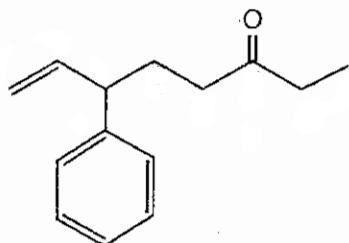


EXAM 2, Sp '04

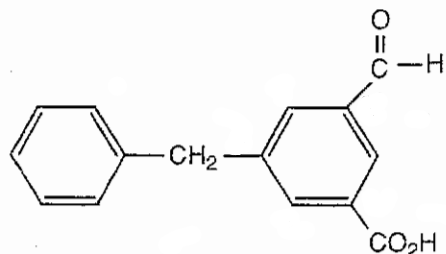
A. Nomenclature: (12 points, 4 points each)

Please provide an acceptable name for each of the following compounds. Be sure to note stereochemistry where appropriate.

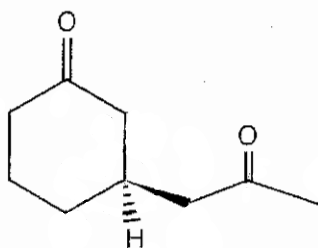
1.



2.

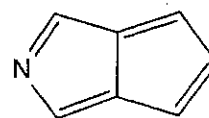
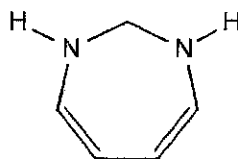
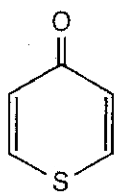
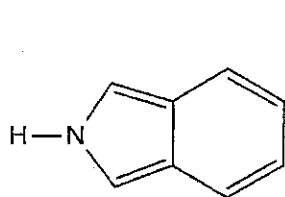


3.

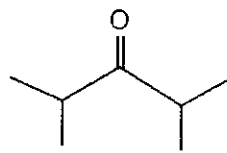
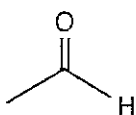
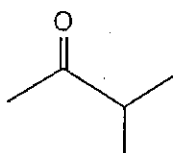


B. Facts: Total = 20 points

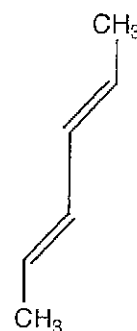
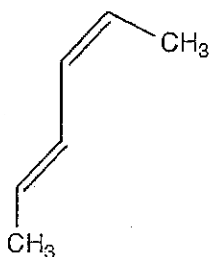
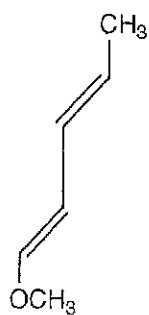
1. Classify the molecules below as aromatic (A), antiaromatic (AA), or nonaromatic (NA). You may assume all are planar. (8 pts.)



2. Place the following compounds in order of increasing reactivity by nucleophilic addition. (1=least reactive, 3=most reactive) (6 points)



