

Second Exam

Name (PRINT) KEY, ANSWER
Last, First

Chemistry 3332

Signature _____

March 24, 2006

ID# _____

Please circle class time.

Dr. Bean's 10:00 AM

Dr. Bean's 1:00 PM

Page #	Score	
1. 12 pts.		
2. 15 pts.		
3. 18 pts.		
4. 18 pts.		
5. 13 pts.		
6. 12 pts.		
7. 12 pts.		

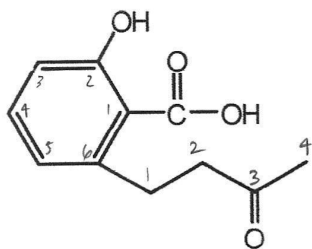
TOTAL _____

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

A. Nomenclature: (12 points)

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

1.



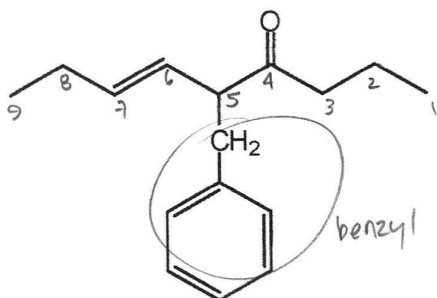
2-hydroxy-6-(3-oxobutyl)benzoic acid

benzoic acid

2-hydroxy
6-(3-oxobutyl)

#d this way cuz 'h' is less than 'o'

2.



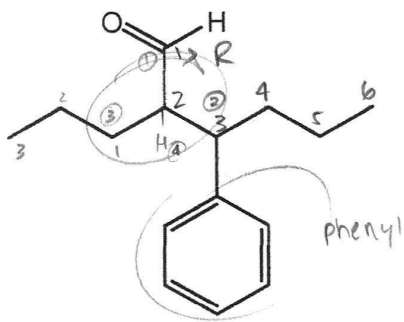
(6E)-5-benzylnon-6-en-4-one

non-6-en-4-one

6E

5-benzyl

3.



(2R)-3-phenyl-2-propylhexanal

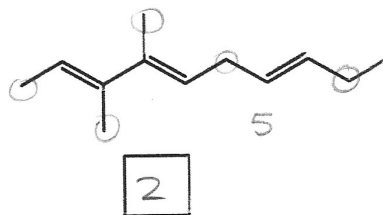
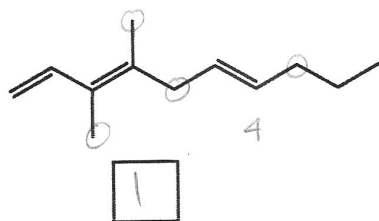
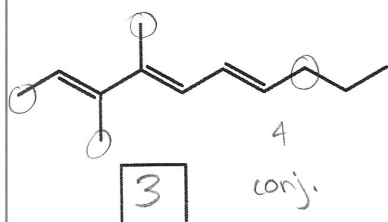
hexanal

2R

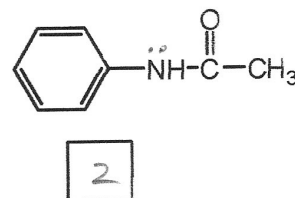
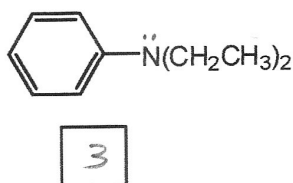
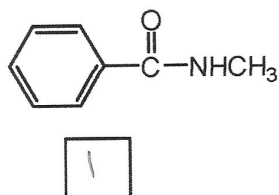
2-propyl
3-phenyl

B. Facts: (15 points total)

1. Place the compounds in increasing order of λ_{\max} (wavelength) for the π to π^* transition observed in the UV spectrum. (shortest wavelength = 1, longest wavelength = 3) (3 pts.)

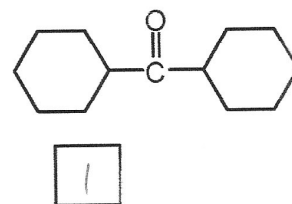
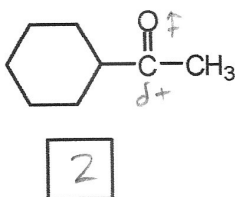
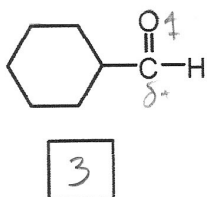


2. Place the compounds in order of increasing reaction rate with bromine in an electrophilic aromatic substitution reaction. (1 = slowest rate, 3 = fastest rate) (3 pts.)

