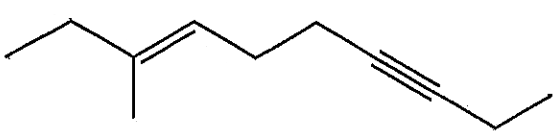
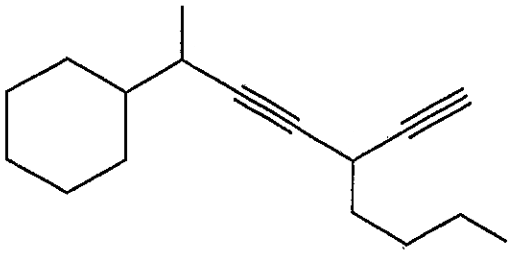
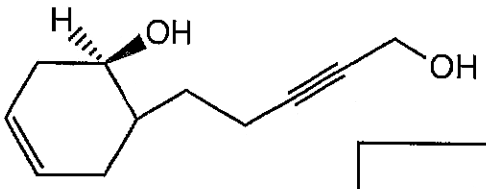
Exam 3 Fall 2019

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.

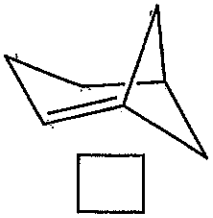
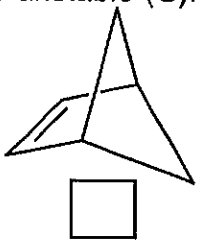
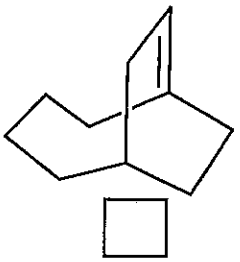
1. 

2. 

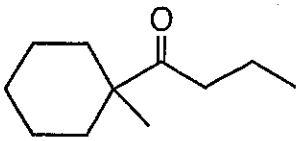
3. 

B. FACTS: Total = 25 points

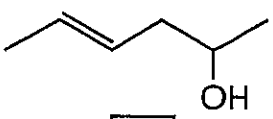
1. Label the alkenes as stable (**S**) or unstable (**U**). (6 points)

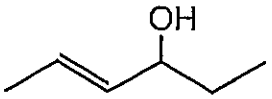




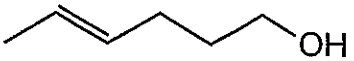
2. Draw the tautomer of the compound below. (3 points)



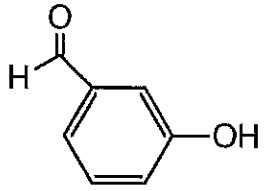
3. Place the alcohols in order of increasing reactivity in an acid catalyzed dehydration. (1=least reactive, 3=most reactive) (6 points)

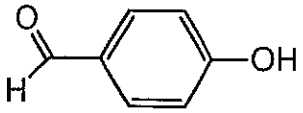


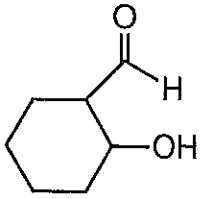




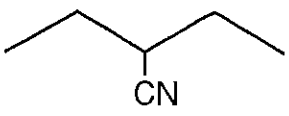
4. Place the compounds in order of increasing acidity. (1=least acidic, 3=most acidic) (6 points)

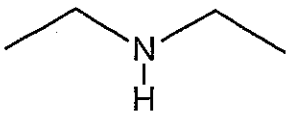


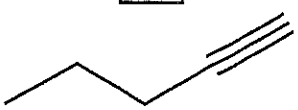




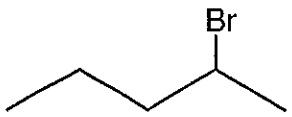
5. Place a "**Y**" in the box below any compound that will react with a Grignard reagent. Place an "**N**" in the box below any that will not. (4 points)

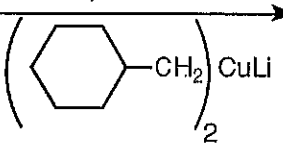




C. Reactions: Total = 36 points, 6 points each
Please provide the major product in the answer box. Indicate **stereochemistry** if applicable. **Full credit is awarded only when the product of each step in a multi-step reaction is shown below the reaction.**

1. 

