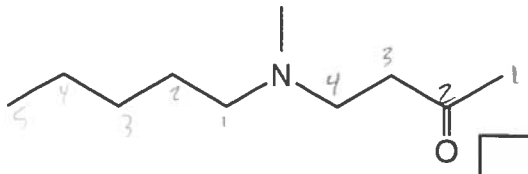
Alt. Final Exam Sp

A. Nomenclature: (15 points) → 5 pts each

(-1) for incorrect numbering

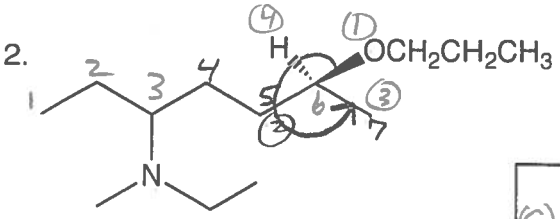
Give an acceptable IUPAC name for each of the following compounds. Be sure to indicate the **stereochemistry** where appropriate.

1. 

(-1) if use N

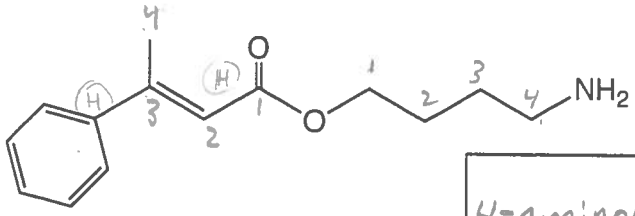
OR

4-methylpentylamino-(2)-butanone

2. 

OR

(S)-N-ethyl-N-methyl-6-propoxy-(3)-heptanamine

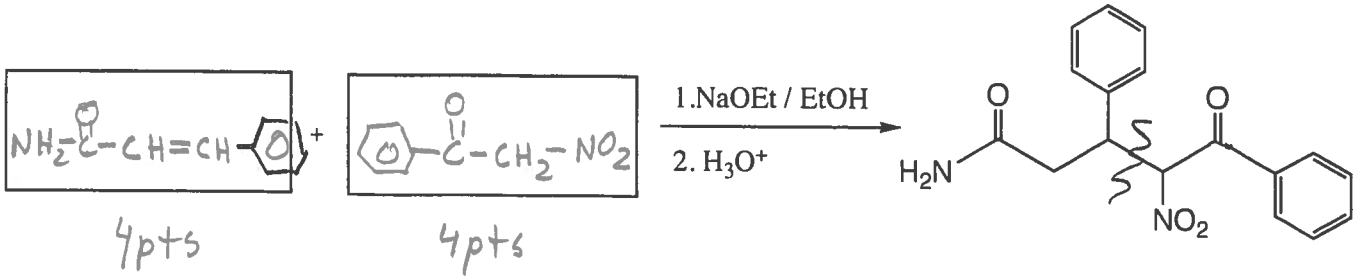
3. 