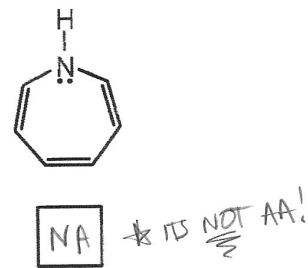
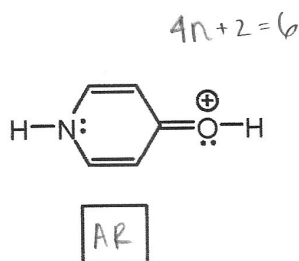
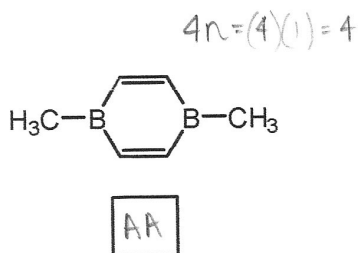


ACTIVATOR

3. Place the compounds in order of increasing reactivity in a nucleophilic addition reaction. (1 = least reactive, 3 = most reactive) (3 pts.)



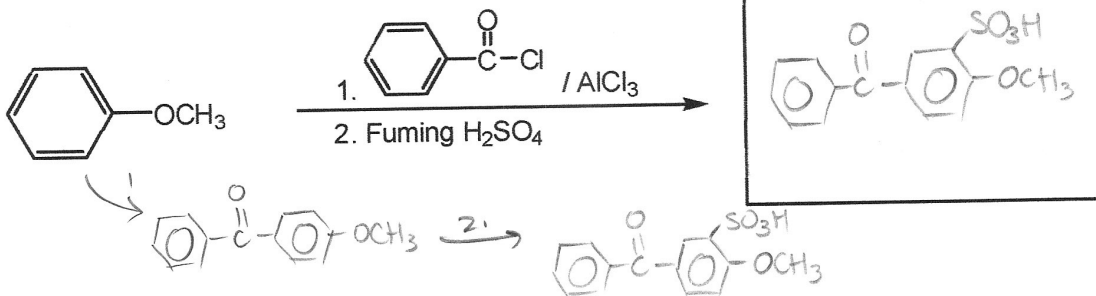
4. Label the compounds as aromatic (AR), antiaromatic (AA), or nonaromatic (NA). (You may assume all are planar.) (6 pts.)



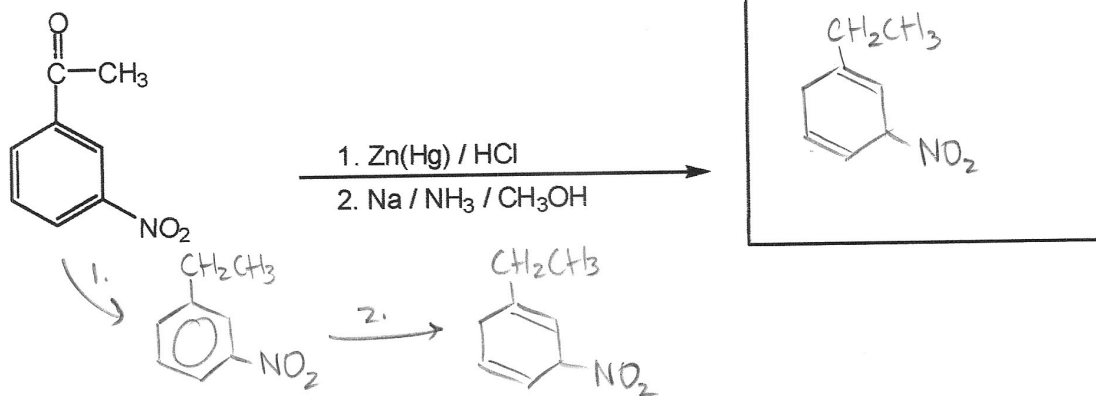
C. Reactions: Total = 36 points, 6 points each

Please provide the major product or the reagents 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.

