

Third Exam

Name (PRINT) ANSWER KEY

Last, First

Chemistry 3332

Signature _____

April 21, 2006

ID# _____

Please circle class time.

Dr. Bean's 10:00 AM

Dr. Bean's 1:00 PM

Page #	Score	
1. 16 pts.	_____	_____
2. 9 pts.	_____	_____
3. 18 pts.	_____	_____
4. 18 pts.	_____	_____
5. 13 pts.	_____	_____
6. 13 pts.	_____	_____
7. 13 pts.	_____	_____

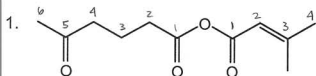
TOTAL _____

Note: Present your student ID when you return the exam booklet

A. Nomenclature: (16 points)

Give an acceptable IUPAC name for each of the following compounds. Be sure to indicate the stereochemistry where appropriate.

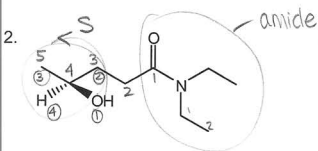
* can choose anhydride from either side, so longer # obviously wins parent name..



hexanoic anhydride
5-oxo

but-2-enoic
3-methyl

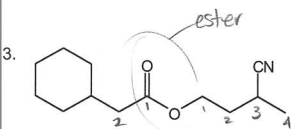
3-methylbut-2-enoic 5-oxohexanoic anhydride



pentanamide
(4S)

N,N-diethyl
4-hydroxy

N,N-diethyl (4S)-4-hydroxypentanamide

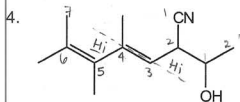


ethanoate
2-cyclohexyl

butyl
3-cyano

3-cyanobutyl 2-cyclohexylethanoate

* nitrile has priority!



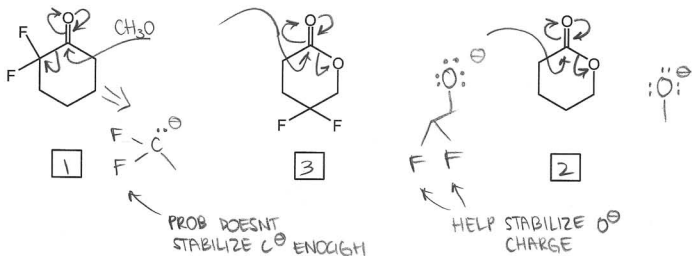
hepta-3,5-dienitrile
(3E)

4,5,6-trimethyl
2-(1-hydroxyethyl)

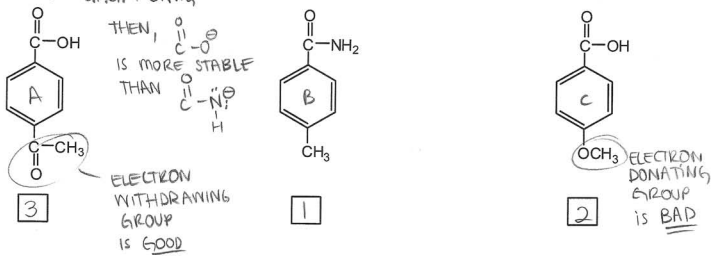
(3E)-2-(1-hydroxyethyl)-4,5,6-trimethylhepta-3,5-dienitrile

B. Facts: (9 points total)

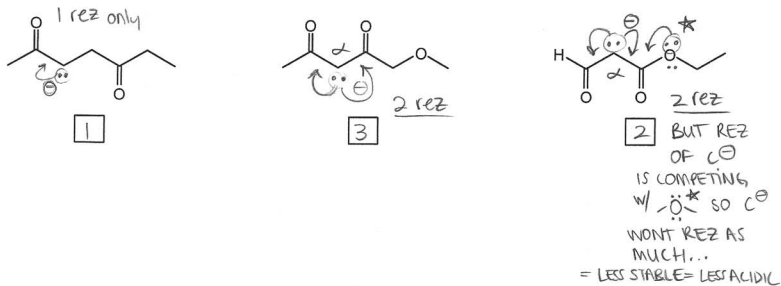
1. Rank the following compounds in order of increasing rate of nucleophilic acyl substitution. (1 = slowest rate, 3 = fastest rate)



2. Rank the following compounds in order of increasing acidity. (1=least acidic, 3=most acidic)
FIRST COMPARE SIMILAR COMPOUNDS, A+C .. BOTH HAVE CO_2H , DIFFERENCE IN EDG. + E.W.G