OR

4-aminobutyl (E)-3-phenyl-(2)-butenoate

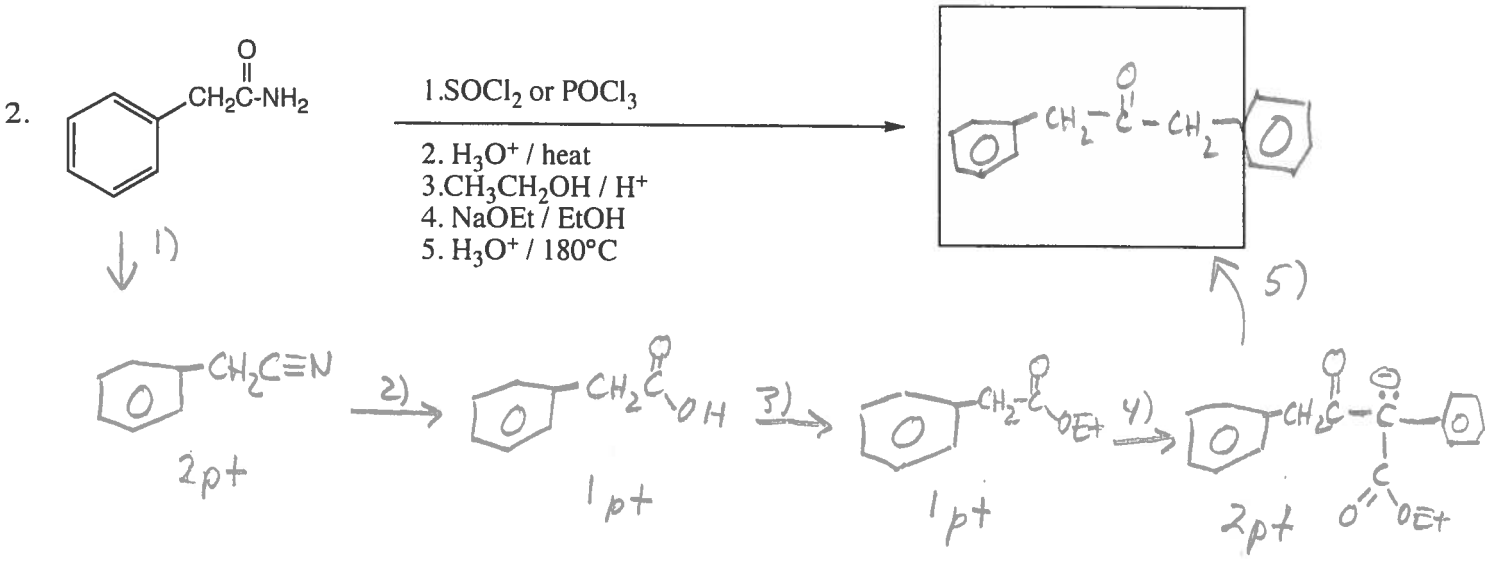
B. Reactions: Total = 40 points, 8 points each
Please provide the starting material or major product in the answer box. Be sure your drawing indicates **stereochemistry** if applicable. Partial credit is awarded only when intermediate products in a multi-step reaction are shown below the reaction.

1.



