Third Exam

Chemistry 3332

April 21, 2006

Name (PRINT) _____
Last, First

Signature _____

ID# _____

Please circle class time.

Dr. Bean's 10:00 AM

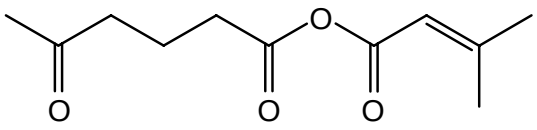
Dr. Bean's 1:00 PM

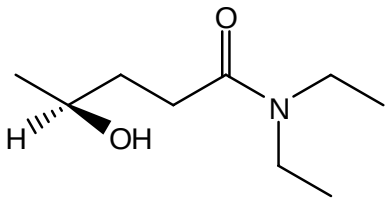
Page #	Score	
1. 16 pts.		
2. 9 pts.		
3. 18 pts.		
4. 18 pts.		
5. 13 pts.		
6. 13 pts.		
7. 13 pts.		

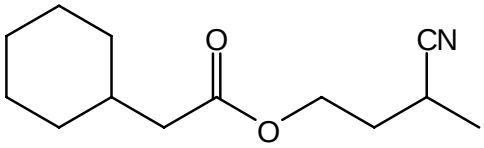
TOTAL _____

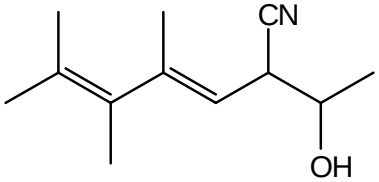
Note: Present your student ID when you return the exam booklet

A. Nomenclature: (16 points)
Give an acceptable IUPAC name for each of the following compounds. Be sure to indicate the **stereochemistry** where appropriate.

1. 

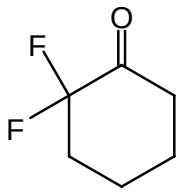
2. 

3. 

4. 

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)



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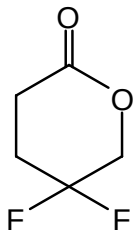

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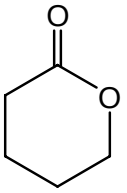

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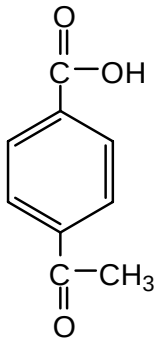
2. Rank the following compounds in order of increasing acidity. (1=least acidic, 3=most acidic)



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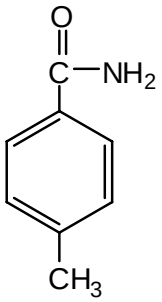

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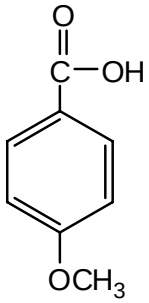

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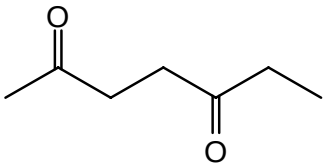
3. Rank the following compounds in order of increasing acidity. (1=least acidic, 3=most acidic)



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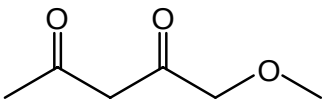

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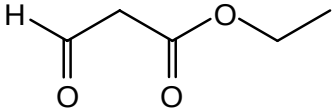

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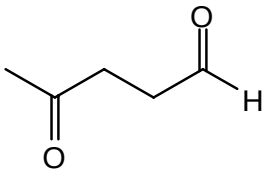
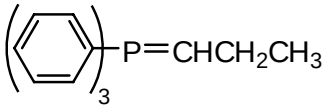
C. Reactions: Total = 36 points, 6 points each
Please provide the starting material, reagents or major product in the answer box. Be sure your drawing indicates **stereochemistry** if applicable. Partial credit is awarded only when intermediate products in a multi-step reaction are shown below the reaction.

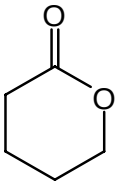
1.



