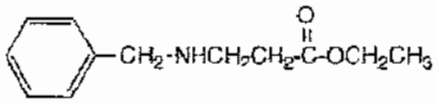
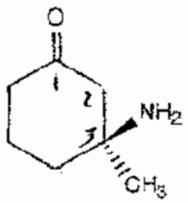
A. Nomenclature: (4 points each. total = 12 points)

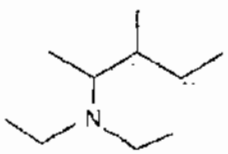
Please provide an acceptable name for each of the following compounds.

1. 

ethyl - 3 - benzylameno propanoate

2. 

(3S) 3 - ameno - 3 - methyl cyclohexanone

3. 

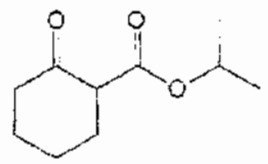
N, N - diethyl - 3 - methyl - 2 - propanamine

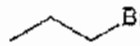
N, N - must be used when amine is used as a parent chain.

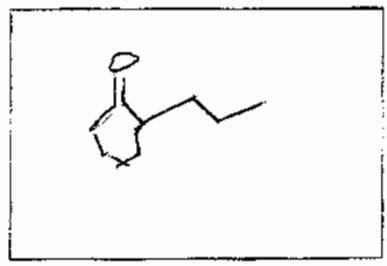
B. Reactions: (40 points, 8 pts. each)

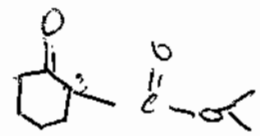
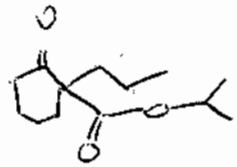
Please provide the reagents, or major organic product(s) in the answer boxes. **Partial credit** is awarded only when intermediate products are shown below the reaction.

1.

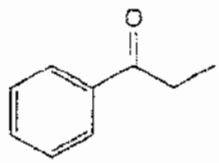


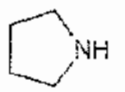
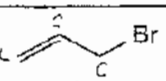
1) NaOEt/EtOH
2) 
3) H_3O^+/180°C

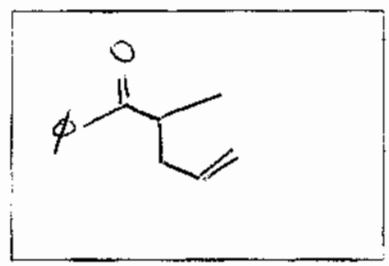


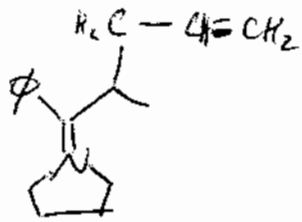
1. →  2. → 

2.

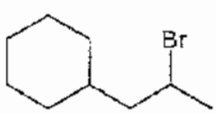


1)  , H^+
2) 
3) H_3O^+

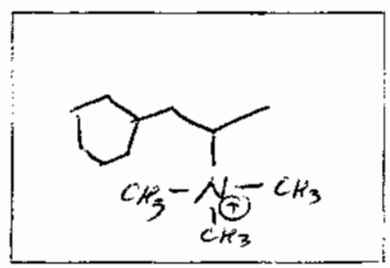


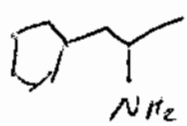
1. →  2. → 

3.