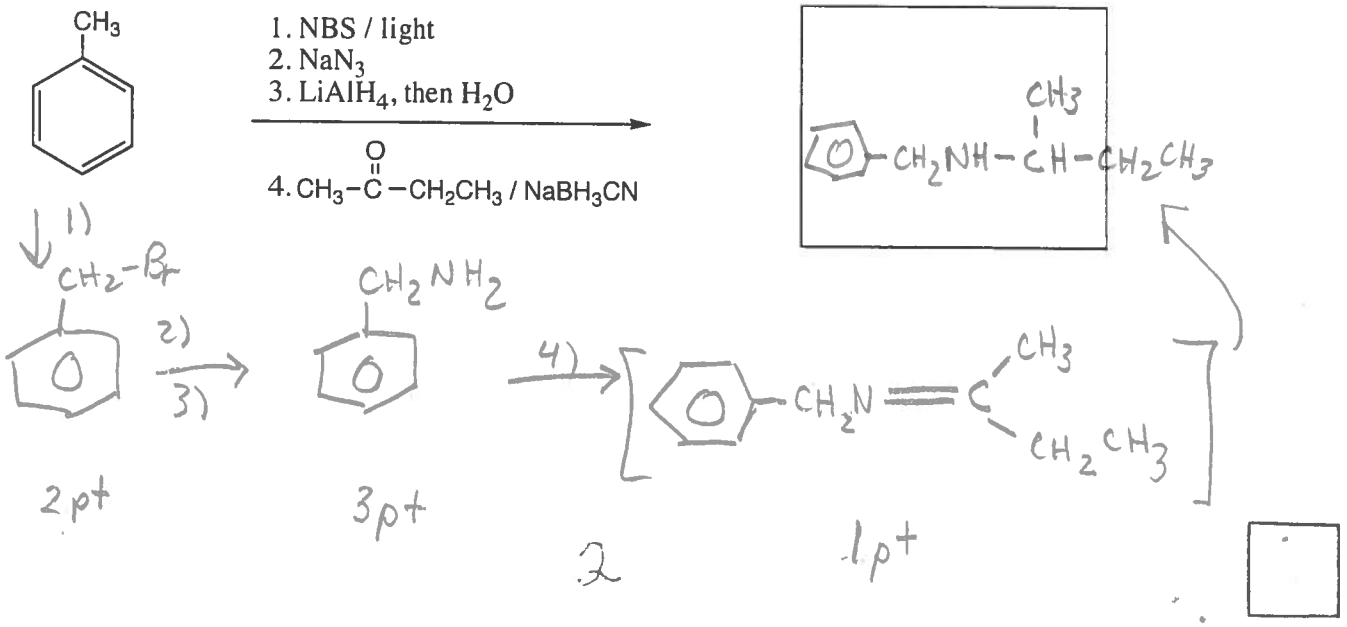
4pts 4pts

2.



2pt 1pt 1pt 2pt

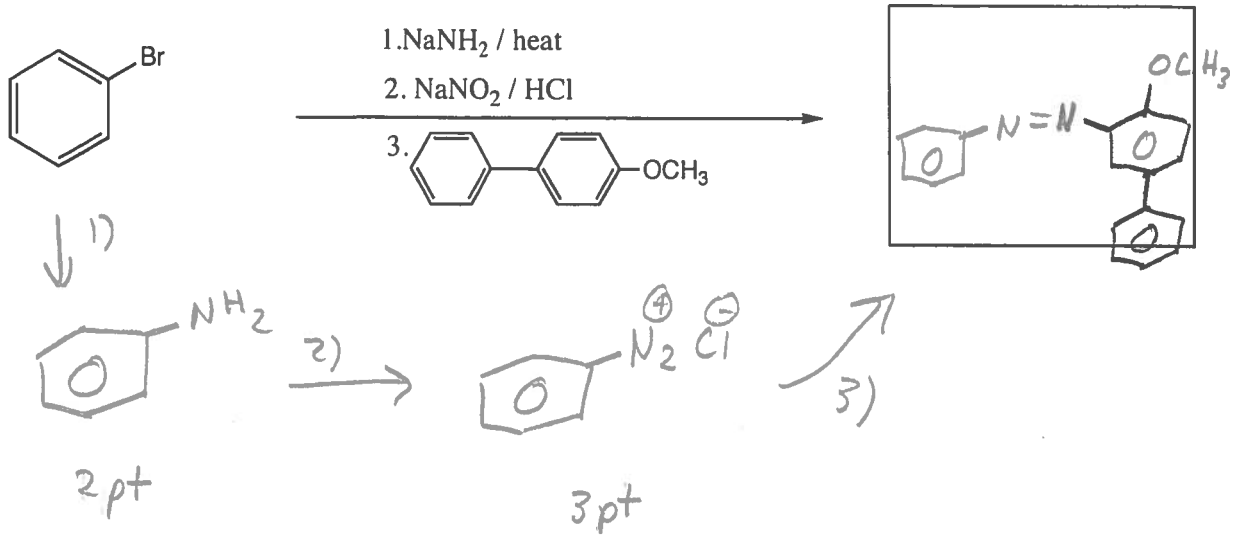
3.