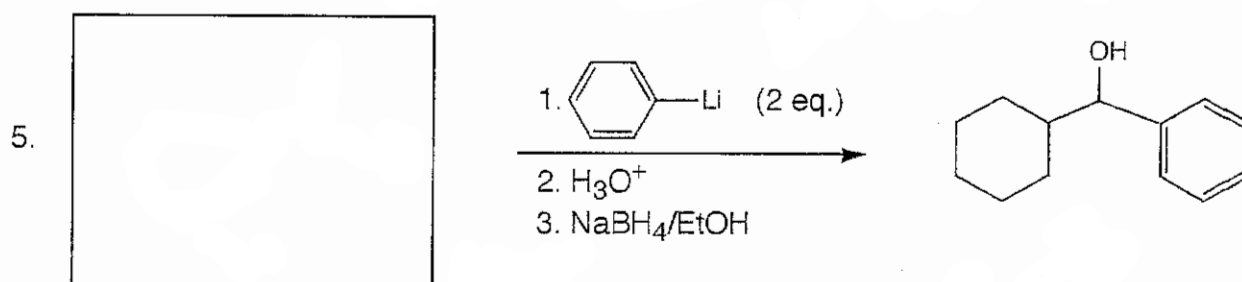
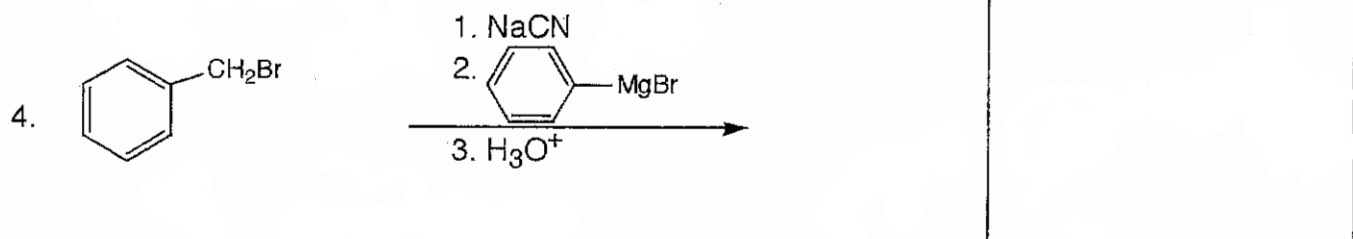
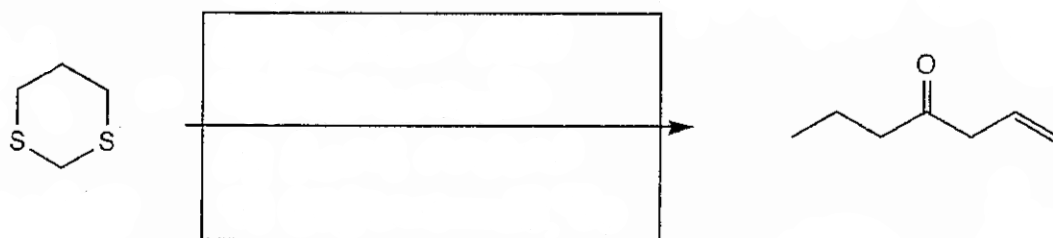
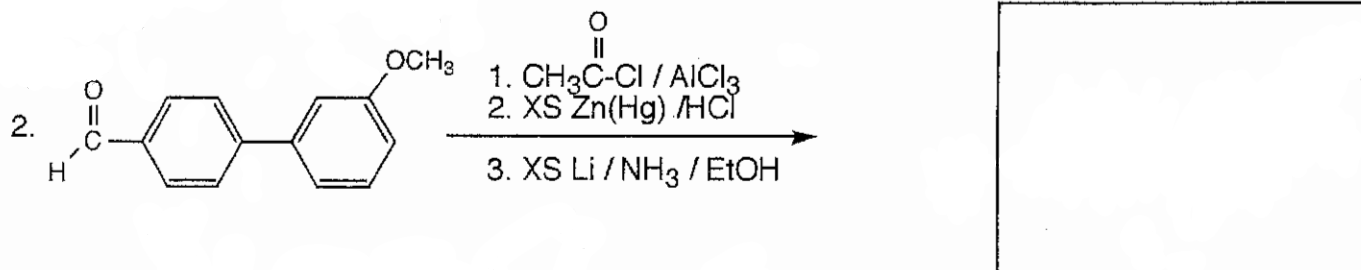
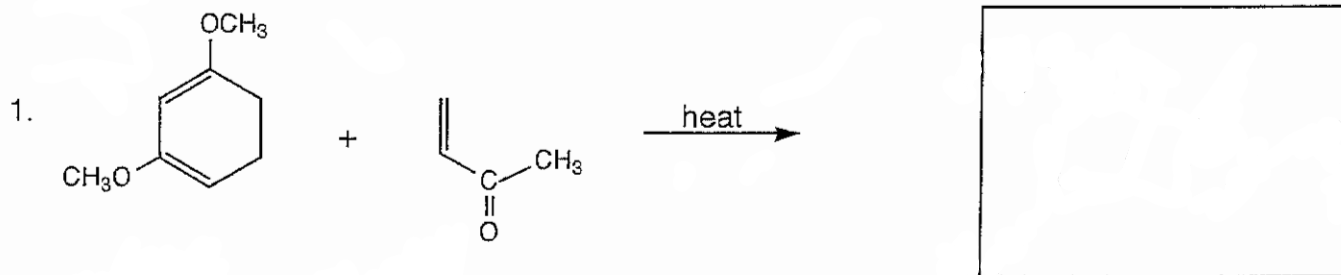
3. Place the following compounds in order of increasing reactivity in a Diels-Alder reaction. (1=least reactive, 3=most reactive) (6 points)



2

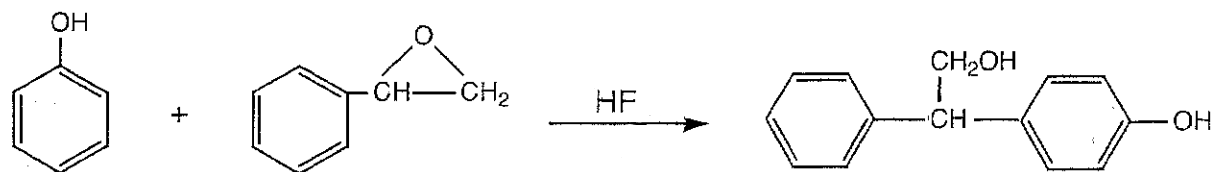
C. Reactions: Total = 25 points

Please provide the starting material, reagents, or major product in the answer box. Be sure your drawing indicates stereochemistry if applicable. Partial credit is awarded only when intermediate products are shown below the reaction.



