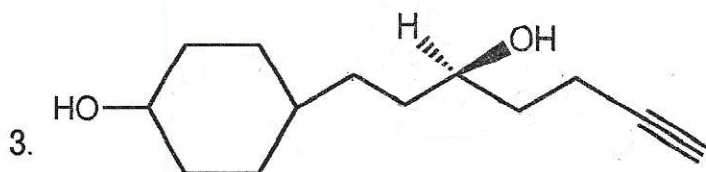
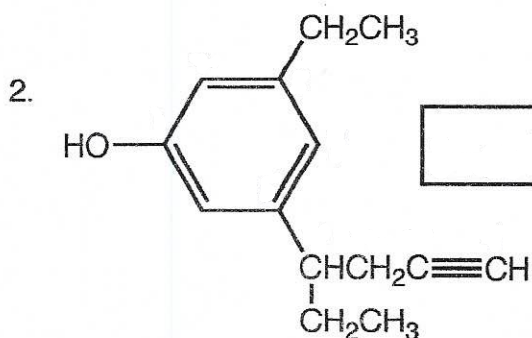
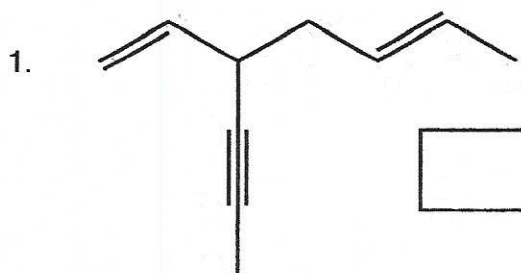


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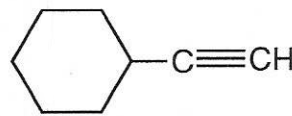
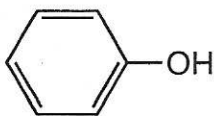
A. Nomenclature: (15 points)

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

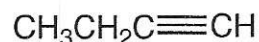
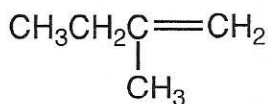


B. FACTS: Total = 24 points

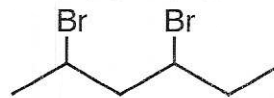
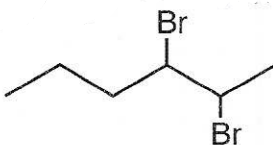
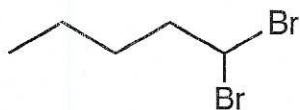
1. Place a "Y" in the box below any compound that will be efficiently deprotonated (equilibrium lies to the right) by hydroxide. Place "N" below any that will not. (6 points)



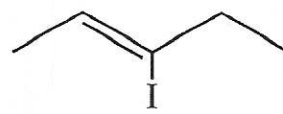
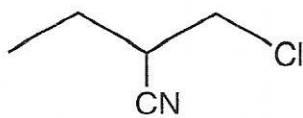
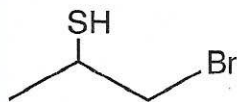
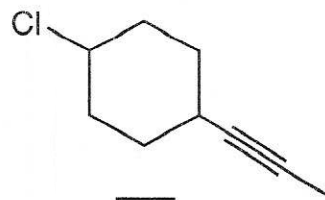
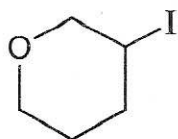
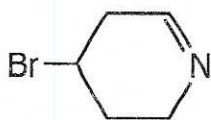
2. Place the compounds in order of increasing reactivity in H_3O^+ . (1=least reactive, 3=most reactive) (6 points)



3. Place a "Y" in the box below any compound that will produce a terminal alkyne as a product when treated with KOH at $200^\circ C$. Place an "N" in the box below any that will not. (6 points)