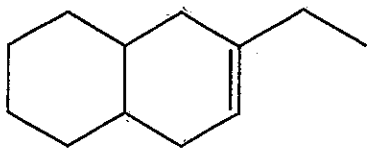
1. $(CH_3)_3CO^-K^+$
2. HBr / peroxide
3. 

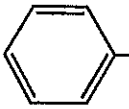
2. $CH_3CH_2C{\equiv}CH$

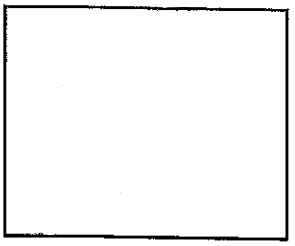
1. Sia_2BH
2. H_2O_2 / OH^-
3. H_2 / Ra-Ni
4. H_2SO_4/180°

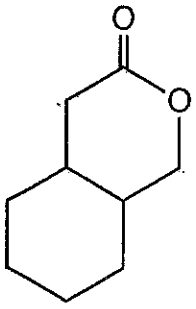
3. $CH_3CH_2C{\equiv}CCH_3$

1. Li / NH_3
2. MCPBA
3. H_3O^+

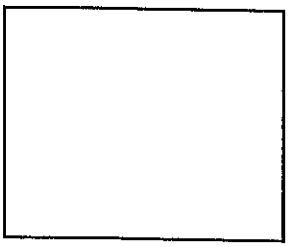
4. 

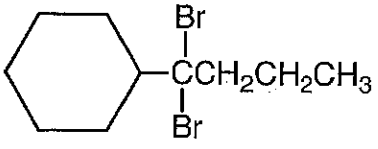
1. O_3
2. $(CH_3)_2S$
3.  MgBr (xs), then H_3O^+
4. PBr_3



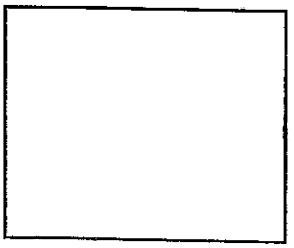
5. 

1. $LiAlH_4$, then H_3O^+
2. $Na_2Cr_2O_7$ / H_2SO_4 / H_2O
3. $NaBH_4$ / EtOH

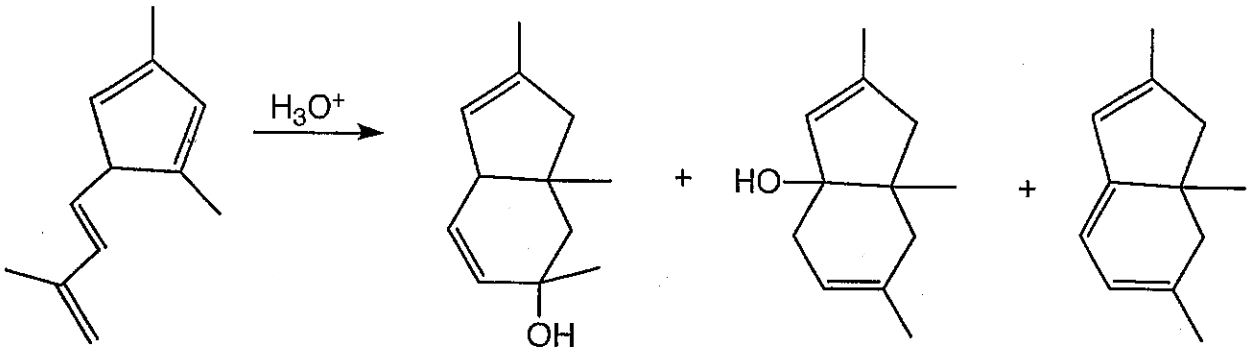


6. 

1. $NaNH_2$ / 150°C
2. CH_3CH_2Br
3. H_2 / $Pd(BaSO_4)$ / quinoline
4. CH_2I_2 / Zn(Cu)



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 of **five** carbons or less, any peroxyacids, any oxidizing or reducing agents, and any other inorganic reagents. (Please do not include mechanisms.)