1) NH_3 (large excess)
2) CH_3I (excess)

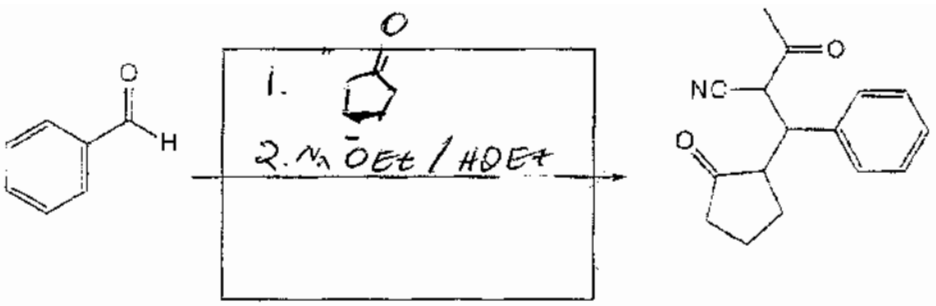


1. → 

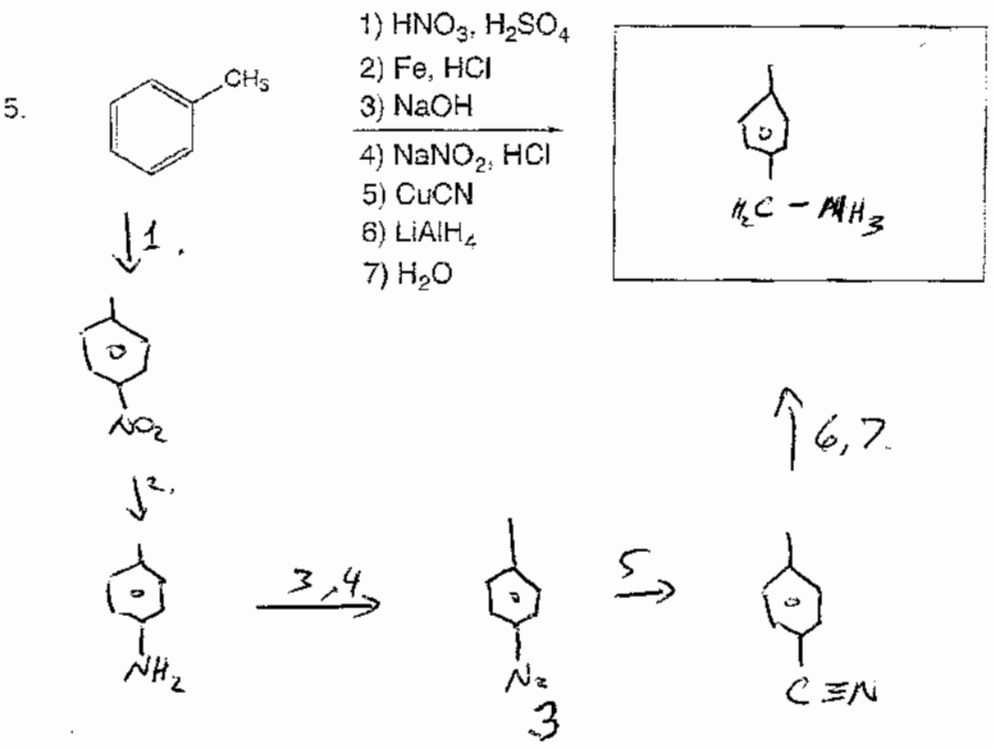
2

This rxn would be generally followed by Hofmann elimination.

4.


O
H
1.
2. Na OEt / HOEt
O
NC
O

5.