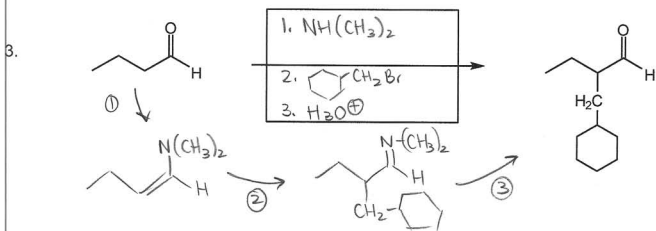
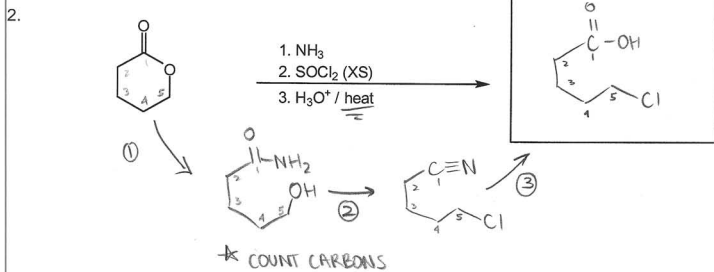
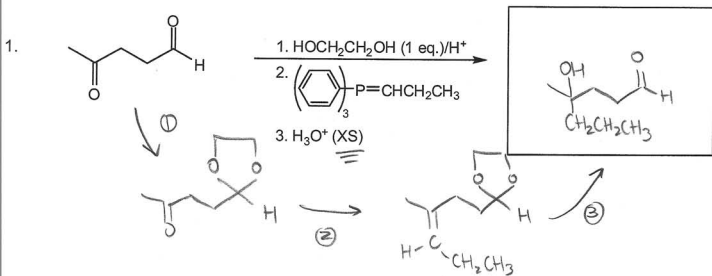


3. Rank the following compounds in order of increasing acidity. (1=least acidic, 3=most acidic)



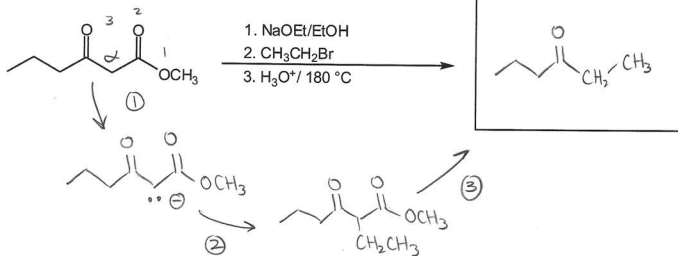
C. Reactions: Total = 36 points, 6 points each

Please provide the starting material, reagents or major product in the answer box. Be sure your drawing indicates **stereochemistry** if applicable. Partial credit is awarded only when intermediate products in a multi-step reaction are shown below the reaction.

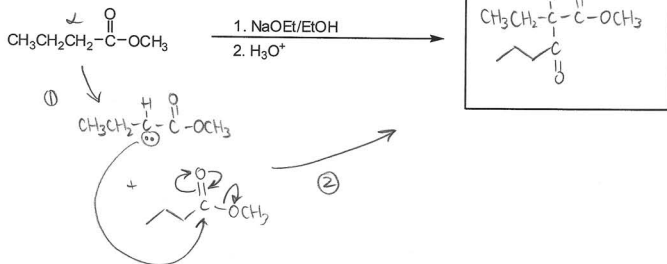


1 2 3
O, carbonyl, α

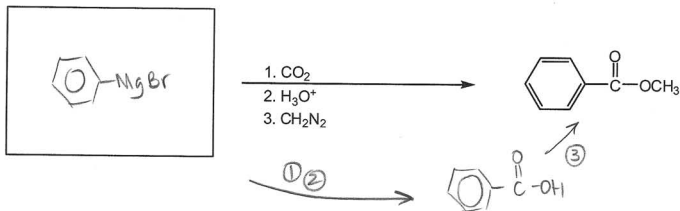
4.



5.