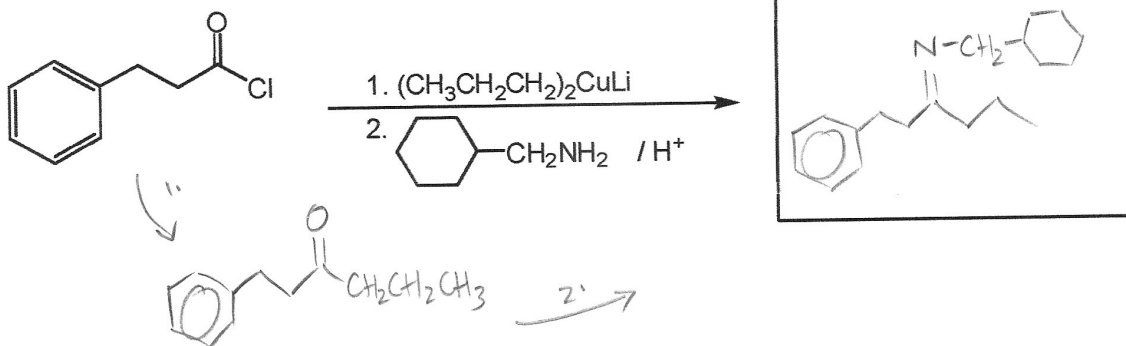
1.



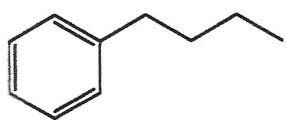
2.



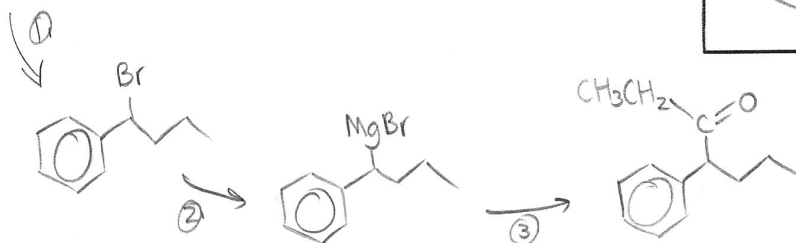
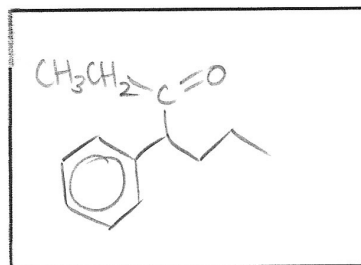
3.



4.



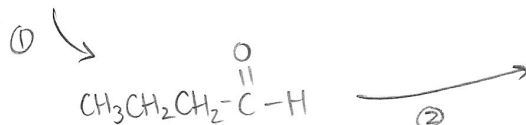
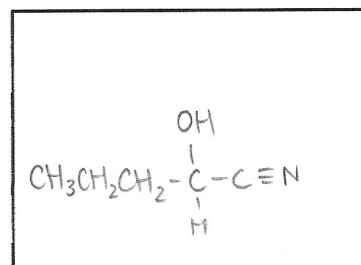
1. $\text{Br}_2 / \text{light}$
2. Mg / ether
3. $\text{CH}_3\text{CH}_2\text{CN}$, then H_3O^+



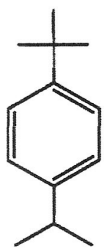
5.



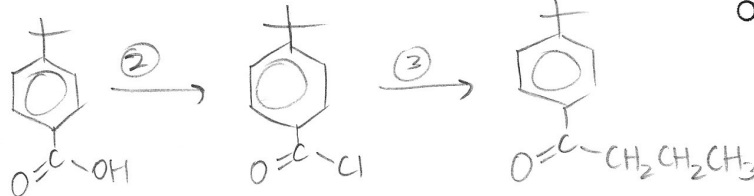
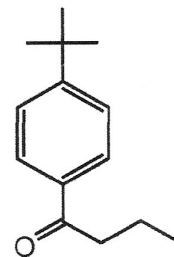
1. O_3
2. $(\text{CH}_3)_2\text{S}$
3. NaCN / H^+ or HCN / CN^-



6.



