First Three Letters of Last Name **TA Name**

Exam 3
5.12 Spring 2005

Name_____

Signature_____

ID#_____

Prerequisite (circle one): 5.112 5.111 3.091

1. Make sure your exam has 9 numbered pages plus a periodic table.

2. Write your initials on each page.

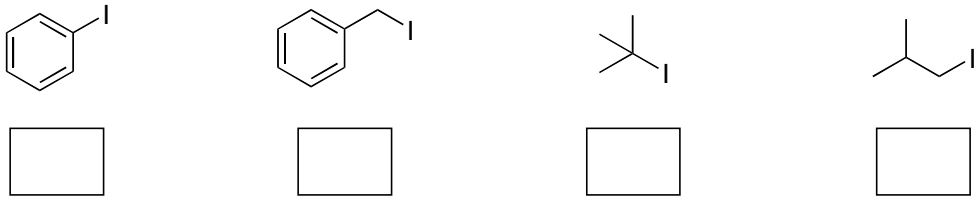
3. Look over entire exam before starting and carefully read all instructions.

4. Show work for partial credit.

Page	Possible Points	Total
1	12	
2	20	
3	16	
4	14	
5	10	
6	10	
7	4	
8	14	
Total	100	
8	5	
XC	105	

1. (12 points)

a. Rank in order of S_N2 reactivity (1= most reactive)



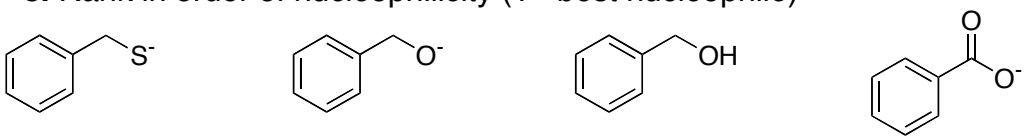
☐ ☐ ☐ ☐

b. Rank in order of leaving group ability (1= best leaving group)

NH_2^- H_2O Cl^- I^-

☐ ☐ ☐ ☐

c. Rank in order of nucleophilicity (1= best nucleophile)



☐ ☐ ☐ ☐

d. Rank in order of alkene stability (1= most stable)

☐ ☐ ☐ ☐

e. Rank in order of radical stability (1= most stable)

☐ ☐ ☐ ☐

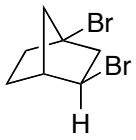
f. Circle the best solvent for an S_N2 reaction.

CH_3OH

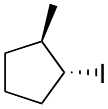
Initials ☐

Points ☐

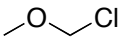
2. (20 points) Draw the structure of the products of the following reactions. Indicate stereochemistry where appropriate. If there is no reaction, write "NR".

a. 

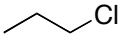
$\xrightarrow[\text{DMF}]{\text{NaCN}}$

b. 

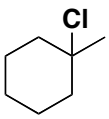
$\xrightarrow[\text{DMF}]{N_3^-}$

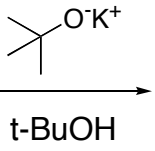
c. 

$\xrightarrow{H_2O}$

d. 

$\xrightarrow{H_2O}$

e. 

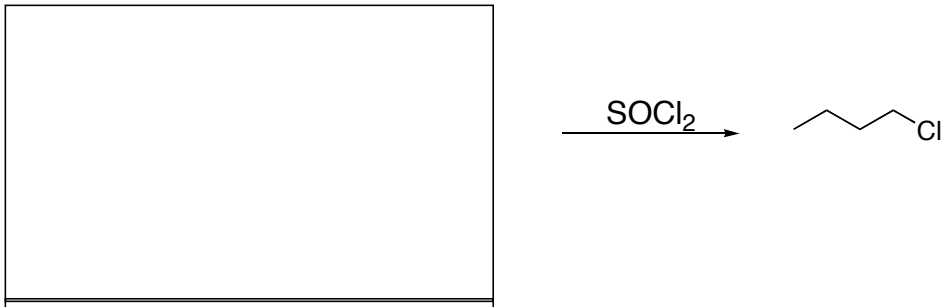


Initials

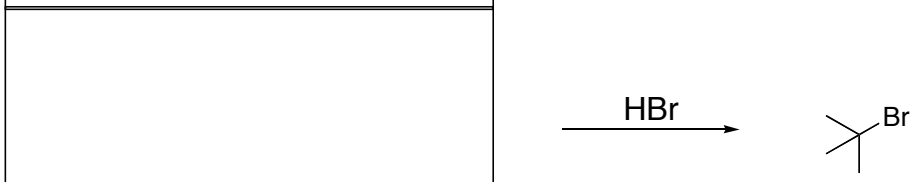
Points

3. (12 points) Draw the structure of the starting materials for the following reactions.

