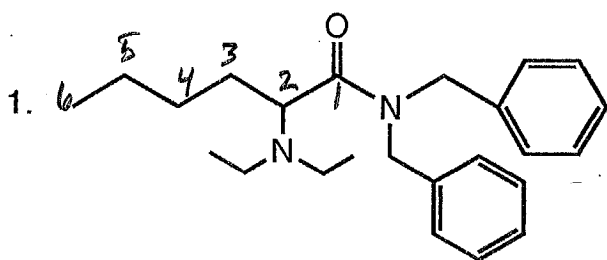


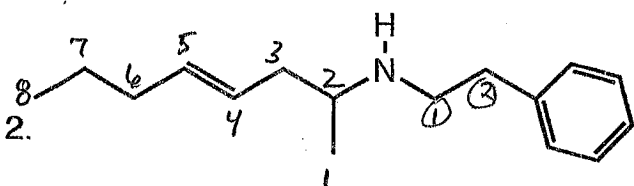
# Final Exam, S2024

## A. Nomenclature: (15 points)

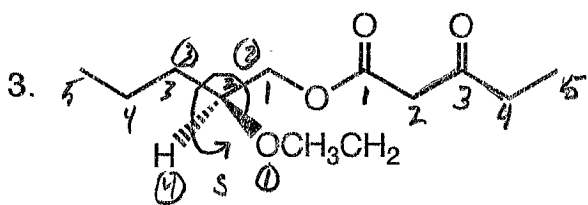
Give an acceptable IUPAC name for each of the following compounds. Be sure to indicate the stereochemistry where appropriate.



$\text{N,N-dibenzyl-2-diethylaminohexanamide}$   
 (1) if use N,N here



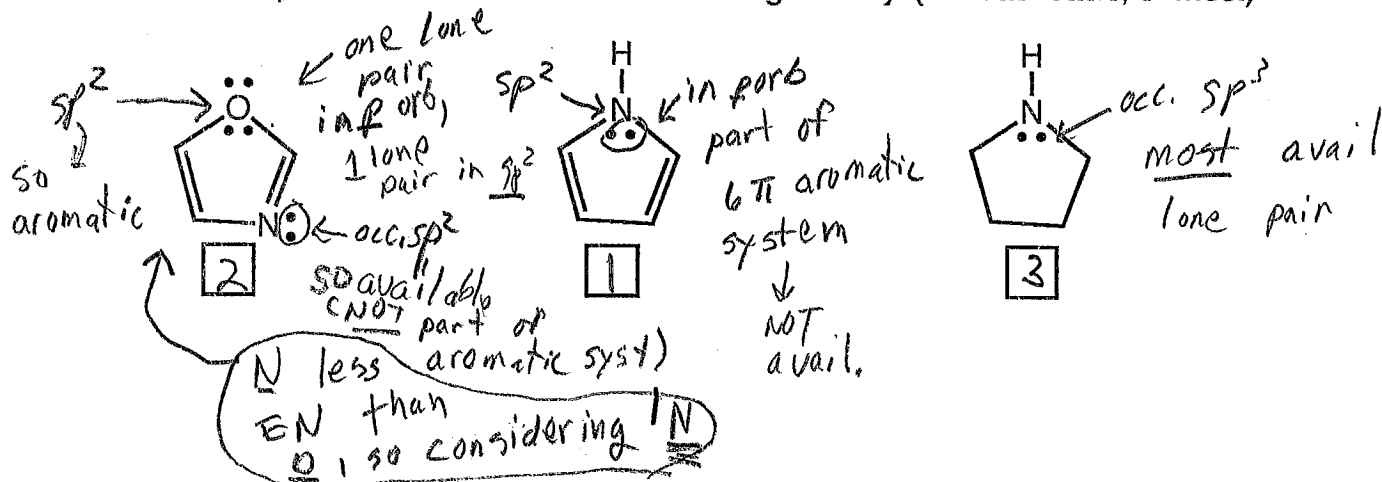
OR E  
 $\text{trans-N-(2-phenylethyl)-4-octen-2-amine}$