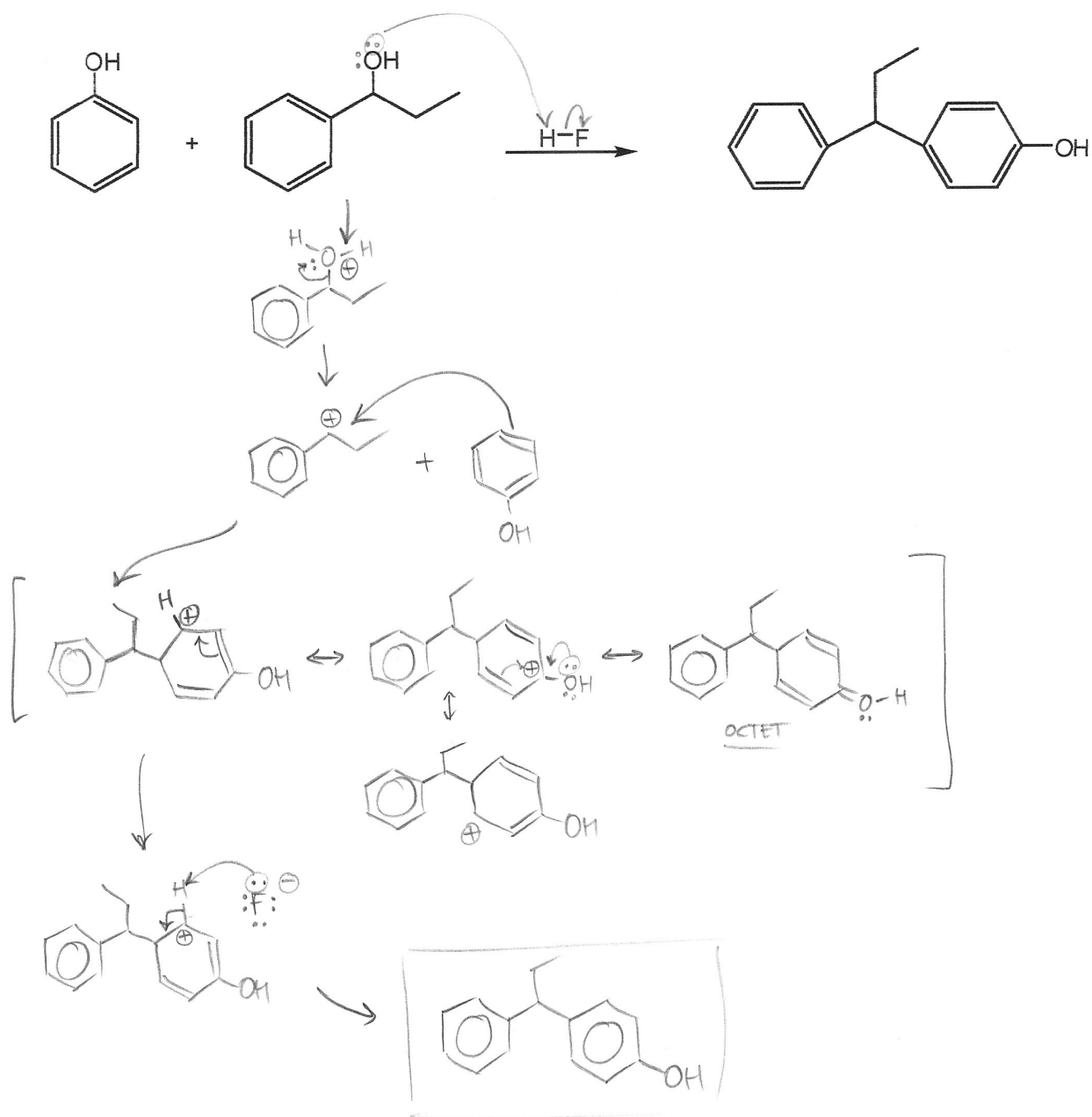
1. $\text{KMnO}_4 / \text{H}_2\text{O} / \text{OH}^- / 100^\circ\text{C}$
 2. SOCl_2
 3. $(\text{CH}_3\text{CH}_2\text{CH}_2)\text{CuLi}$



★ NOT SURE IF 1ST STEP IS CORRECT
FORGOT IF IT WILL REACT W/ T-BUTYL...

