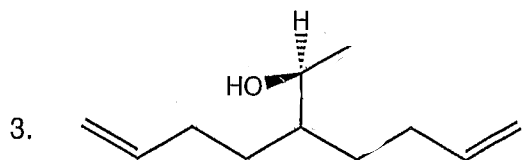
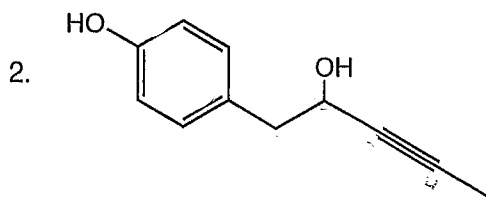
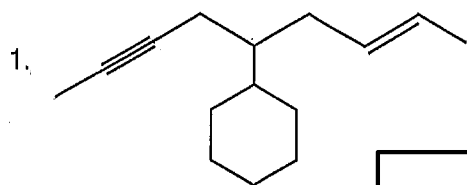


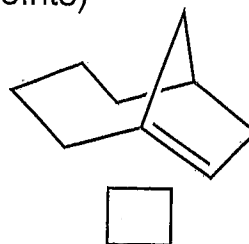
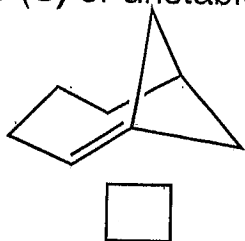
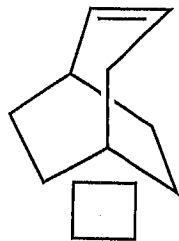
A. Nomenclature: (15 points)

Give an acceptable IUPAC name for each of the following compounds. Be sure to include the **stereochemistry** when indicated and appropriate.

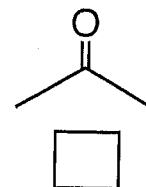
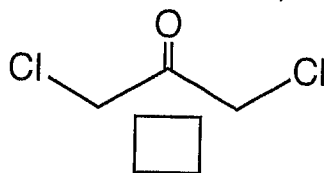
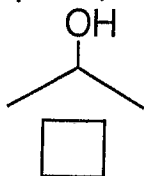


B. FACTS: Total = 24 points

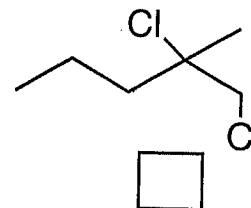
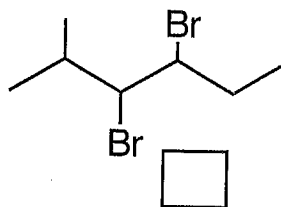
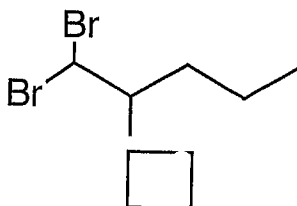
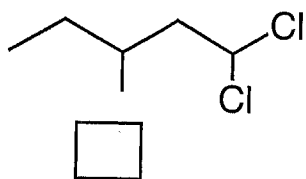
1. Label the alkenes as stable (**S**) or unstable (**U**). (6 points)



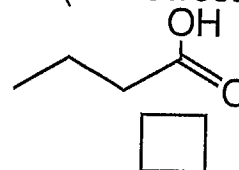
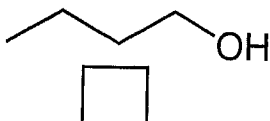
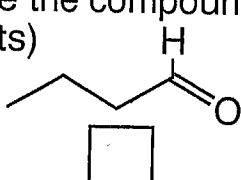
2. Rank the electrophiles in order of increasing electrophilic character. (1=least electrophilic, 3=most electrophilic) (3 points)



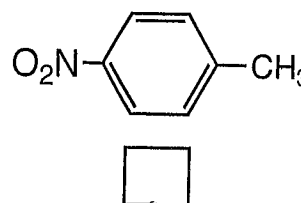
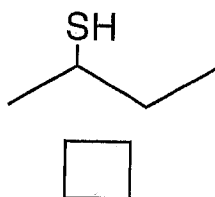
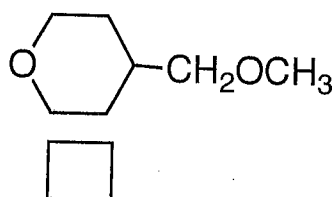
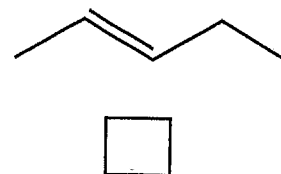
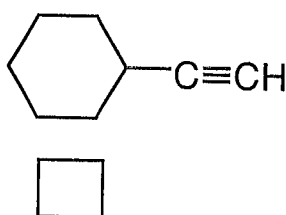
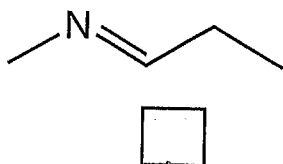
3. Place a "Y" in the box below any compound that will produce a terminal alkyne when treated with NaNH_2 at 150°C . Place an "N" in the box below any that will not. (4 points)



4. Place the compounds in order of increasing oxidation state. (1 = lowest, 3=highest) (6 points)

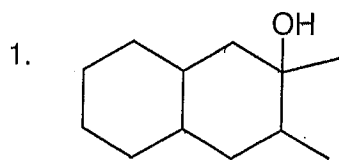


5. Place a "Y" in the box below any compound that will react with a Grignard reagent. Place an "N" in the box below any that will not. (6 points)