$\text{(S)-2-ethoxypentyl 3-oxopentanoate}$

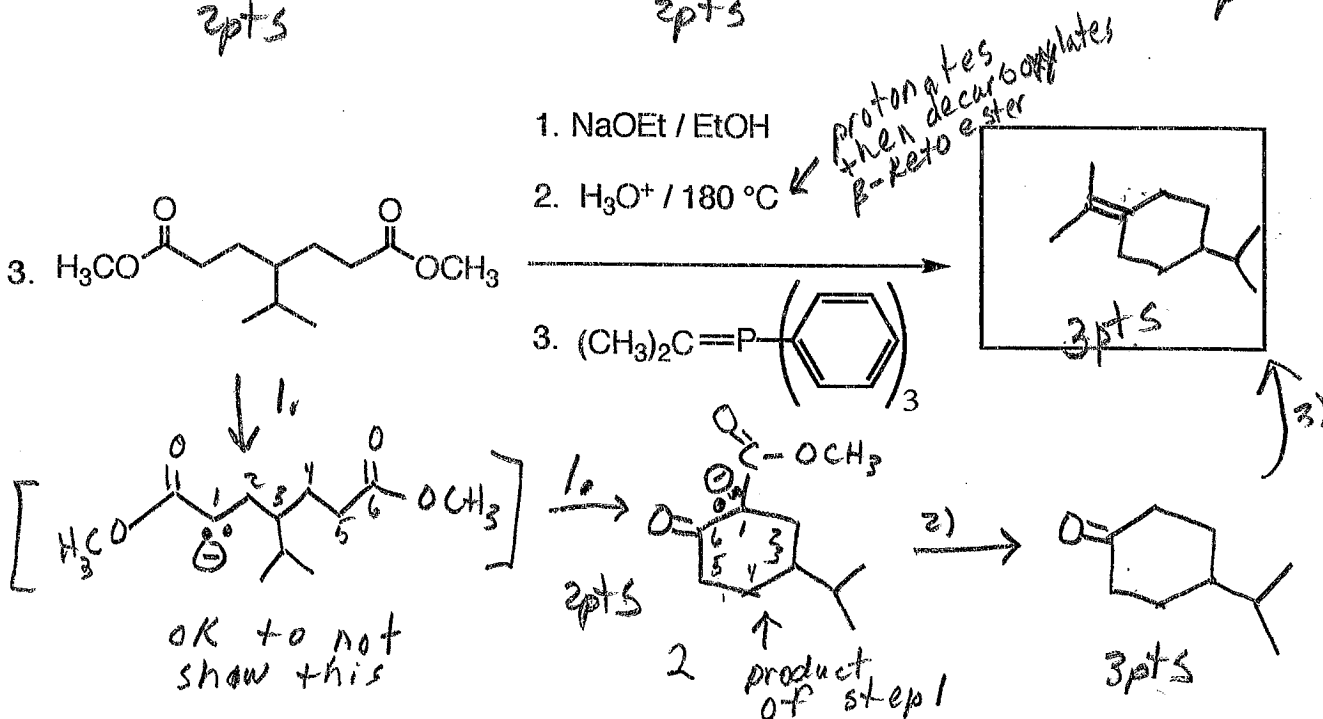