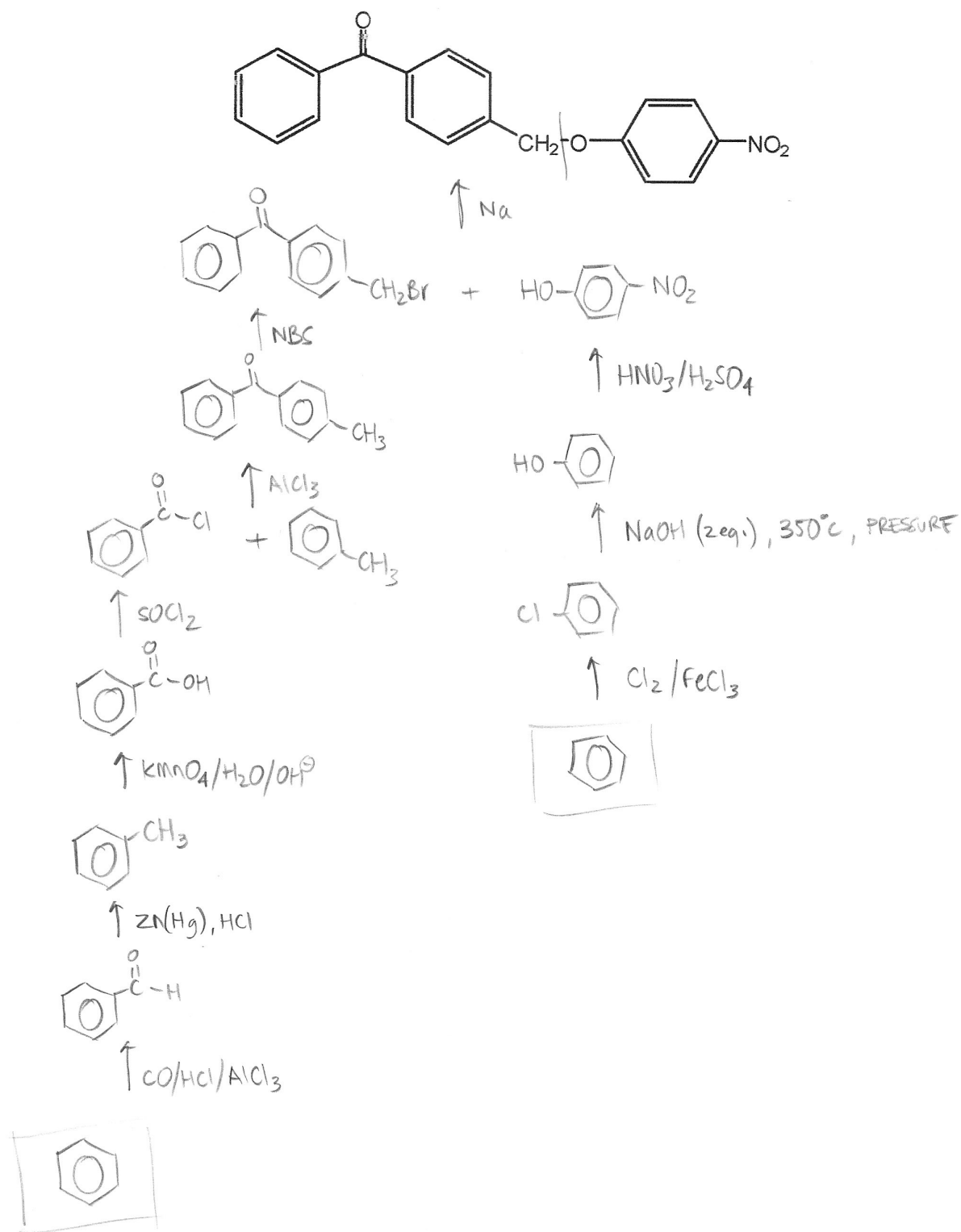
D. Mechanisms: (13 points)

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: 12 Points

Synthesize the molecule below using any of the following reagents: benzene, any **stable**, one carbon molecule, any inorganic reagents, any oxidizing or reducing agents, and any peroxyacids



F. Spectroscopy: 12 Points

A compound with the formula $C_9H_{18}O$ 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.