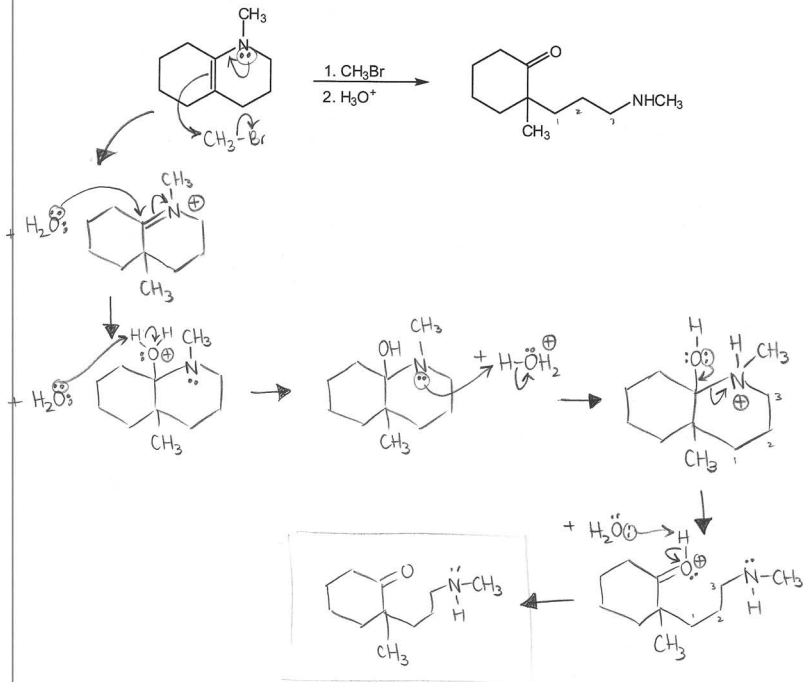


6.



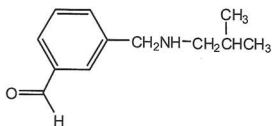
D. Mechanisms: (13 points)

Provide a clear mechanism to explain the formation of the product. Use curved arrows to indicate "electron flow". Remember to show only one step at a time. Show all intermediates and all formal charges. When more than one resonance contributor may be drawn, be sure to draw the most stable contributor.



E. Synthesis: 13 Points

Synthesize the molecule below using any of the following reagents: benzene, any alkanes, alkenes, or alcohols of **three carbons** or less, any inorganic reagents, any oxidizing or reducing agents, and any peroxyacids.

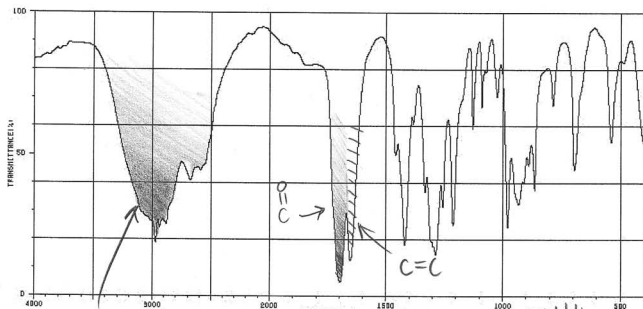


not done yet..
must sleep

$$UN = 5 - \left(\frac{8}{2}\right) + 1 = (5-4) + 1 = 2$$

F. Spectroscopy: 13 Points

A compound with the formula $C_5H_8O_2$ exhibits the IR, 1H NMR and proton decoupled ^{13}C NMR spectra shown below. Please identify this compound and draw the structure in the box provided below.



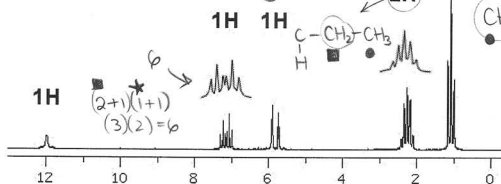
OH shifted from 3300 to 3000 means definite carboxylic acid!!

So, for sure we have..

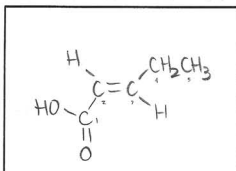
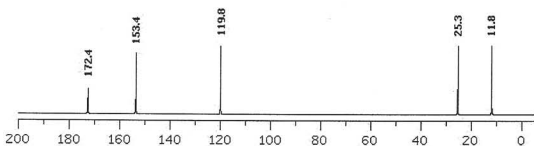
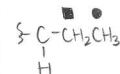


which is 3 carbons out of 5

* splitting going on..



so now...



* check carbons, H's and O's
 $C_5H_8O_2$