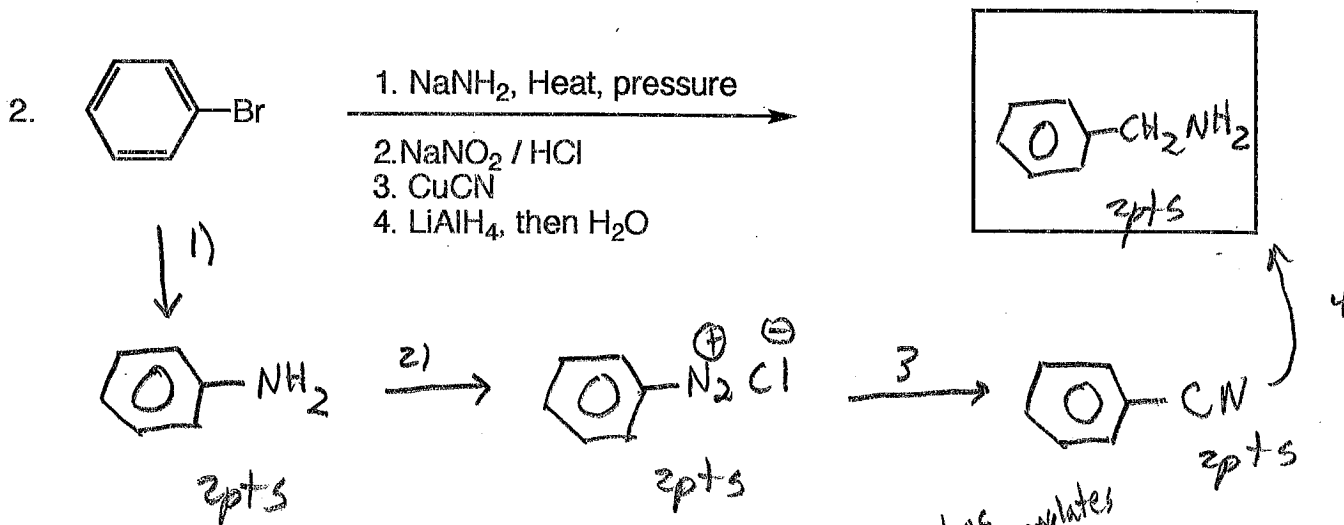
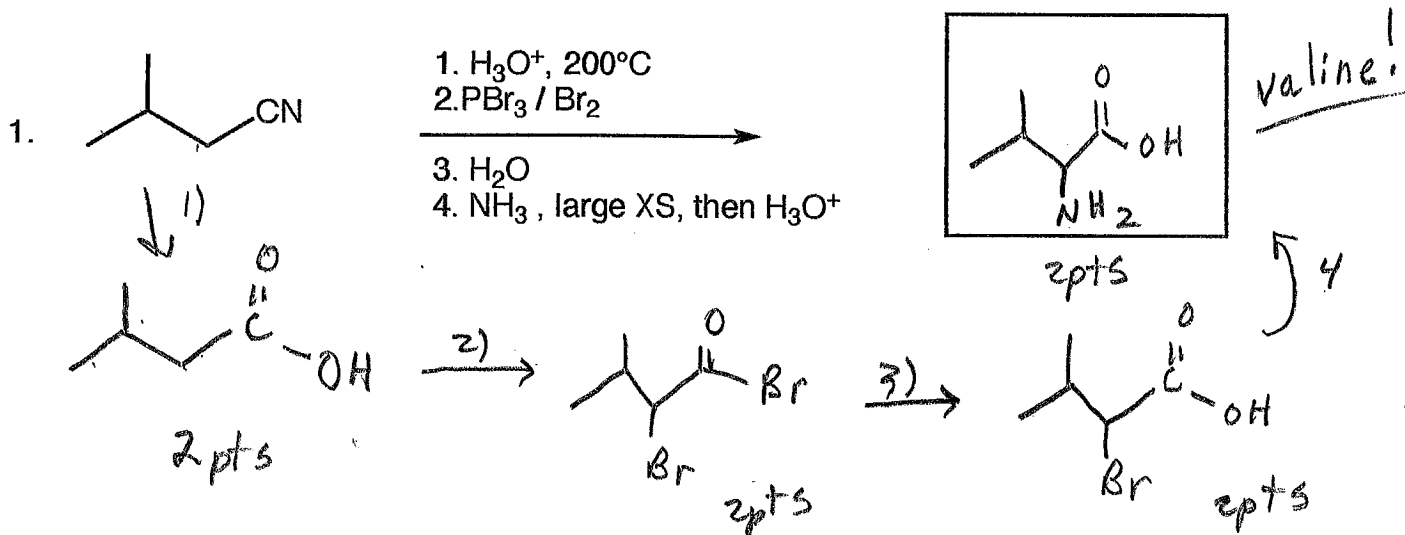
## B. Facts: (6 points)