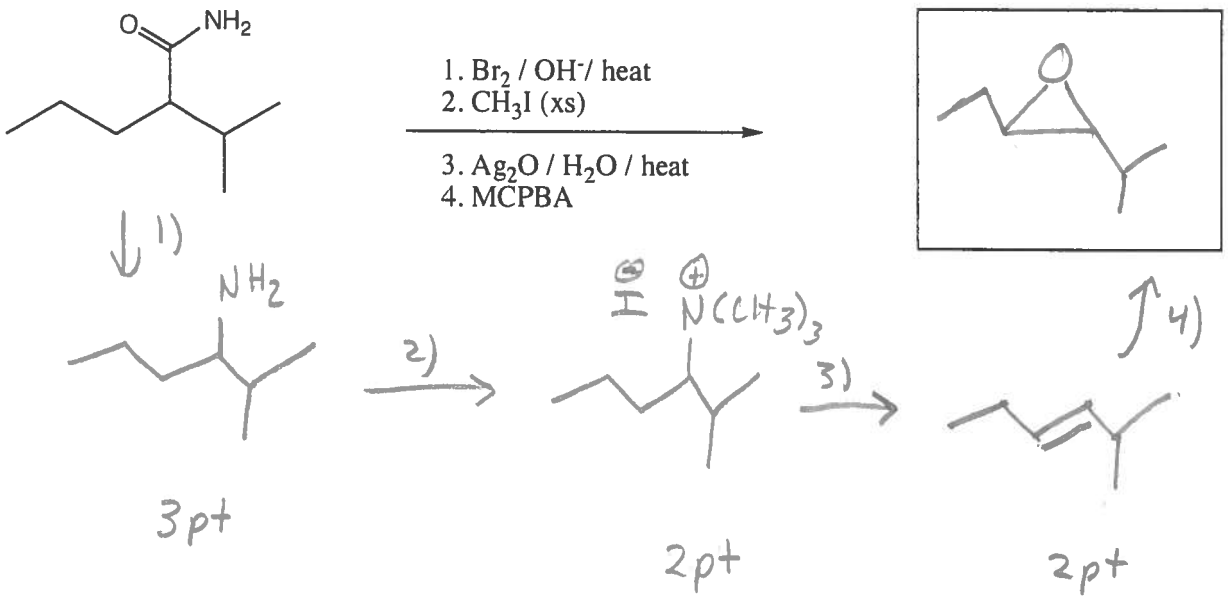
2pt 3pt 1pt

