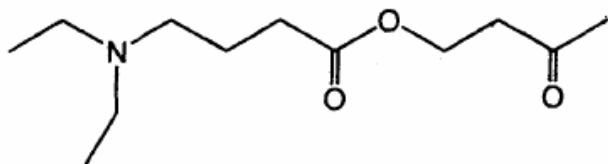


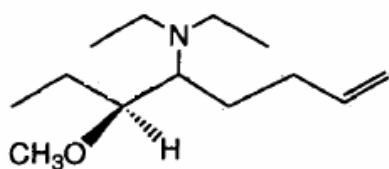
1. Nomenclature: (15 points)

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

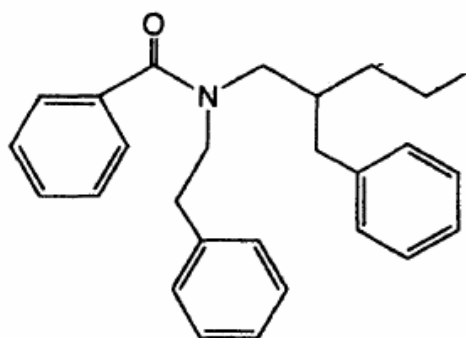
1.



2.

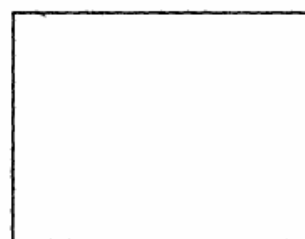
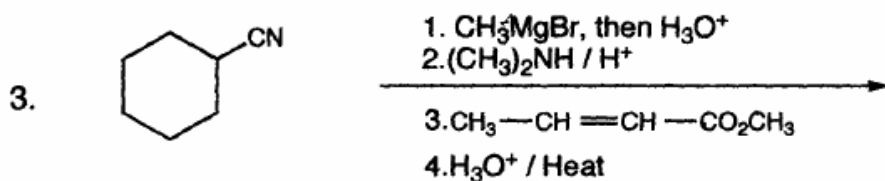
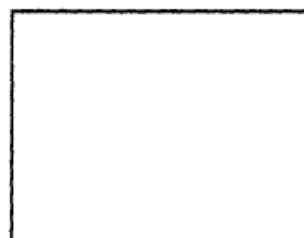
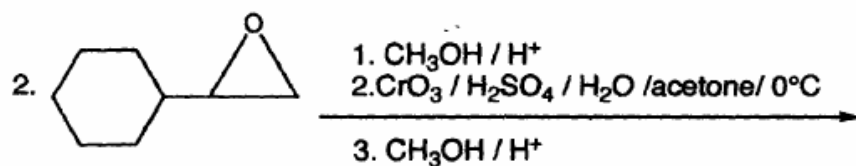
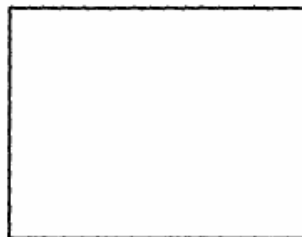
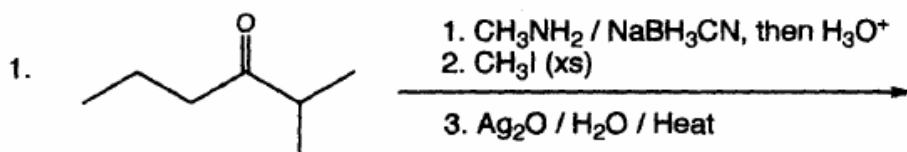


3.