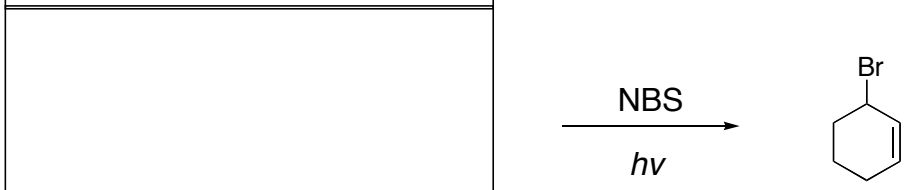
a.



b.



c.

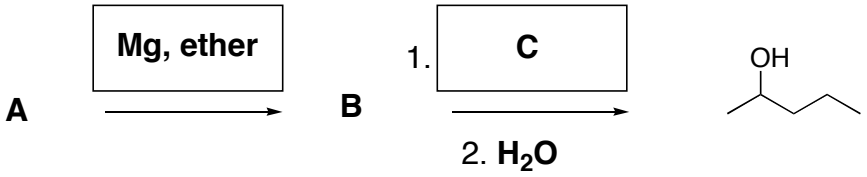


4. (4 points) Draw the structures of **A** and **B**.

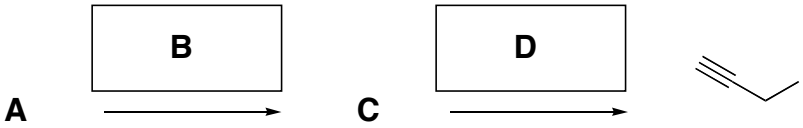
Initials

Points

5. (6 points) Draw the structures of **t**he starting materials and reagents (**A**, **B, C**) for the following reaction.



6. (8 points) Draw the structure of the starting materials and reagents (**A**, **B, C, D**) for the following reaction.

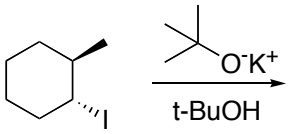


Initials

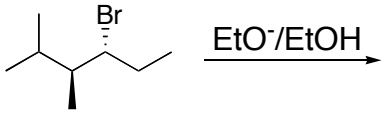
Points

7. (10 points) Draw the MAJOR product and a detailed mechanism for the following reactions. Specify correct stereochemistry where appropriate.

a.



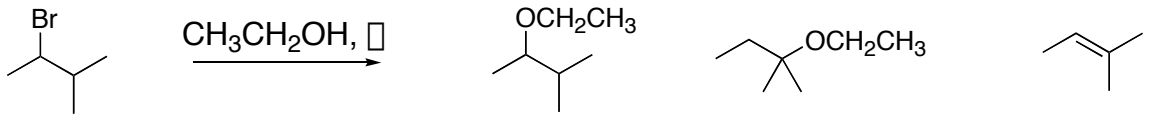
b.



Initials

Points

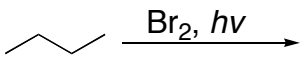
8. (10 points) Draw a detailed mechanism that accounts for each of the following products.

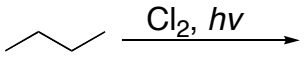


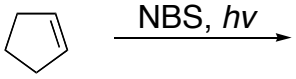
Initials

Points

9. (4 points) Circle the reactions that are synthetically usefu(i.e.give only one major product).



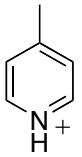


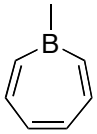


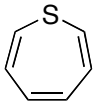
Initials

Points

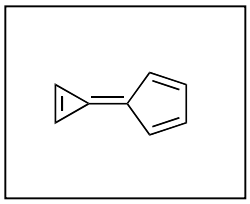
10. (6 points) Circle the heterocycles that are aromatic.



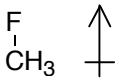




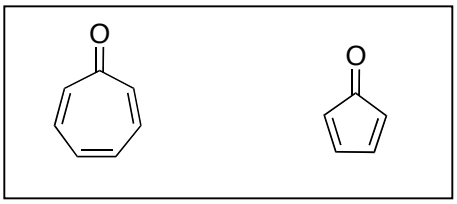
11. (4 points) Draw the dipole moment of calicene, if there is one.



calicene

Example: 

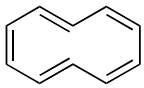
12. (4 points) Which molecule is more stable? Explain why in 1-2 sentences.



Initials

Points

Extra Credit:
The compound shown below is not aromatic. Explain why not. Draw a picture or a model if this will help explain your reasoning.



Initials

Points