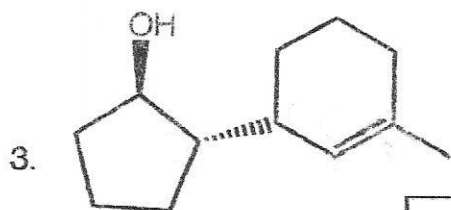
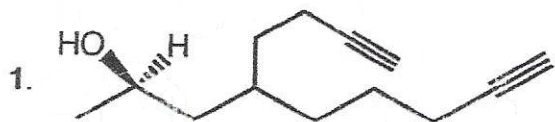


# EXAM 3, F 2023

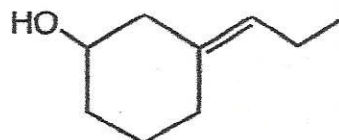
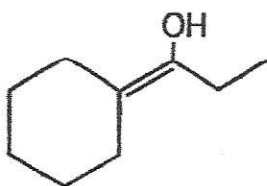
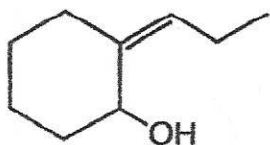
## A. Nomenclature: (15 points)

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

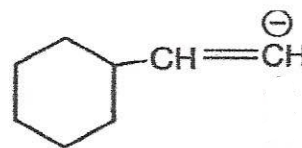
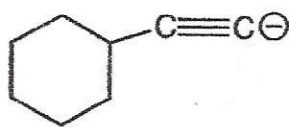
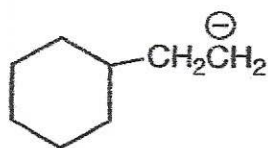


**B. FACTS:** Total = 24 points

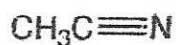
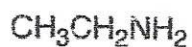
1. Place the alcohols in order of increasing reactivity in an acid catalyzed dehydration. (1=least reactive, 3=most reactive) (6 points)



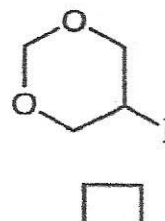
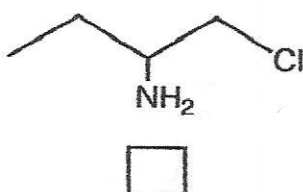
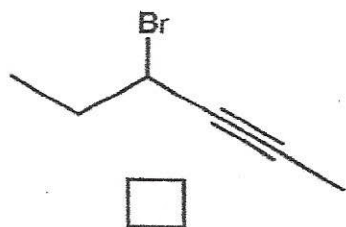
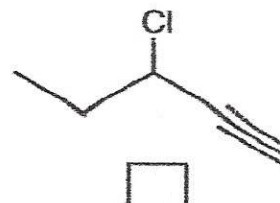
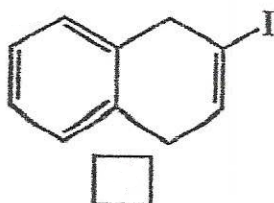
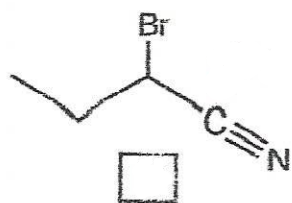
2. Place the anions in order of increasing stability. (1=least stable, 3=most stable) (6 points)



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

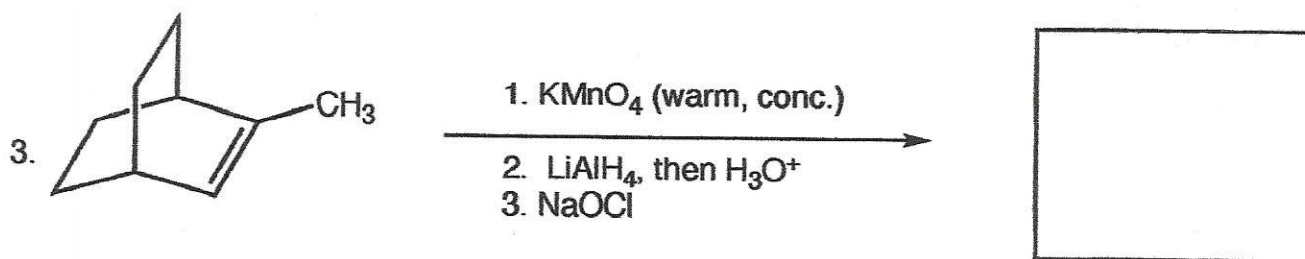
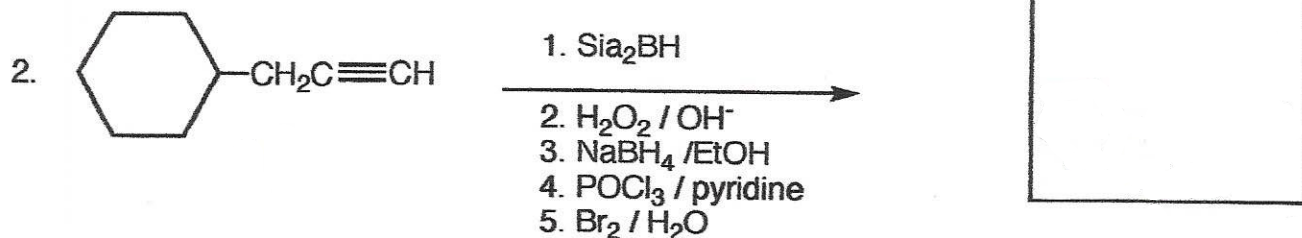
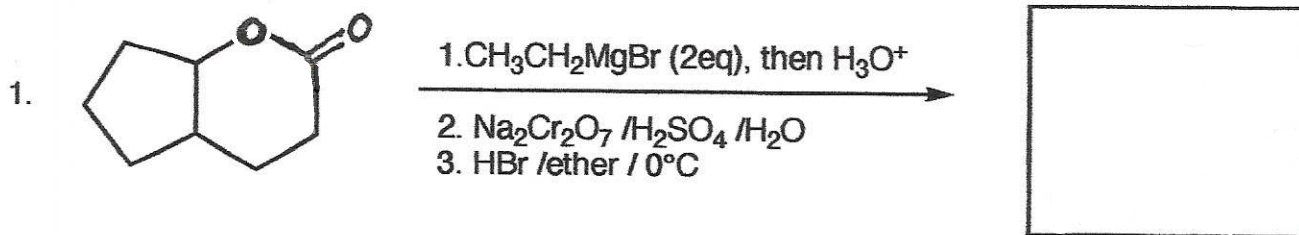