2

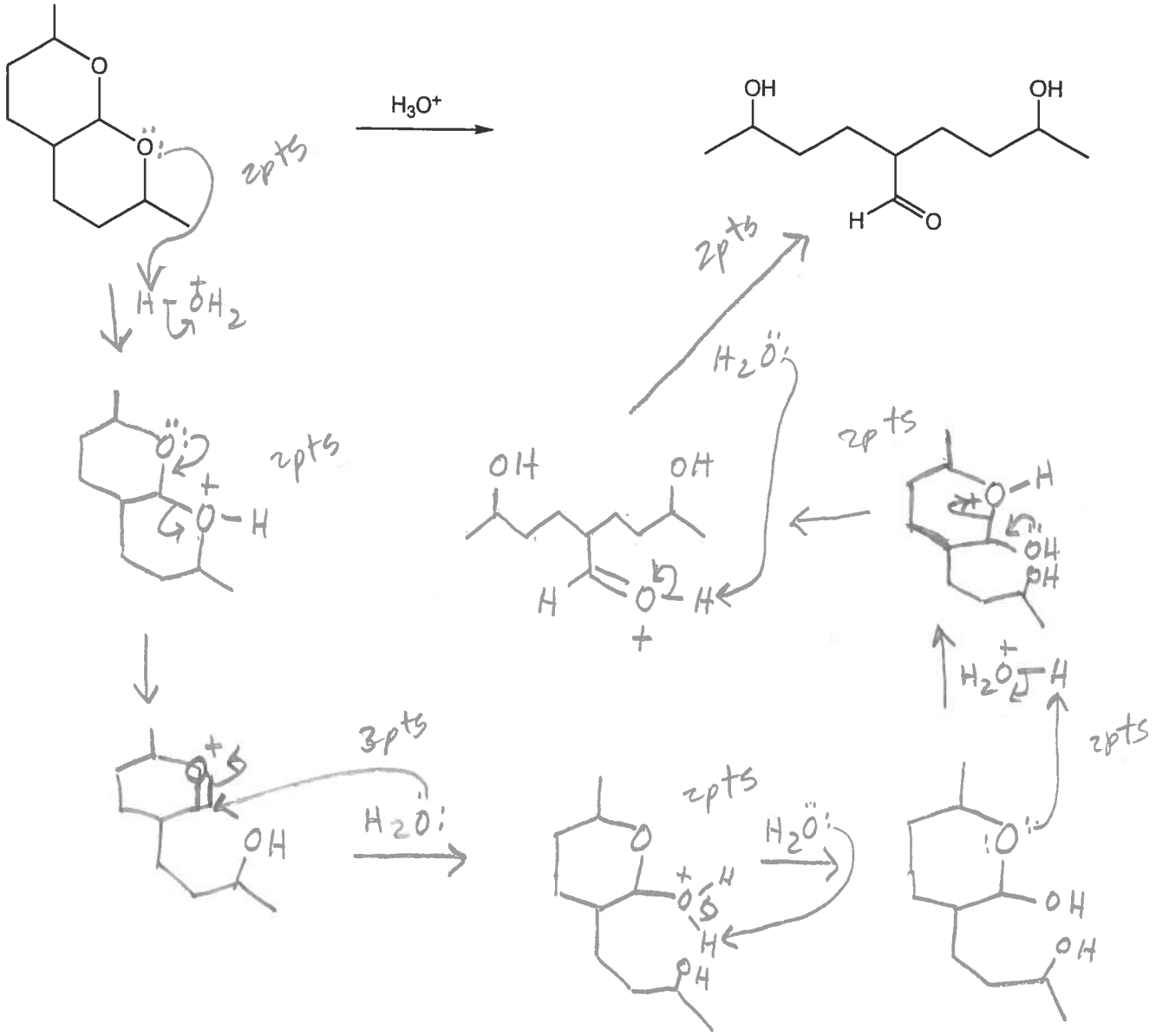
4.