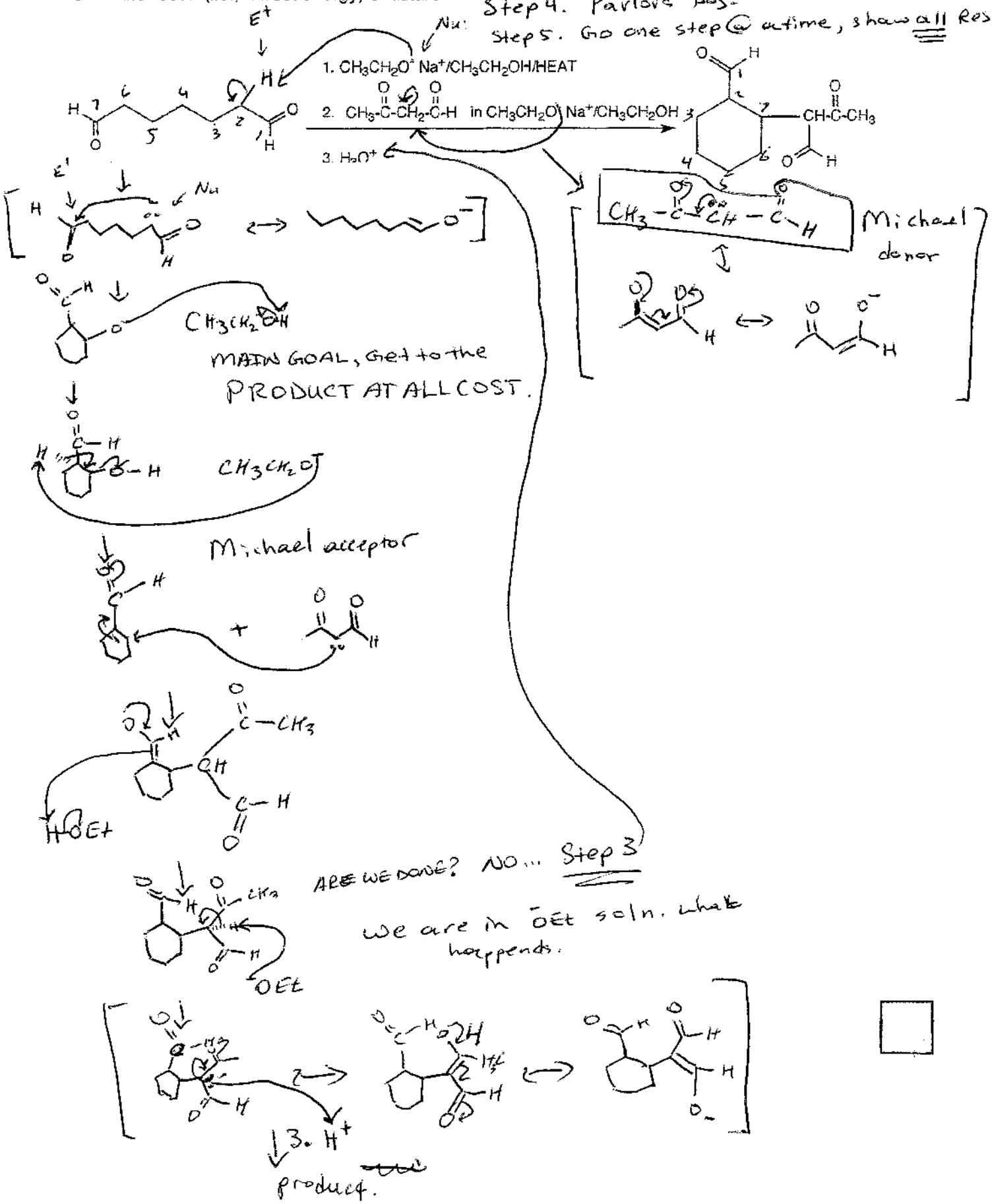

CH3
1) HNO3, H2SO4
2) Fe, HCl
3) NaOH
4) NaNO2, HCl
5) CuCN
6) LiAlH4
7) H2O
H2C – NH3
1.
NO2
2.
NH2
3, 4
N2
3
5
6, 7
C ≡ N

Mech: Step 1. try to make out the puzzle.
Step 2. number your carbons in reactants + prods
Step 3. what is Nu:⁻ & E⁺