1. $HOCH_2CH_2OH$ (1 eq.)/H^+
2. 

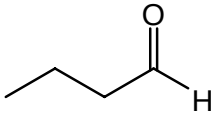
3. H_3O^+ (XS)

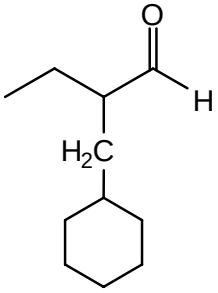
2.



1. NH_3
2. $SOCl_2$ (XS)
3. H_3O^+ / heat

3.





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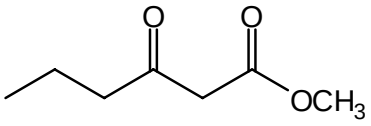
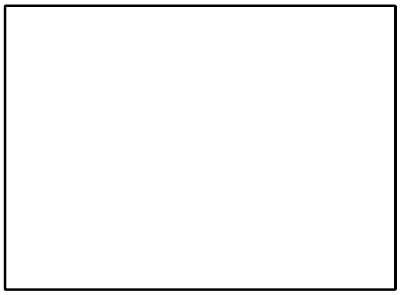


1. NaOEt/EtOH
2. CH_3CH_2Br
3. H_3O^+/ 180 °C



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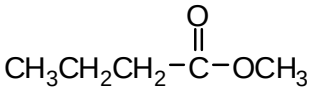
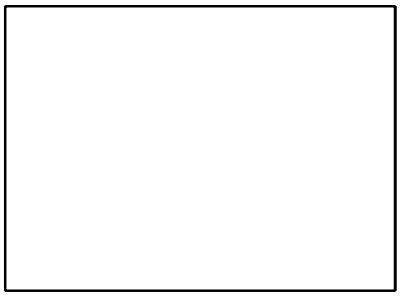


1. NaOEt/EtOH
2. H_3O^+



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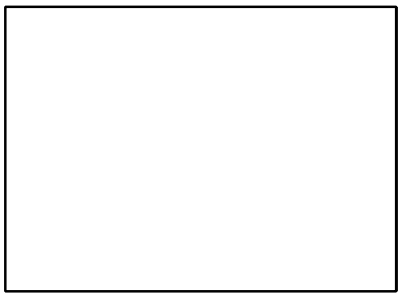
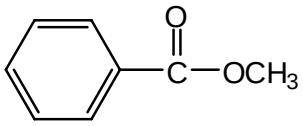
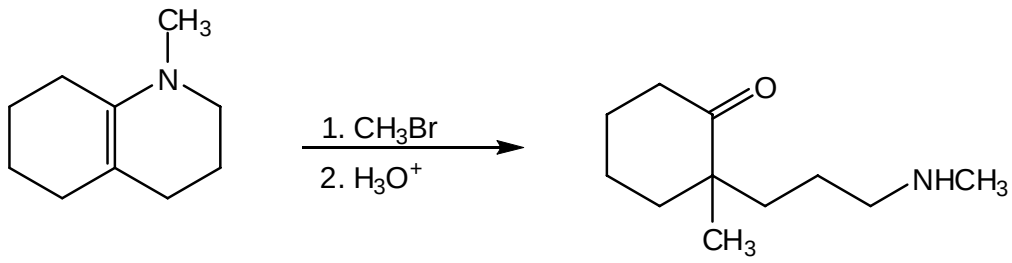


1. CO_2
2. H_3O^+
3. CH_2N_2



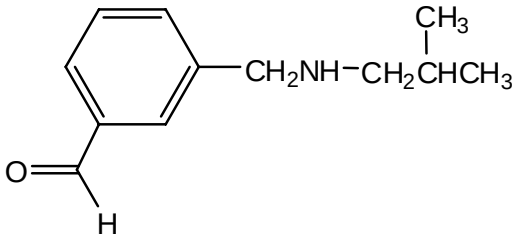
D. Mechanisms: (13 points)

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.



F. Spectroscopy: 13 Points

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