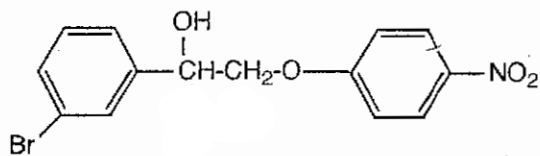
D. Mechanism: 14 points

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



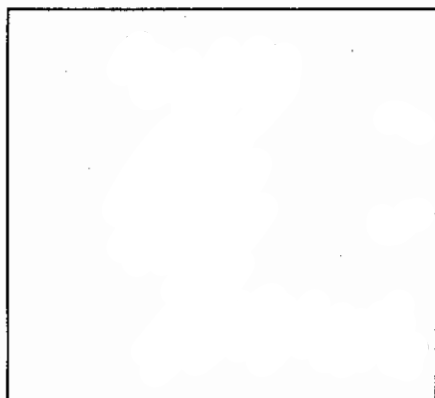
E. Synthesis: (14 points)

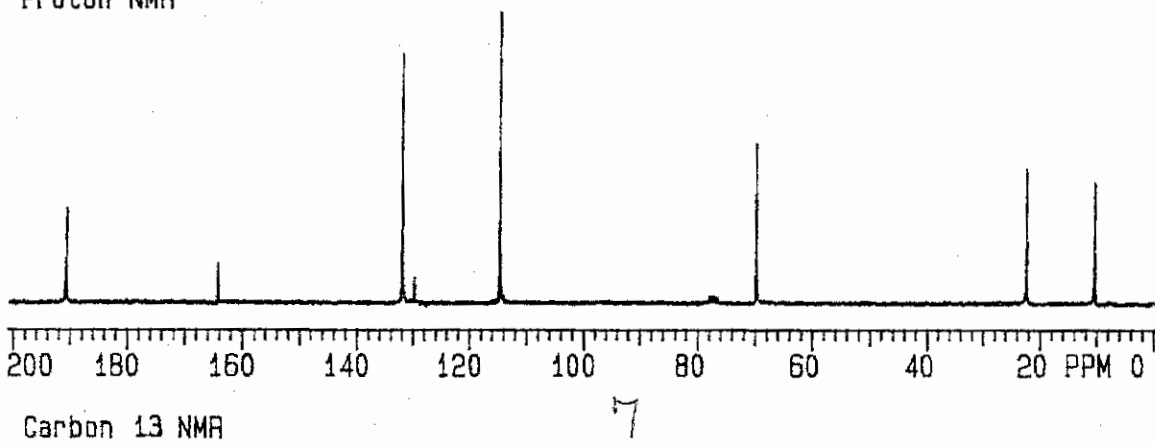
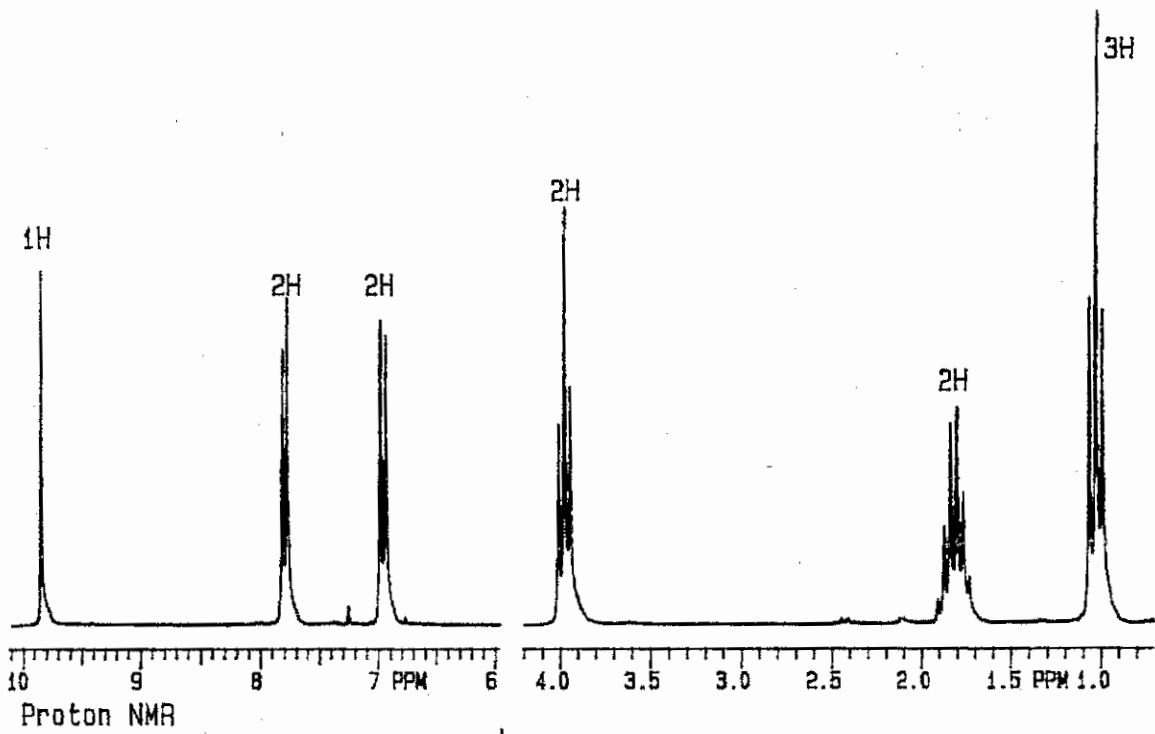
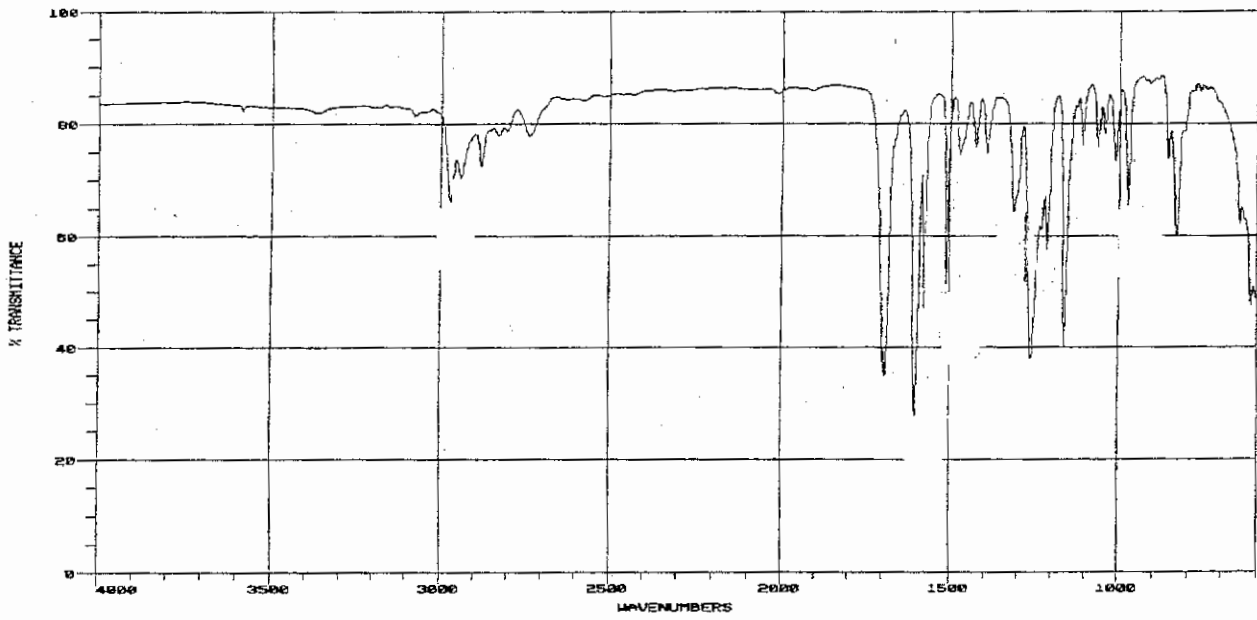
Synthesize the compound below using any of the following reagents: benzene, alkanes, alkenes, alkynes or alcohols of **two carbons or less**, any oxidizing or reducing agents, any peroxyacids, and any inorganic reagents.



F. Spectroscopy: 15 Points

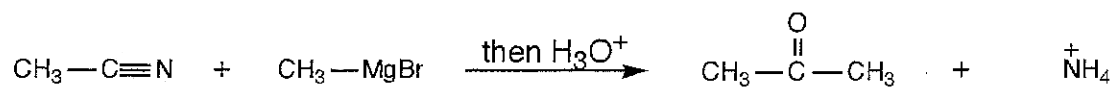
A compound with the formula $C_{10}H_{12}O_2$ exhibits the IR, 1H NMR, and proton-decoupled ^{13}C NMR shown on the following page. Please identify this compound and draw the structure in the box provided below.





Bonus Question (10 points)

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



8