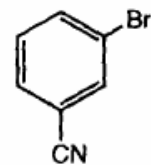
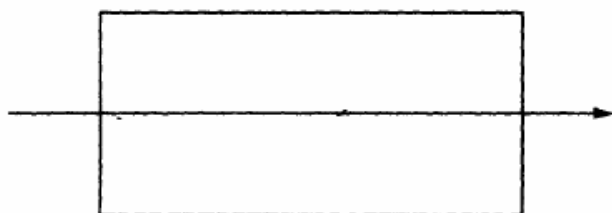
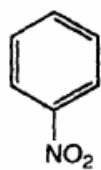


B. Reactions: Total = 40 points, 8 points each

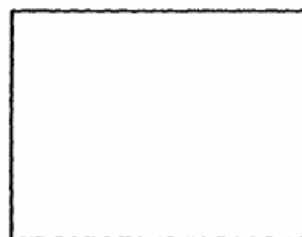
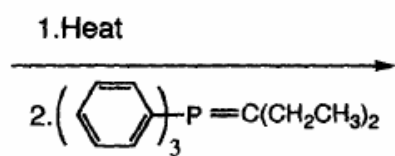
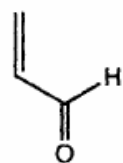
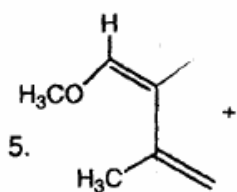
Please provide the reagents or major product in the answer box. Be sure your drawing indicates **stereochemistry** if applicable. Partial credit is awarded only when intermediate products in a multi-step reaction are shown below the reaction.



4.

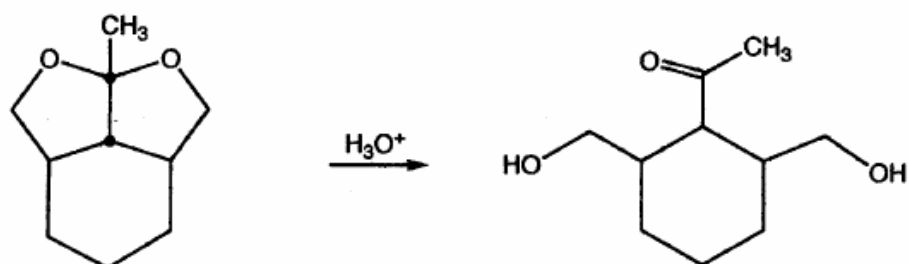


5.



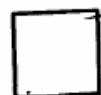
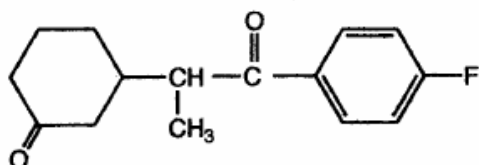
C. Mechanism: (15 points)

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.