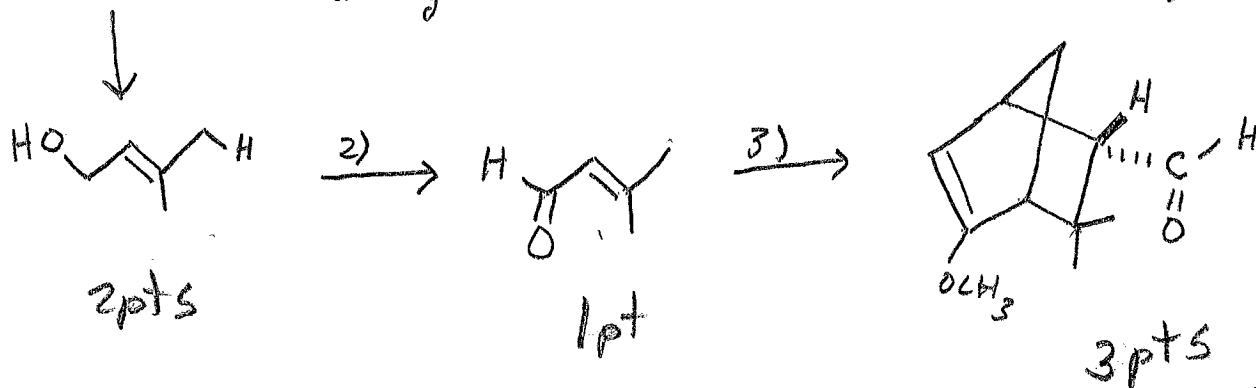
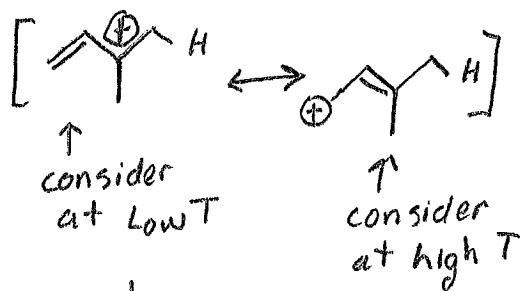
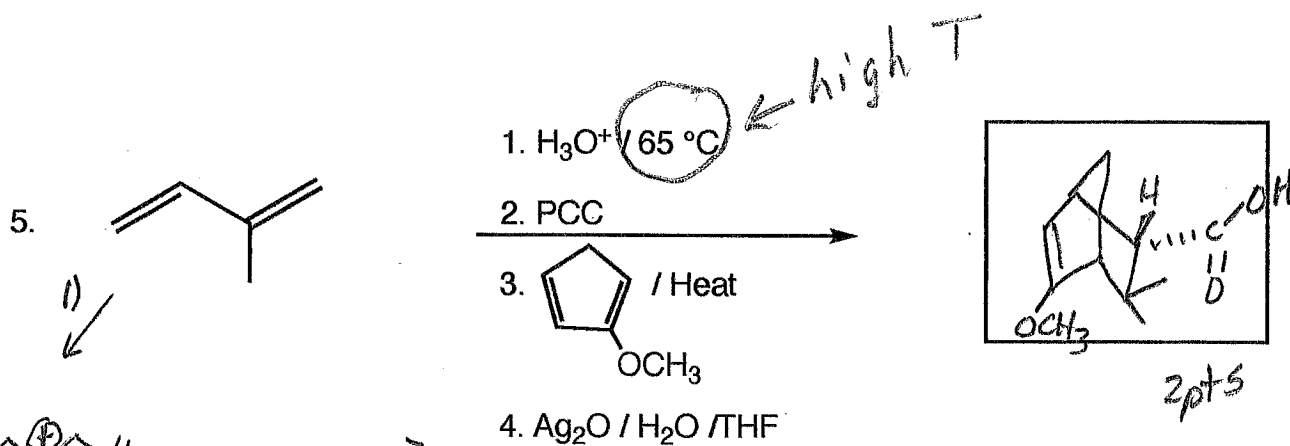
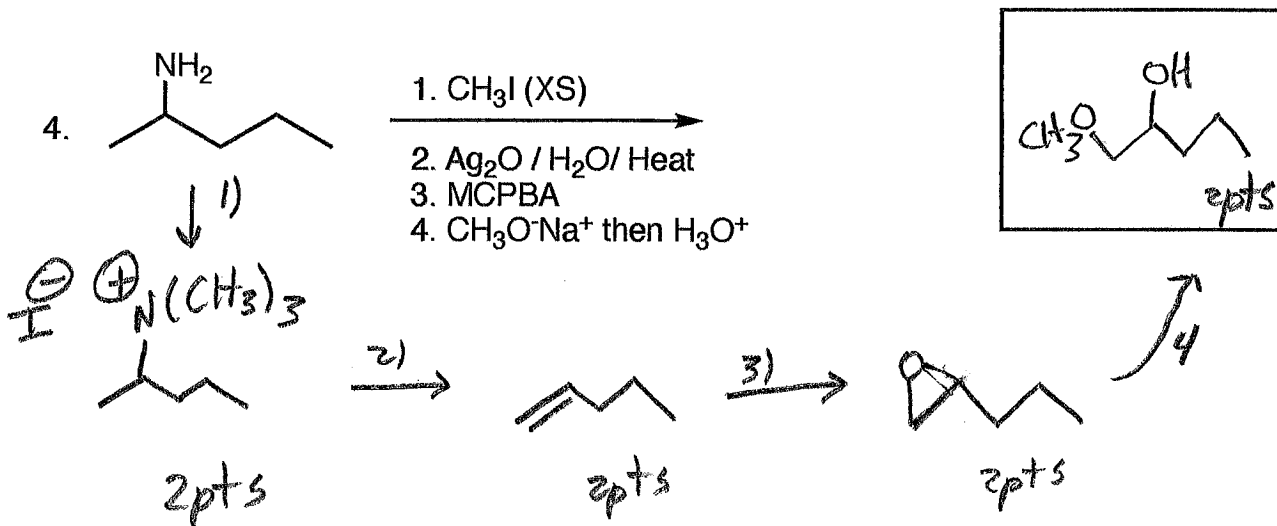
Place the compounds below in order of increasing basicity. (1= least basic, 3=most)