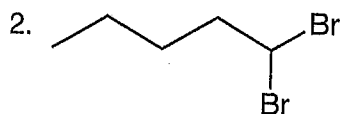
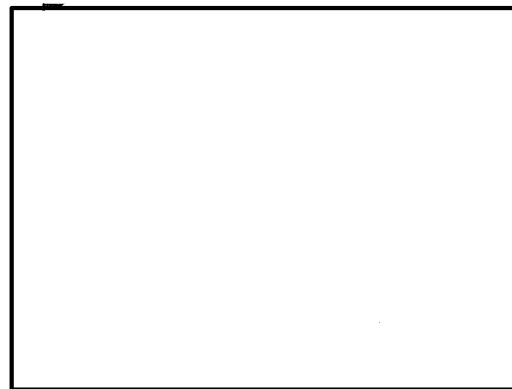
C. Reactions: Total = 36 points, 6 points each

Please provide 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.**



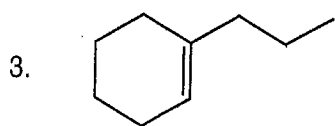
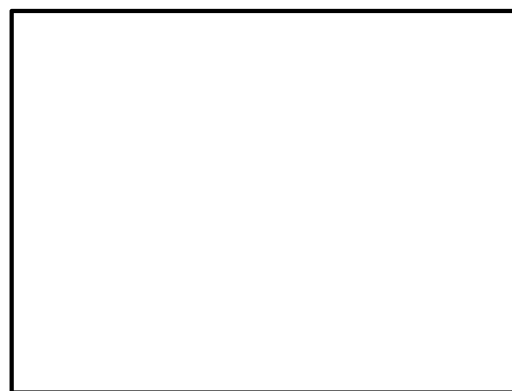
1. H_2SO_4 / Heat

2. O_3
3. $(\text{CH}_3)_2\text{S}$
4. $\text{CH}_3\text{C}\equiv\text{C}:^- \text{Na}^+$, then H_3O^+



1. KOH / 200°C

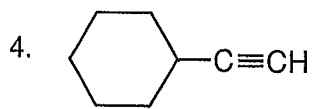
2. Li / NH_3
3. MCBPA



1. BH_3 / THF
2. H_2O_2 / OH^-

3. PBr_3
4. $\text{NaCN} / \text{CH}_3\text{CN}$



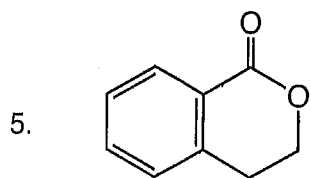
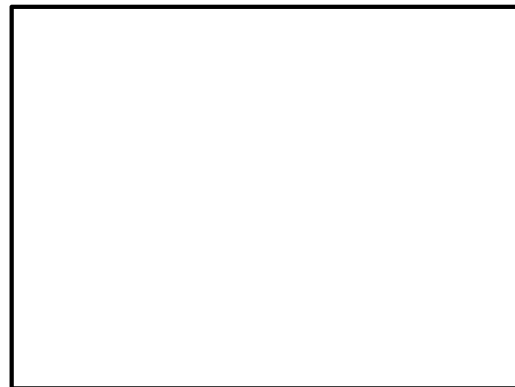


1. Si_2BH

2. $\text{H}_2\text{O}_2 / \text{OH}^-$

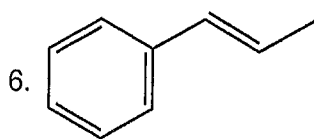
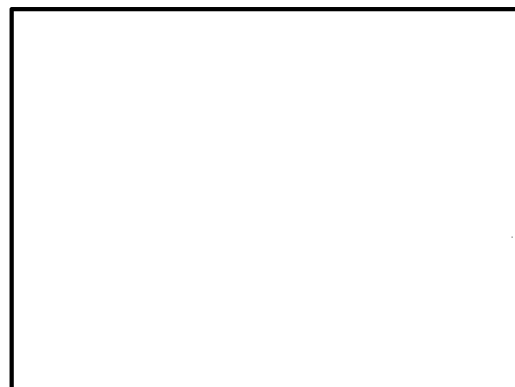
3. $\text{CH}_3\text{CH}_2\text{Li}$, then H_3O^+

4. $\text{Na}_2\text{Cr}_2\text{O}_7 / \text{H}_2\text{SO}_4 / \text{H}_2\text{O}$



1. LiAlH_4 , then H_3O^+

2. NaOCl



1. HBr

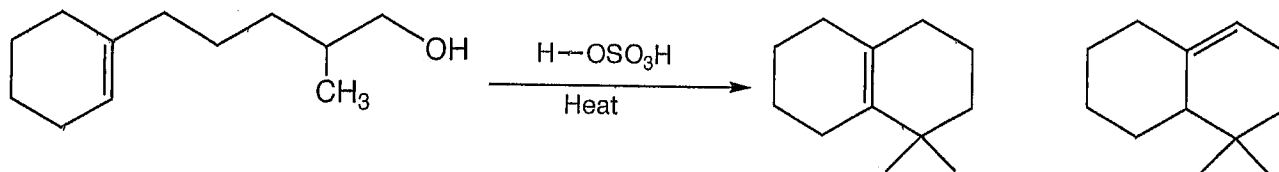
2. $\text{Mg} / \text{Et}_2\text{O}$

3. $\text{CH}_3\text{CH}_2\text{-C}(=\text{O})\text{-Cl}$, then H_3O^+



D. Mechanisms: (12 points)

The reaction below produces a mixture of products. Provide a clear mechanism to explain the formation of the products shown. Use curved arrows to indicate "electron flow". Remember to show only one step at a time. Show all intermediates and all formal charges. Do not show transition states.



E. Synthesis: (12 points)

Synthesize the molecule below from **alcohols** or **alkenes** of **three** carbons or less, any oxidizing or reducing agents, and any other inorganic reagents. (Please do not include mechanisms.)