C. Mechanism: 17 points

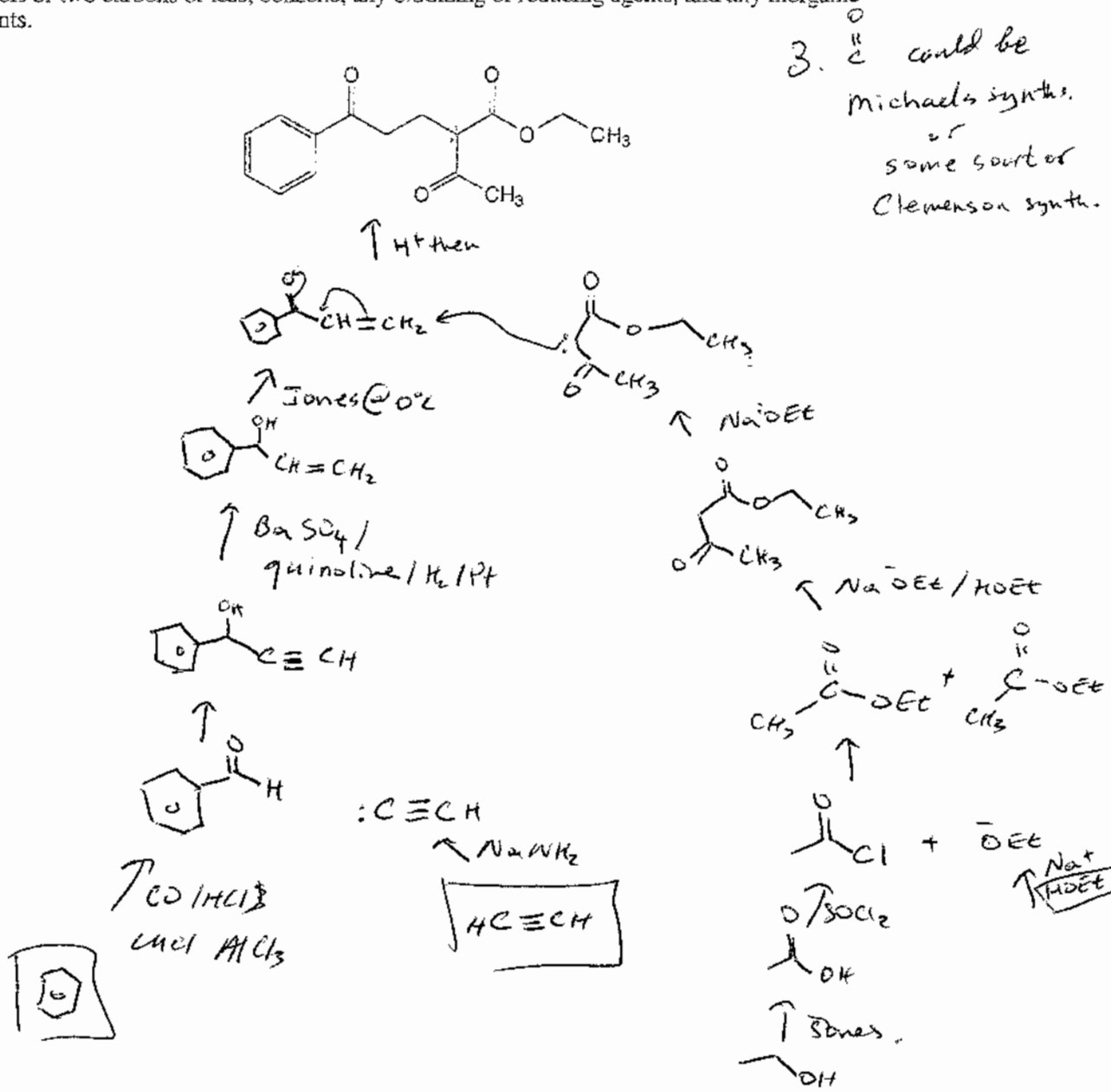
Provide a reasonable mechanism for the reaction below. Use curved arrows to indicate "electron flow." Show all intermediates and formal charges. If there is more than one resonance contributor, you must show the "best" (i.e., lowest energy) structure.

Step 4. Parlor's Dos-
Step 5. Go one step @ a time, show all Res.