**C. Reactions:** Total = 40 points, 8 points each

Please provide the major product in the answer box. Indicate **stereochemistry** if applicable. Full credit is awarded only when the product of each step in a multi-step reaction is shown below the reaction.



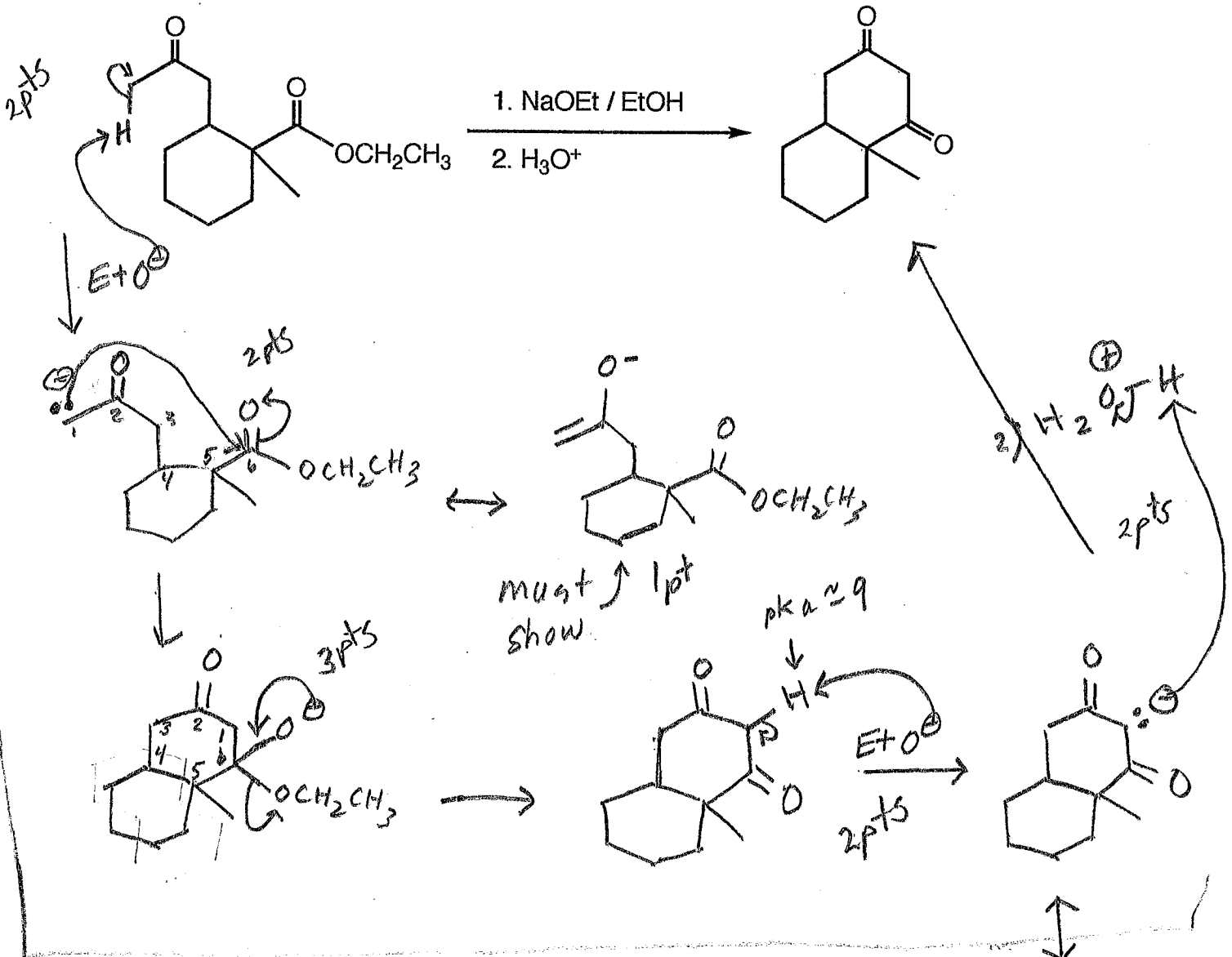


3

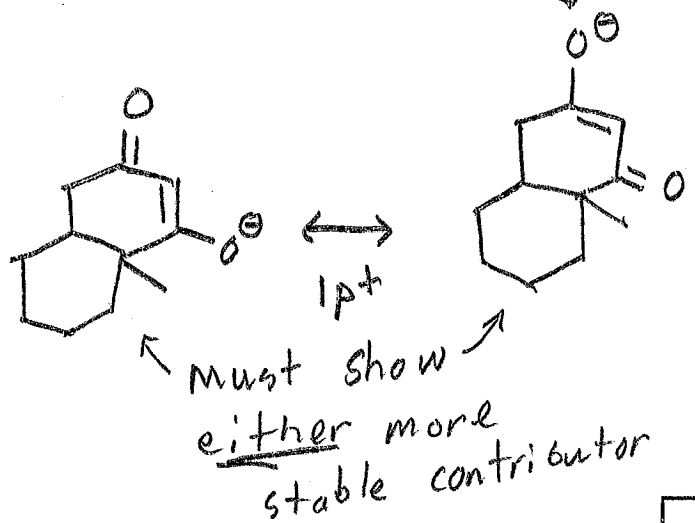
⊖ incorrect stereo   
⊖ incorrect regio

**D. Mechanism: (13 points)**

Provide a clear mechanism to explain the formation of the product shown. Use curved arrows to indicate "electron flow". Remember to show only one step at a time. Show all intermediates and all formal charges. If more than one resonance contributor may be drawn, be sure to draw the most stable one. Please do not show transition states.

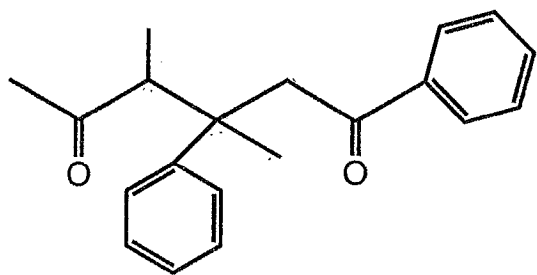


all of this happens in any Claisen condensation before H<sub>3</sub>O<sup>+</sup> is added. (This is a mixed Claisen.)



