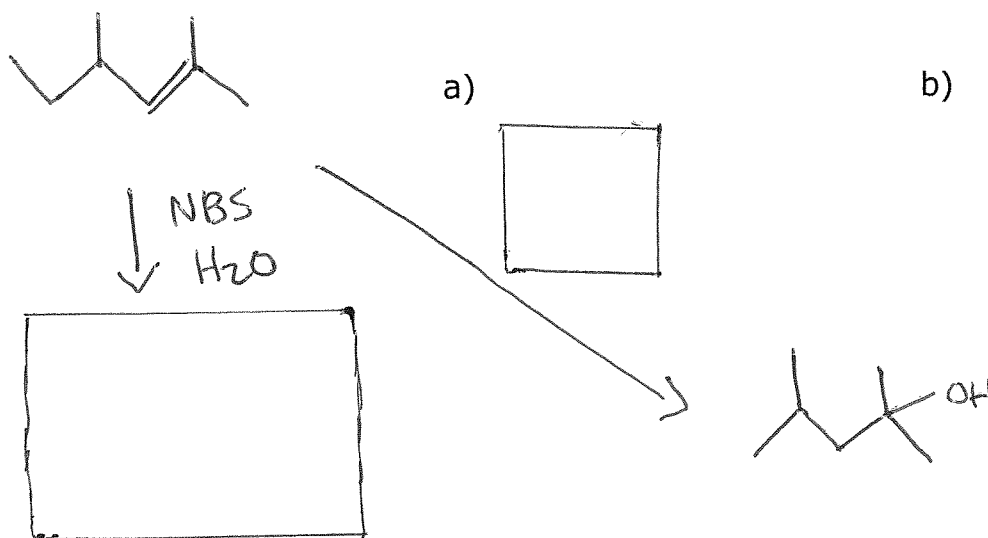


Organic Chemistry I
SI Review: Final Exam
Thursday, December 6
Sudro 24
4PM - 6PM

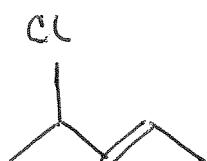
**Top 10 signs you've studied too much for your
Organic Chemistry Final (or maybe just enough!)**

10. You get excited about switching pen colors.
 9. Every single coffee mug is dirty and in the dishwasher.
 8. Your apartment is either really clean (because study break = manic tidying session) or looks like a tornado ran through it.
 7. Going to study groups on Friday, Saturday and Sunday rates high in your social life.
 6. Unless you turn off your Internet connection, you check your email every five minutes.
 5. A friend calls and after talking for a few minutes says, "I'll call back tomorrow and maybe you'll be in a better mood".
 4. Instead of doodling in other classes, you draw line structures of molecules.
 3. Your study group friends begin to look FINE.
 2. You have Dr. Cook on your Facebook. ☺
- And last but not least...
1. You realize you care a GREAT deal about alkenes and alkynes... and what happens to them!!
-

1. For the following molecule, which two fragments (a and b) would be most abundant upon analysis via Mass Spectrometry? Also, fill in missing starting material and product.



2. Consider the following molecule:



a)

b)

a) Draw structures corresponding to fragments of that molecule at $m/z = 69$ (a) and $m/z = 89$ (b).

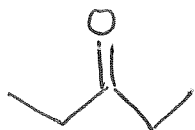
b) Which of the two structures would most likely represent the base peak?

c) If any of the molecular ion were still present, at what m/z value would the peak exist? What is this peak called?

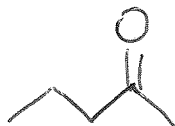
d) If a peak existed at $m/z = 89$, a peak 1/3 its size might also be present 2 units away. What would the m/z value be of that peak, and what would it represent?

3. Match each molecule with its respective ^1H NMR data.*

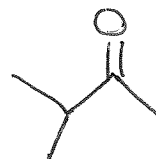
a)



b)



c)



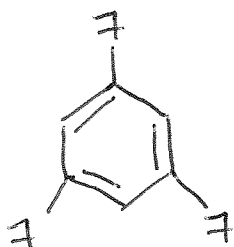
A1) 2.4 ppm, triplet
2.13 ppm, singlet
1.60 ppm, sextet
0.93 ppm, triplet

B1) 1.111 ppm, doublet
2.141 ppm, singlet
2.584 ppm, septet

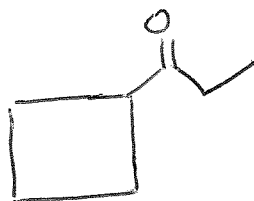
C1) 2.439, quartet
1.058, triplet

4. How many ^1H NMR and ^{13}C NMR resonances would you expect to see for the following molecules? Also, fill in missing starting material and product.