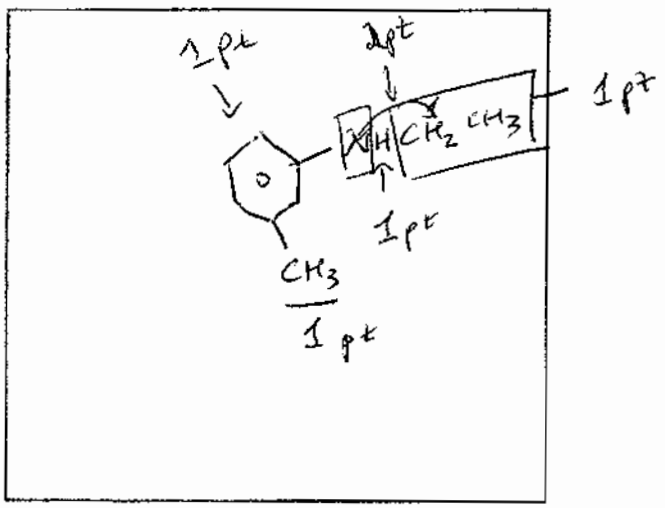
D. Synthesis (17 points)

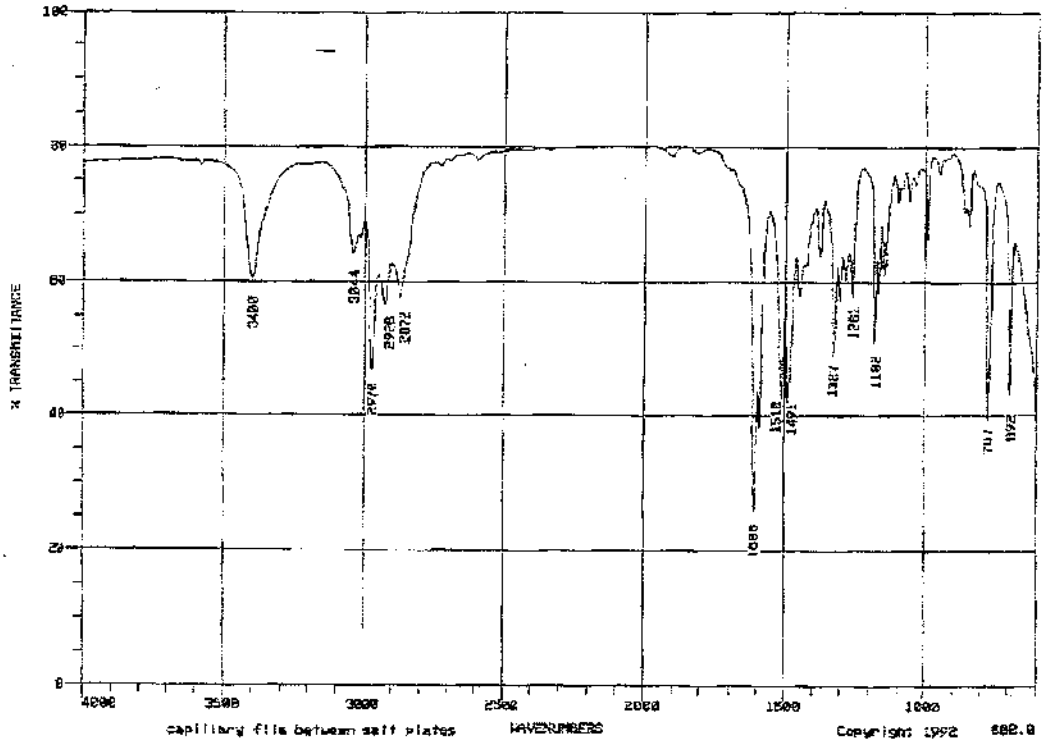
Synthesize the compound below using any of the following reagents: alkanes, alkenes, alkynes or alcohols of two carbons or less, benzene, any oxidizing or reducing agents, and any inorganic reagents.