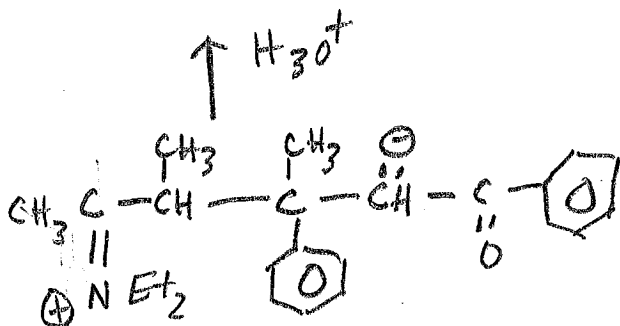
E. Synthesis: 13 Points

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

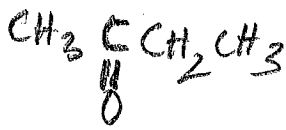
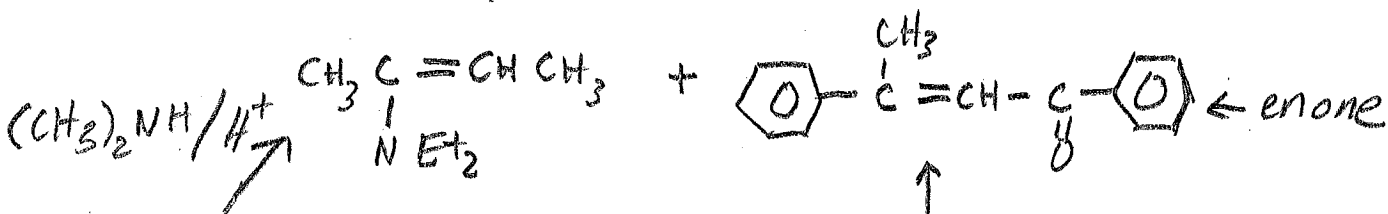


← Michael target

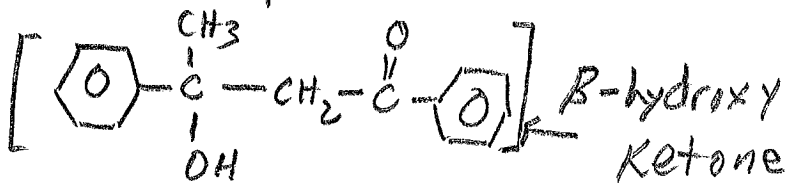
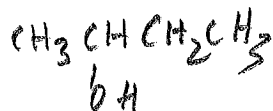
temp ester  
synth okay  
but longer



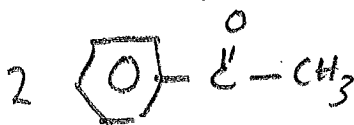
↑



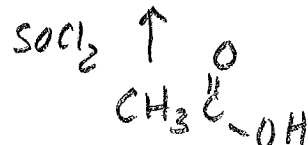
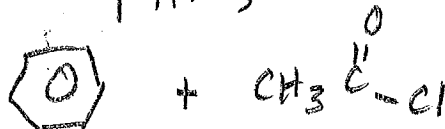
red or ↑ Jones' ox