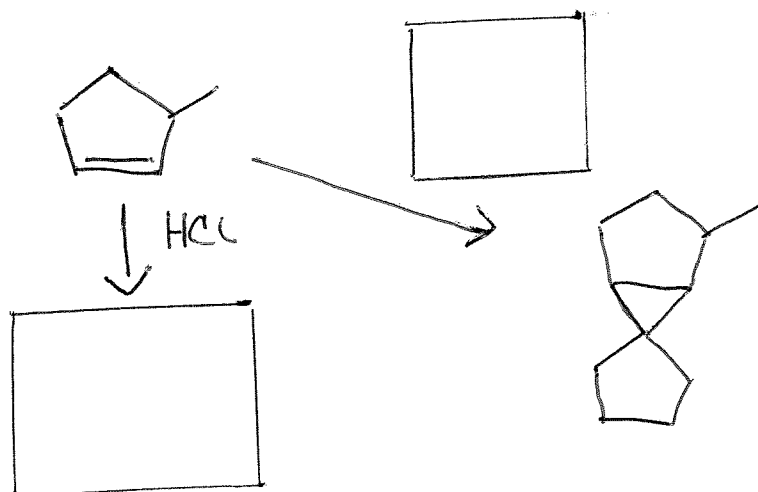
a)



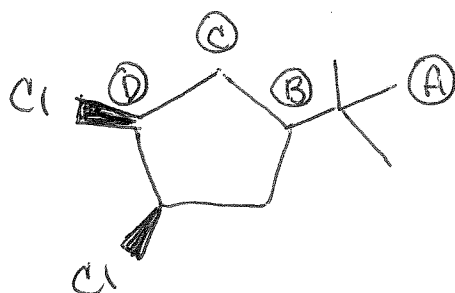
b)



c)



5. Please identify the relative integrations and peak-splitting patterns you would expect to see in the ^1H NMR spectra for unique (labeled) hydrogens in the following molecule.



Integration

n+1

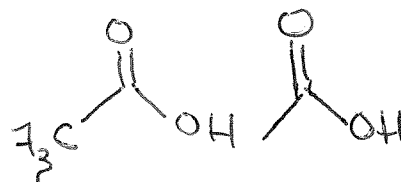
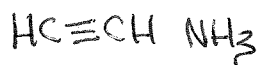
- A)
- B)
- C)
- D)

Identify each stereocenter as R or S.

What else can be said about this molecule? (Think stereochemistry.)

Draw this molecule's diastereomer.

6. Circle the stronger acid.

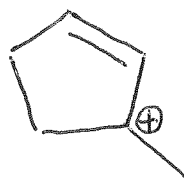


7. Please draw the a) lowest and b) highest energy chair conformers for the molecule: *trans*-1-methyl-4-(1-methylethyl)cyclohexane

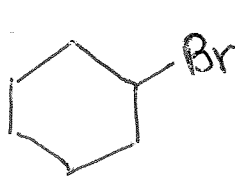
a)

b)

8. Provide a resonance structure for each of the following molecules:

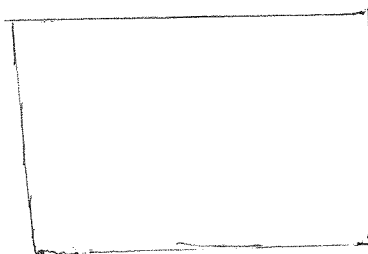


9. Fill in missing starting materials or product.

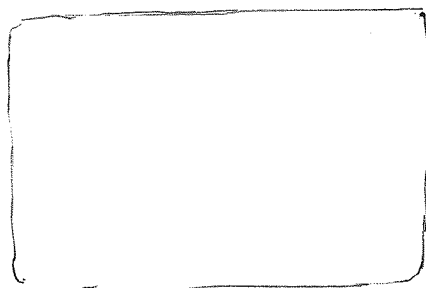


1.) 2 Li
2.) CuI

3.) I⁻

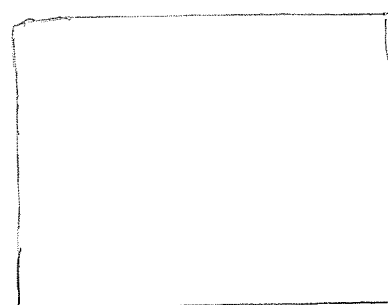


KOH



\ominus CN

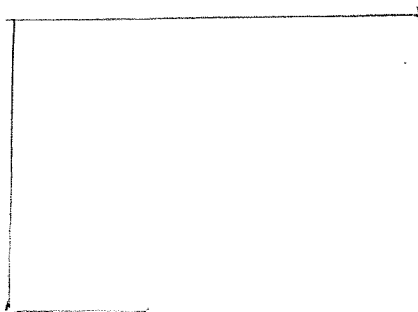
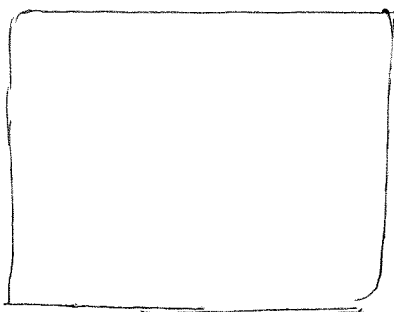
DMSO