Br
1.NaNH2 / heat
2. NaNO2 / HCl
3.
OCH3
1)
NH2
2)
N2 Cl
3)
OCH3
N=N
2pt
3pt

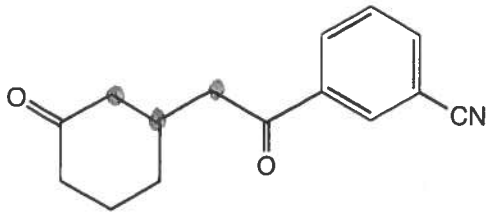
5.


O
NH2
1. Br2 / OH- / heat
2. CH3I (xs)
3. Ag2O / H2O / heat
4. MCPBA
1)
NH2
2)
H
N(CH3)3
3)
4)
3pt
2pt
2pt

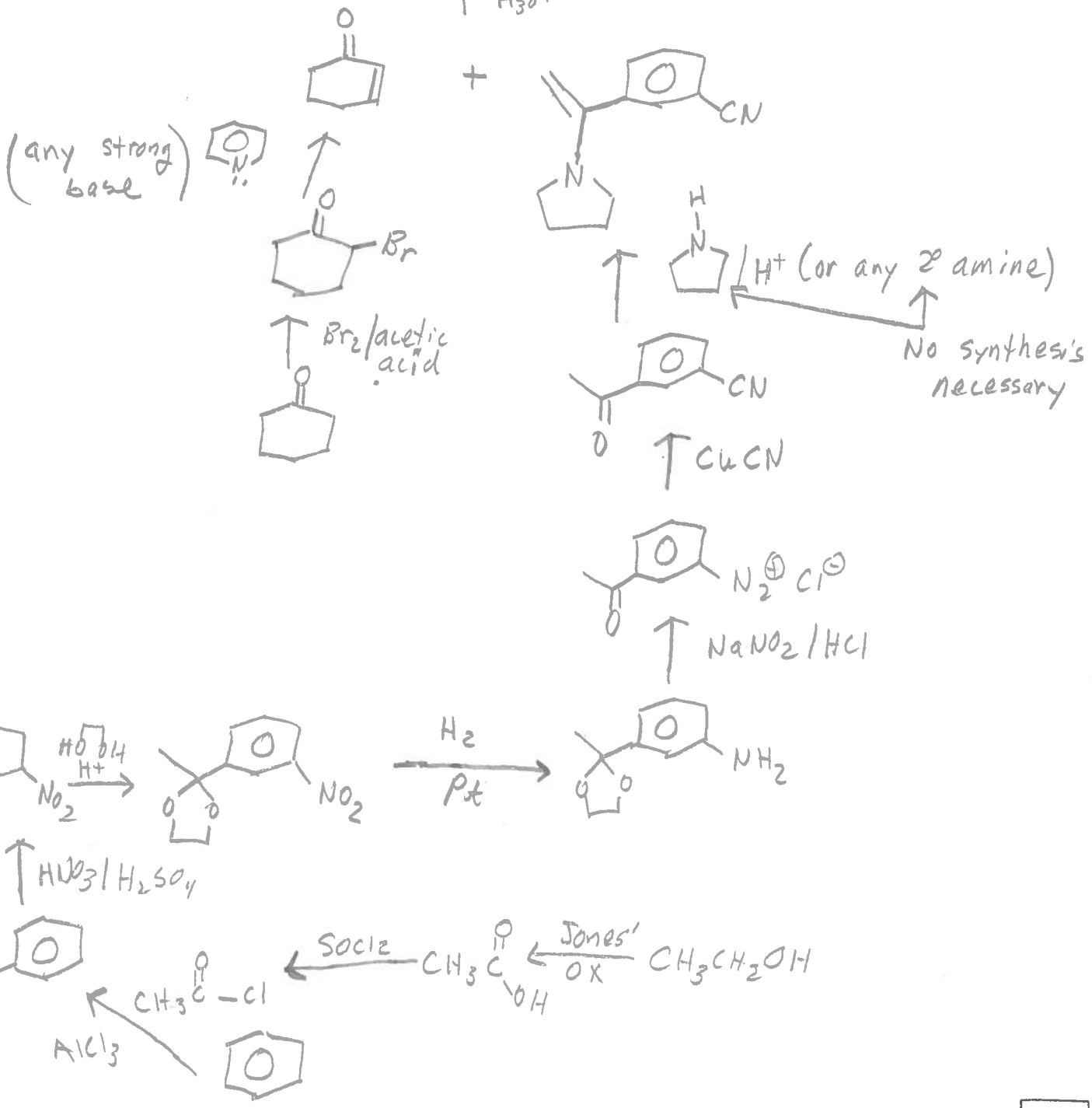
C. Mechanism: (15 points)
Provide a clear mechanism to explain the formation of the product. Use curved arrows to indicate "electron flow". Remember to show only one step at a time. **Show all intermediates and all formal charges. When more than one resonance contributor may be drawn, be sure to draw the most stable contributor.**



D. Synthesis: 15 Points
Synthesize the molecule below using any of the following reagents: **cyclohexanone**, benzene, any alcohols of **two carbons** or less, any inorganic reagents, any oxidizing or reducing agents, and any peroxyacids.