↑ NaOEt / EtOH / Δ



↑  $AlCl_3$

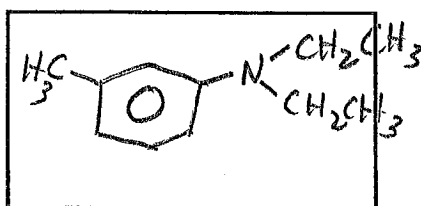
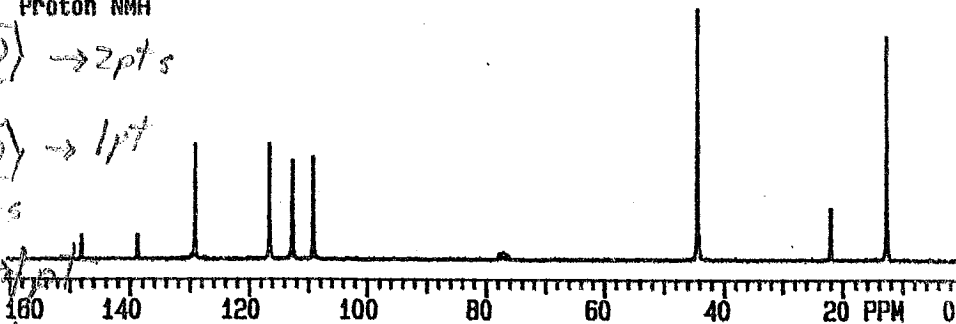
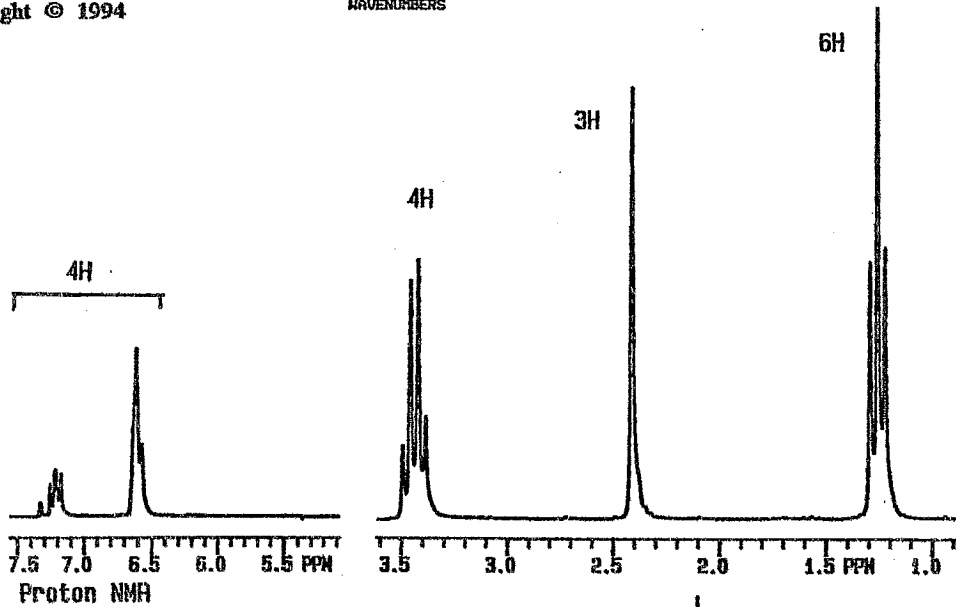
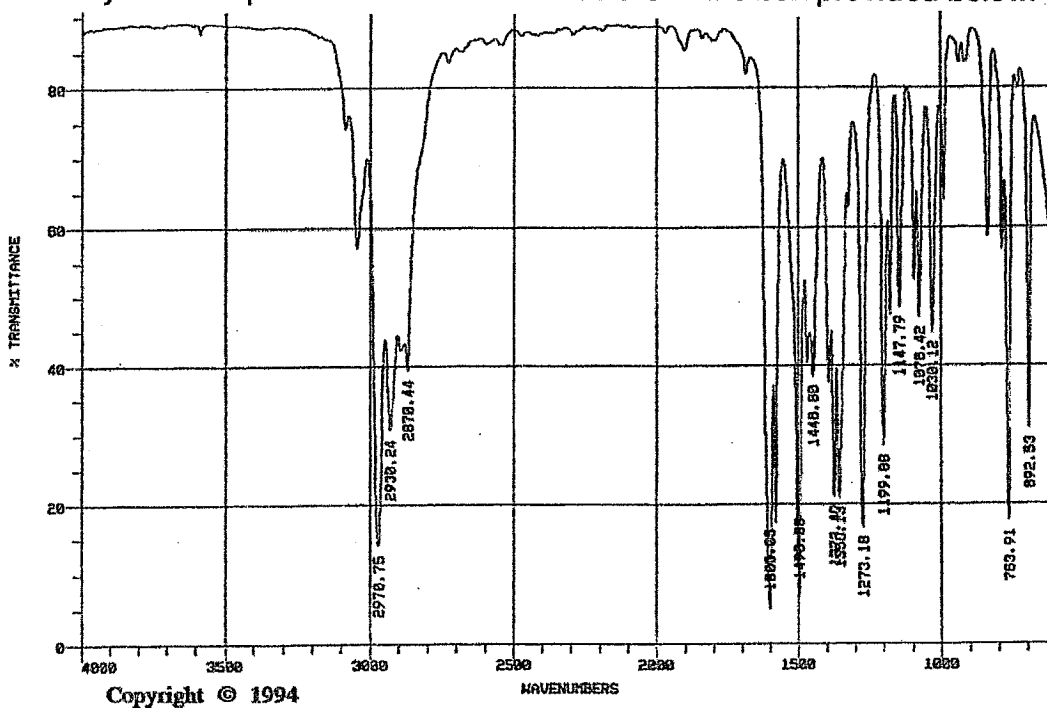


↑ Jones' ox



**F. Spectroscopy: 13 Points**

A compound with the formula  $C_{11}H_{17}N$  exhibits the IR,  $^1H$  NMR, and  $^{13}C$  NMR spectra shown below. Please identify this compound and draw the structure in the box provided below.



- partial:
- any disubst c1ccc(O)cc1 → 2pts
  - except para
  - other subst c1ccc(O)cc1 → 1pt
  - 3° amine → 2pts
  - 1° or 2° amine CCN → 1pt
  - isolated  $-CH_3$  → 1pt
  - isolated  $-CH_2CH_3$  → 2pts
  - $CH_2$  adj. to only 2H → 1pt
- Not extra if have the isolated  $CH_2CH_3$  credit 6