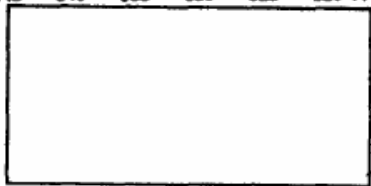
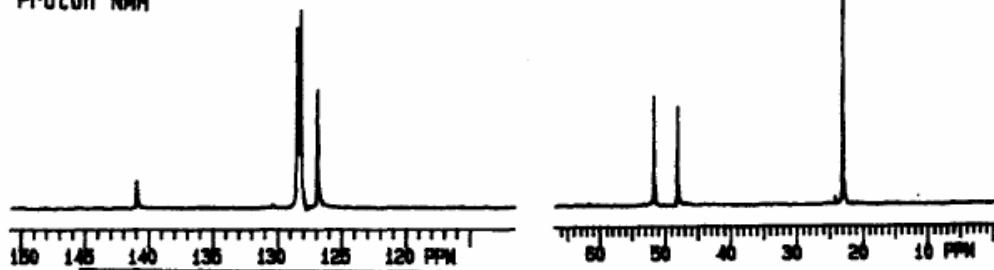
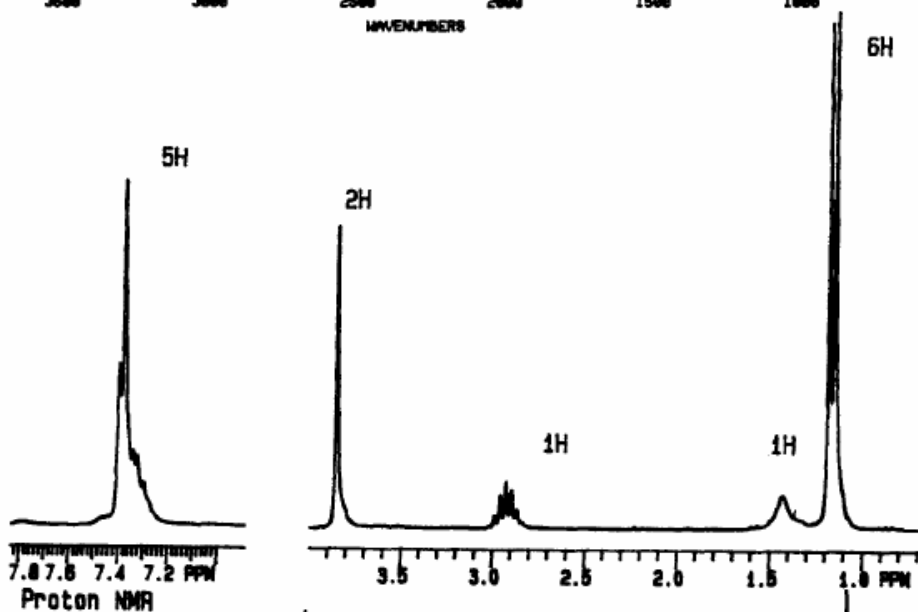
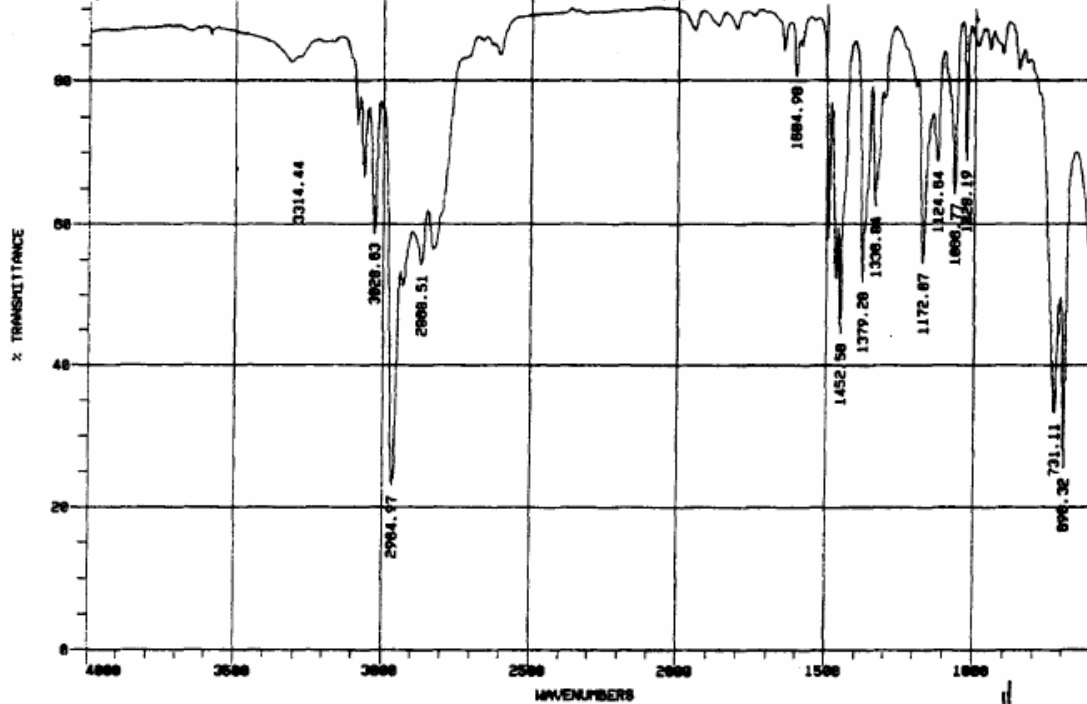
D. Synthesis: 15 Points

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



E. Spectroscopy: 15 Points

A compound with the formula $C_{10}H_{15}N$ 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.



6