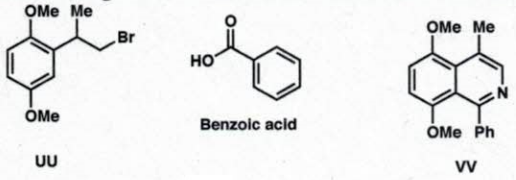
(a) Indicate which of the following substituents would direct ortho/para (with "o/p") or meta (with "m") in the boxes provided (1 pt each; 6 pts total)



(b) Predict the outcome of the following reactions. Place your answers in the boxes provided (3pts each) 2 pts



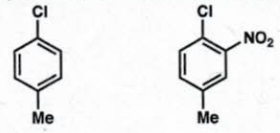
(c) Quinoline **VV** can be prepared from **UU** and benzoic acid. Provide a synthesis (show reagents) knowing that it involves a Gabriel amine synthesis and Bischler-Napieralski reaction (8 pts).



UU Benzoic acid VV

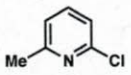
Question 5 (12 points):

(a) Rank the following chlorinated aromatic compounds in order of their reactivity with NaOMe (indicate the most reactive as 1). (1 pt each)

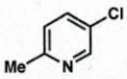


A

B



C

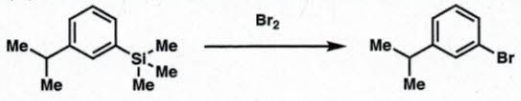


D

_____ _____ _____ _____

(b) Provide a rationalization for your relative ranking of **C** and **D** from Part (a) in three or less sentences and four or less structures (4 pts)

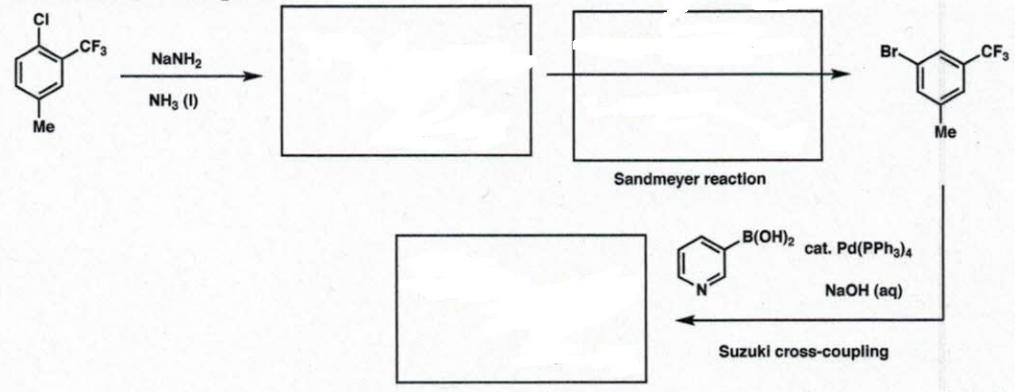
(c) Provide a mechanism for the following observation of *ipso* substitution (4 pts)



HH CC

Question 6 (19 points)

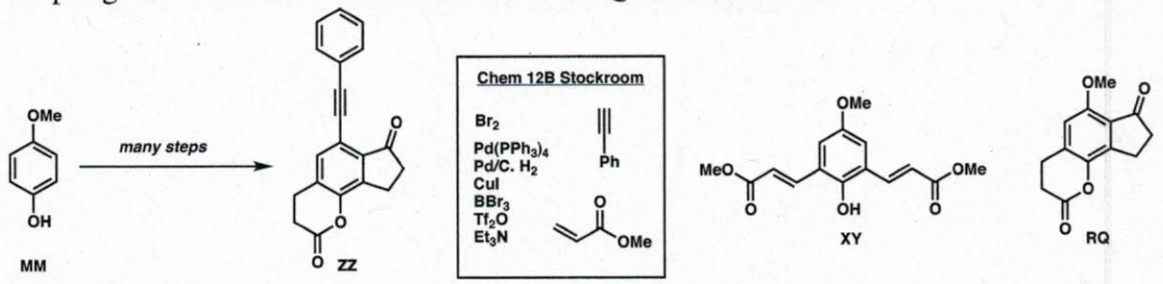
(a) Fill in the boxes below (3 pts each)



(b) Provide a mechanism for the Suzuki coupling step from Part (a) above. Be sure to label each elementary organometallic step in your mechanism (10 pts)

Question 7 (20 points):

Propose a synthesis of **ZZ** from **MM** using unlimited amounts of the materials provided from the Chem 12B stockroom and any other materials that you may deem necessary. Hints: Heck and Sonogashira coupling reactions are involved and **XY** and **RQ** are intermediates.



The End