4. Place a "Y" in the box below any halide that will produce a useful Grignard reagent. Place an "N" in the box below any that will not. (6 points)



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

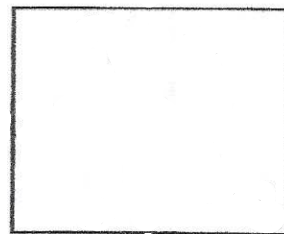
Please provide the major product in the answer box. Indicate **stereochemistry** if applicable. **Full credit is awarded only when the product of each step in a multi-step reaction is shown below the reaction.**



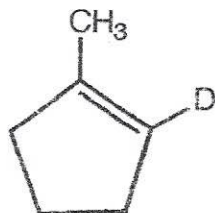


1.  $\text{Br}_2 / \text{CH}_2\text{Cl}_2$   
2.  $\text{KOH} / 200^\circ\text{C}$

3.  $\text{Li} / \text{NH}_3$   
4.  $\text{CHCl}_3 / \text{KOH}$

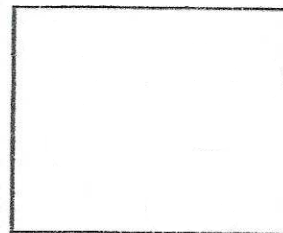


5.

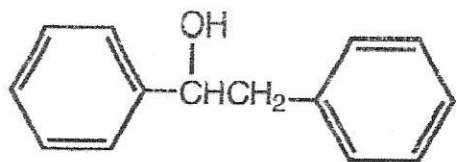


1.  $\text{BH}_3 \cdot \text{THF}$

2.  $\text{H}_2\text{O}_2 / \text{OH}^-$   
3.  $\text{pTsCl} / \text{pyridine}$   
4.  $\text{CH}_3\text{S}^- \text{Na}^+ / \text{CH}_3\text{CN}$

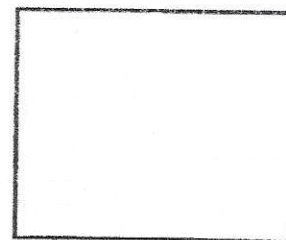


6.



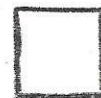
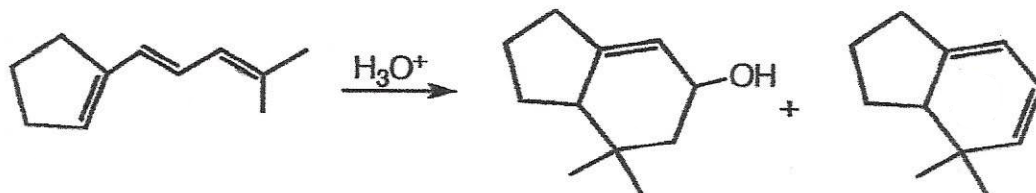
1.  $\text{H}_2\text{SO}_4 / \text{Heat}$   
2.  $\text{O}_3$

3.  $(\text{CH}_3)_2\text{S}$   
4.  $\text{CH}_3\text{C}\equiv\text{C}^- \text{Na}^+$ , then  $\text{H}_3\text{O}^+$   
5.  $\text{H}_2 / \text{Pd}(\text{BaSO}_4) / \text{quinoline}$



**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 cyclohexene, cyclohexanol, alcohols or alkenes of three carbons or less, any peroxyacids, any oxidizing or reducing agents, and any other inorganic reagents. (Please do not include mechanisms.)

