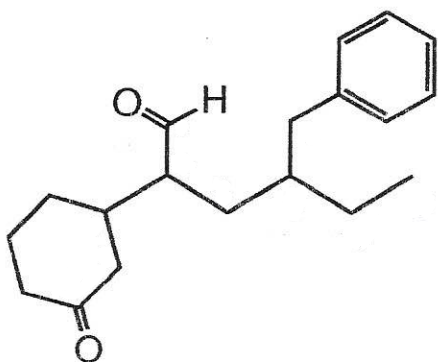


Exam 2, Sp 24

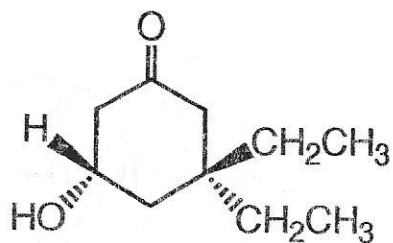
A. Nomenclature: (12 points)

Give an acceptable IUPAC name for each of the compounds in 1 and 2. Draw a structure for the compound in 3. Be sure to indicate the **stereochemistry** where appropriate.

1.



2.



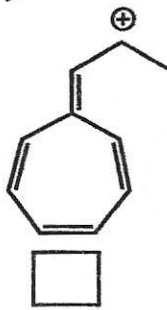
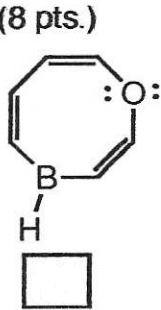
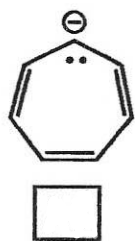
3. 2-bromo-6-phenylaniline



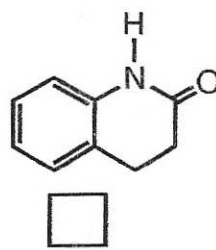
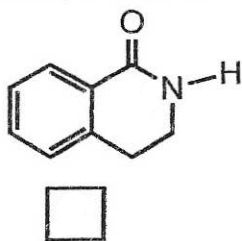
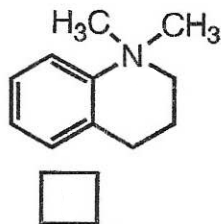
B. Facts: 20 points

1. Label the molecules below as aromatic(**AR**), antiaromatic(**AA**), or nonaromatic(**NA**).

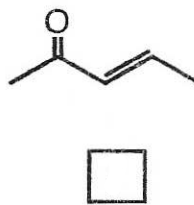
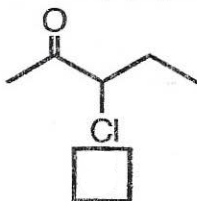
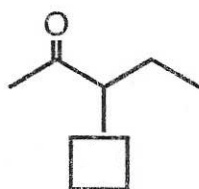
Assume all are planar. (8 pts.)



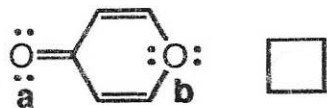
2. Rank the following substituted benzene compounds in order of increasing rate in the reaction with bromine and FeBr_3 . (1=slowest rate, 3=fastest rate) (3 pts.)



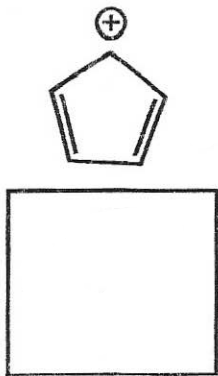
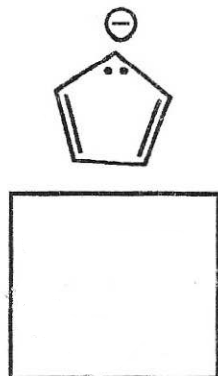
3. Rank the compounds in order of increasing amount of hydrate produced when reacted with H_3O^+ . (1= smallest amount, 3=largest amount) (3 pts.)



4. Which oxygen atom is more basic, a or b? (2 pts.)

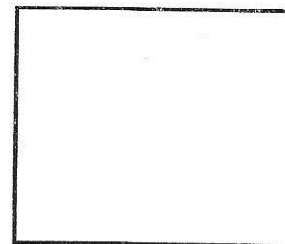
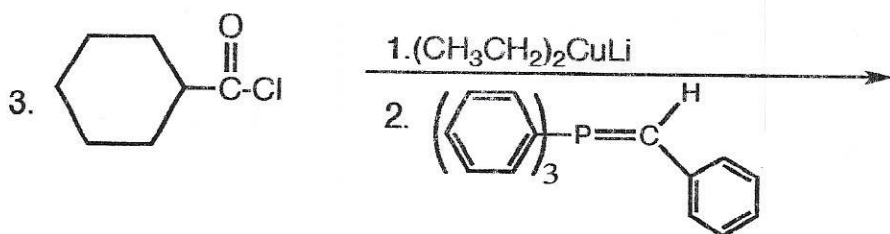
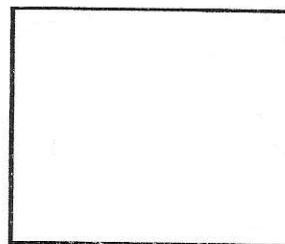
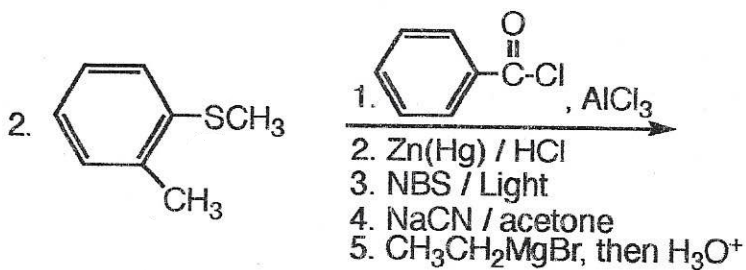
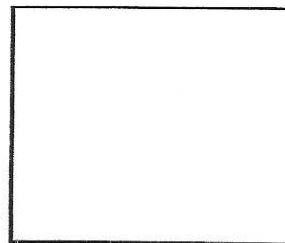
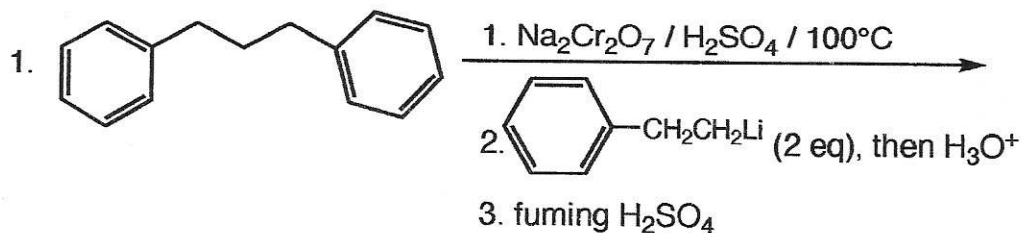