E. Spectroscopy: 10 Points

A compound with the formula $C_9H_{13}N$ exhibits the IR, ^1H NMR, and proton-decoupled ^{13}C NMR shown on the following page. Please identify this compound and draw the structure in the box provided below.




% TRANSMITTANCE
3400
3044
2970
2928
2872
1600
1518
1491
1387
1261
1182
767
692
capillary film between salt plates
WAVENUMBERS
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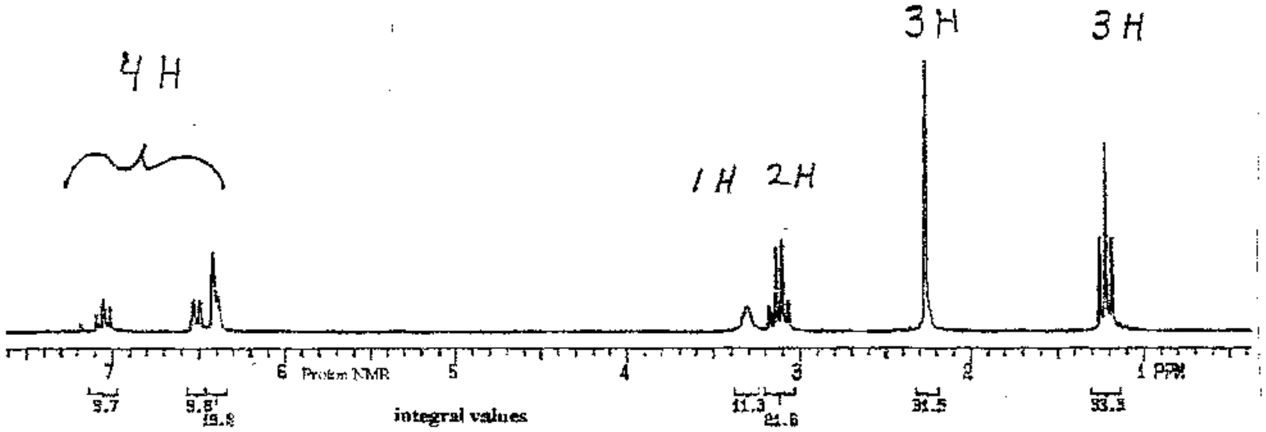
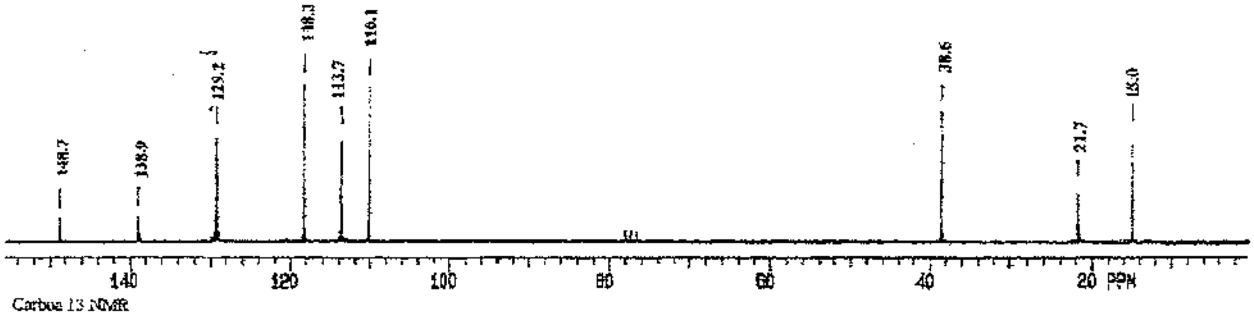

4 H
1 H 2 H
3 H
3 H
Proton NMR
integral values
9.7
9.8
19.8
11.3
21.6
31.5
33.5
PPM


148.7
138.9
129.2
118.3
113.7
110.1
38.6
21.7
15.0
PPM
Carbon 13 NMR