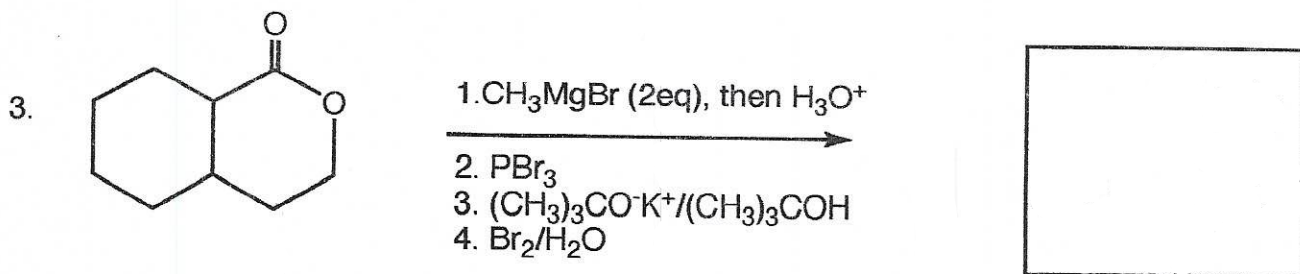
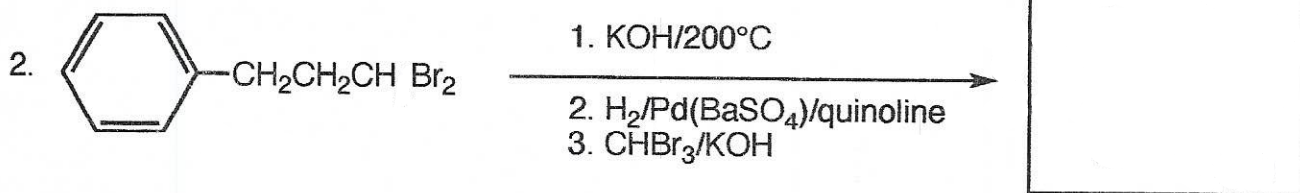
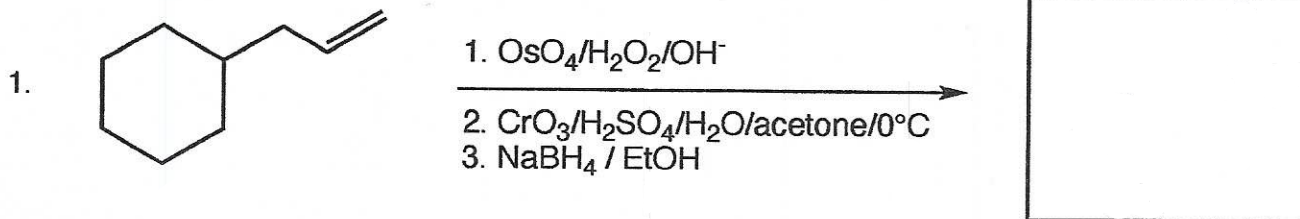


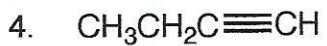
4. Place a "Y" in the box below any halide that will produce a useful Grignard reagent. Place an "N" in the box below any that will not. (6 points)



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.**



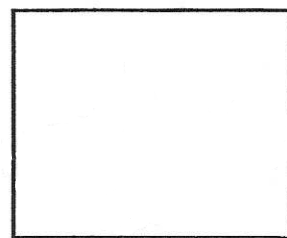


1. $\text{HgSO}_4 / \text{H}_2\text{SO}_4 / \text{H}_2\text{O}$

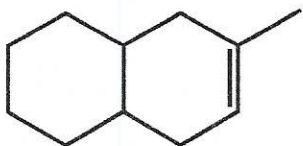
2. $\text{NaBH}_4 / \text{EtOH}$

3. $\text{H}_2\text{SO}_4 / \text{heat}$

4. $\text{MCPBA} / \text{CH}_2\text{Cl}_2$



5.

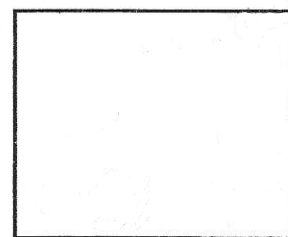


1. $\text{BH}_3 \cdot \text{THF}$

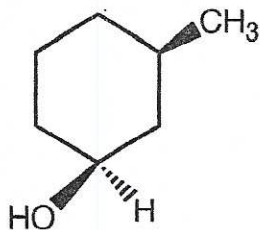
2. $\text{H}_2\text{O}_2 / \text{OH}^-$

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

4. $\text{CH}_3\text{C}\equiv\text{C} : ^- \text{Na}^+$, then H_3O^+

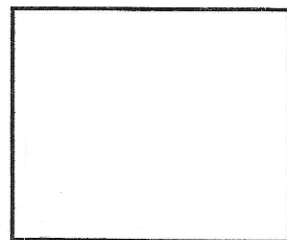


6.



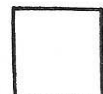
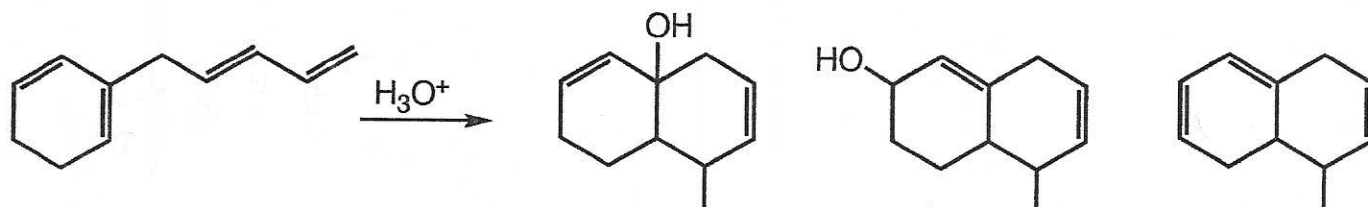
1. PBr_3

2. $\text{CH}_3\text{S}^- \text{Na}^+ / \text{DMSO}$



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: (13 points)

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