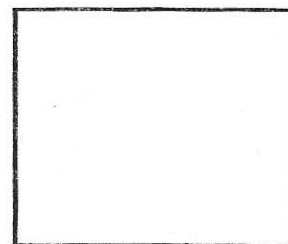
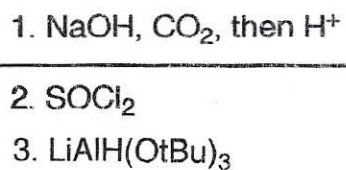
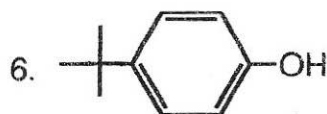
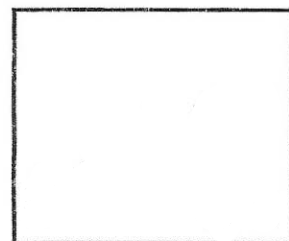
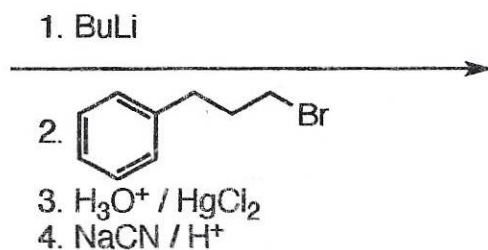
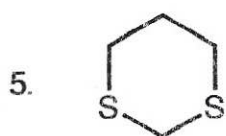
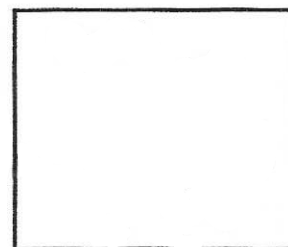
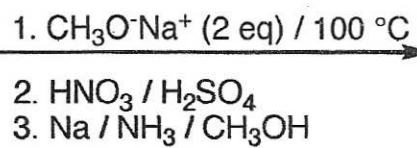
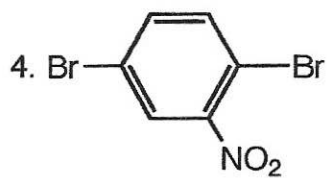
5. In the box below each ion, draw its energy level diagram using the polygon rule. Without using the Huckel equation, explain why the anion is aromatic while the cation is antiaromatic. (4 pts.)



C. Reactions: Total = 36 points, 6 points each

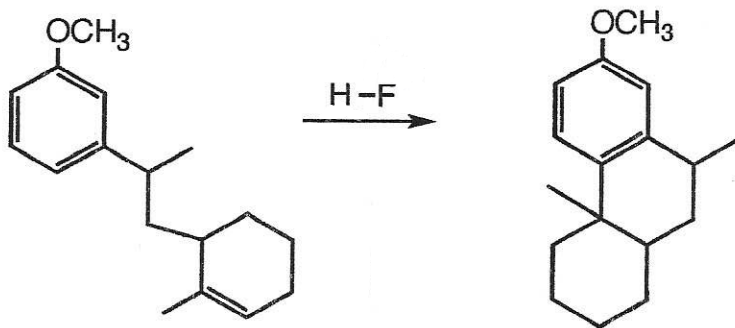
Please provide the the major product in the answer box. Indicate **stereochemistry** if applicable. **Full credit is awarded only when the product of each step in a multi-step reaction is shown below the reaction.**





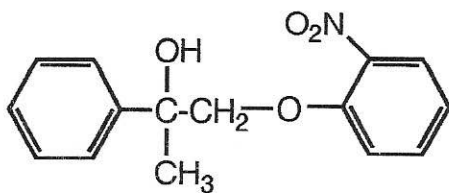
D. Mechanism: (11 points)

Provide a clear mechanism to explain the formation of the product. Use curved arrows to indicate "electron flow". **Show all intermediates and all formal charges.** When more than one resonance contributor may be drawn, be sure to draw the most stable contributor.



E. Synthesis: 11 Points

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



F. Spectroscopy: 10 Points

A compound with the formula C_9H_8O exhibits the IR, 1H NMR and proton decoupled ^{13}C NMR spectra shown below. Identify this compound and draw the structure in the box provided below.
 NOTE: The multiplets at 7.4 - 7.6 ppm represent overlapping signals equivalent to 6 hydrogens. One signal is a 1 H doublet.