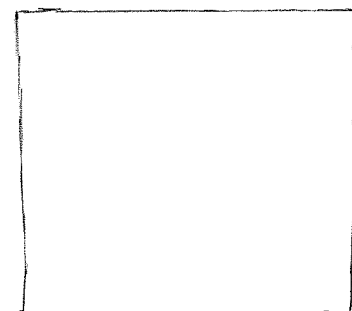
1. OsO₄

2. NaHSO₃

KMnO₄



HI/O₄



10. Please provide a plausible structure for a compound of molecular formula C_6H_{10} (a). Take into consideration the following spectral data*:

Infrared Spectroscopy absorbencies include a medium peak at 2120 cm^{-1} , a peak at 2962 cm^{-1} and a strong peak at 3315 cm^{-1}

^1H NMR includes the following resonances:

2.18 ppm, triplet

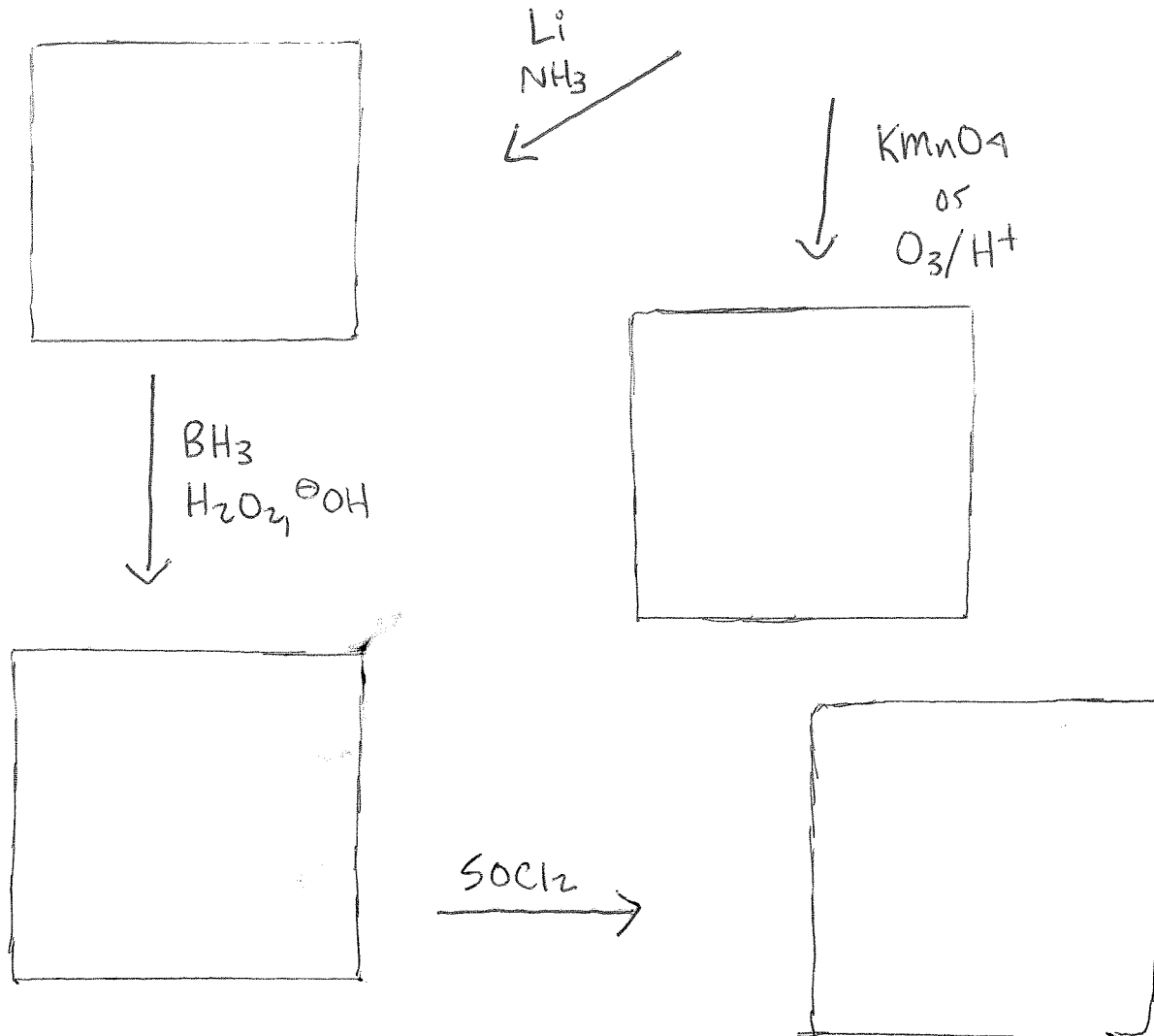
a)

1.931 ppm, singlet

1.52 ppm, quintet

1.41 ppm, sextet

0.92 ppm, triplet



11. Please complete the following syntheses.