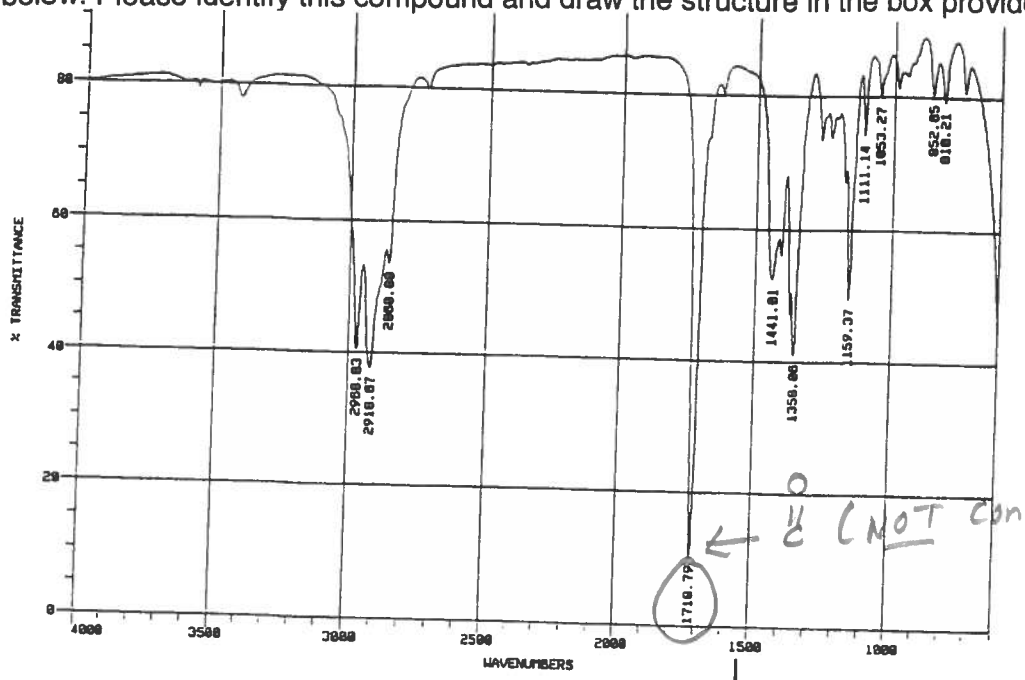


↑ then H_3O^+

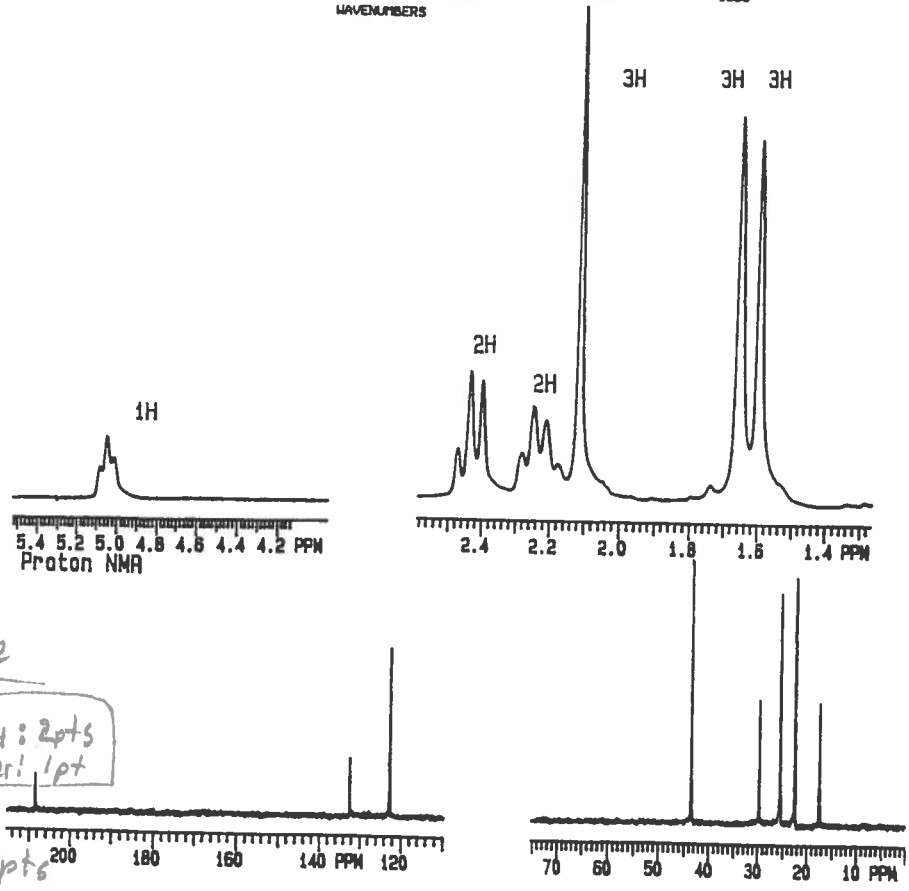


E. Spectroscopy: 15 Points

A compound with the formula $C_8H_{14}O$ 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.



C=O (NOT conjugated)



No peak → 9-10 δ so can't be aldehyde

vinyl CH adj. to 2H: 2pts
+ to other: 1pt
none eq.

CH_2 adj to mult H: 2pts

Ketone: 2pts

other C=O: 1pt

C=C: 2pts

$CH_3-\overset{O}{\overset{\|}{C}}$: 2pts

CH_3 adj to NO H: 1pt (2pts max)

CH_2 adj. to only 2H's

$CH_3-\overset{O}{\overset{\|}{C}}CH_2CH_2\overset{H}{\overset{|}{C}}=C(CH_3)(CH_3)$

correct answer

6