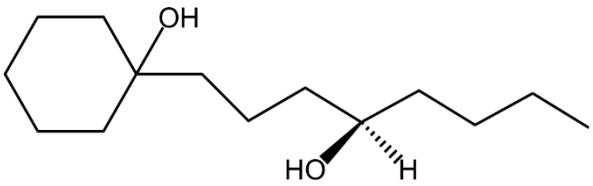
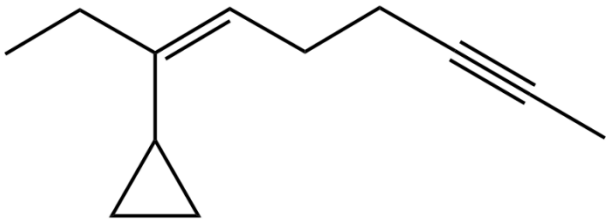
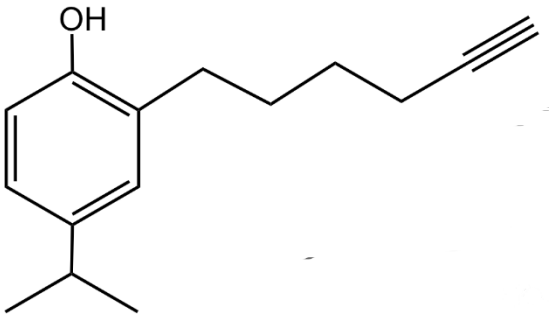
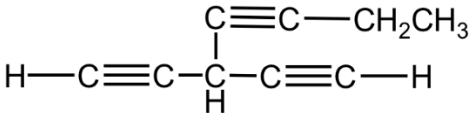
A. Nomenclature: (16 Points)

Give an acceptable IUPAC name for each of the following compounds Be sure to indicate the **stereochemistry** where appropriate.

1. 

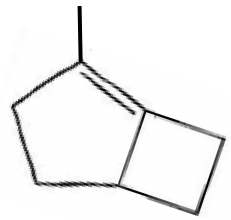
2. 

3. 

4. 

B. Facts: (24 Points)

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



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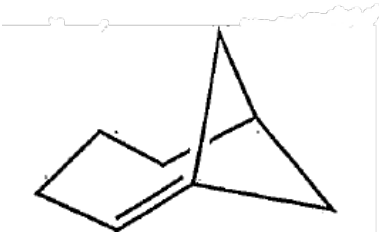

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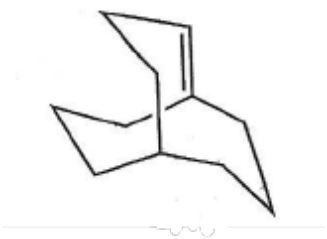

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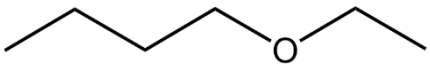
2. Place the following compounds below in order of increasing solubility in H_2O (1=least soluble, 3=most soluble) (6 points)



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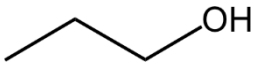

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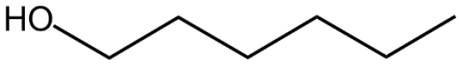

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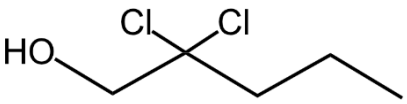
3. Place the following compounds in order of increasing acidity (1 = weakest acid, 3=strongest) (6 points)



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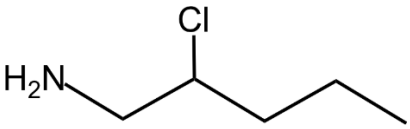

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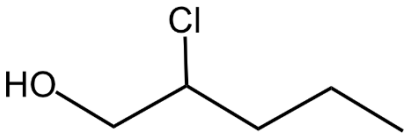

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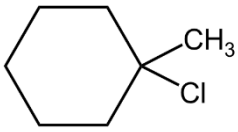
4. Place a "**Y**" in the box below any halide that will produce a useful Grignard reagent. Place an "**N**" in the box below any that will not. (6 points)



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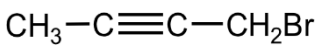

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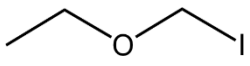

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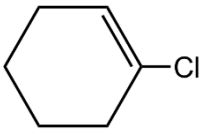

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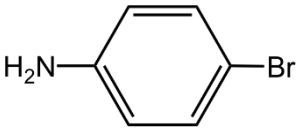

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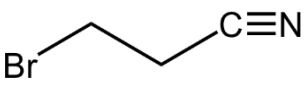

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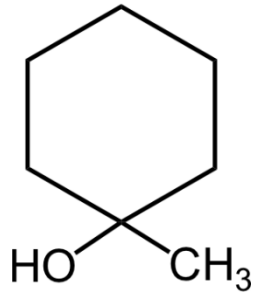
C. Reactions: Total = 36 points, 6 points each

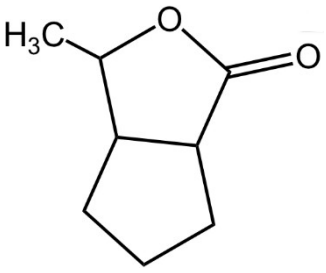
Please provide the reagents or the major products in the answer box. Be sure your drawing indicates stereochemistry if able. Partial credit is awarded only when the intermediate products in a multi-step reaction are shown the reaction

1.



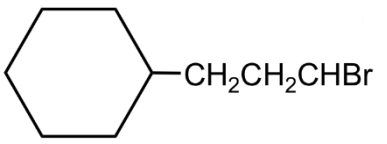
1. H_2SO_4 / Heat
2. $KMnO_4$ (warm, conc.)
3. $NaBH_4$ (xs) / EtOH

2.

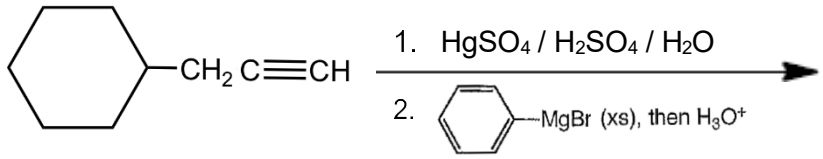


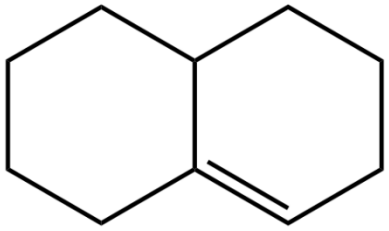
1. $LiAlH_4$ (xs)
2. H_3O^+
3. CrO_3 / H_2SO_4/ H_2O / acetone/ 0°C

3.

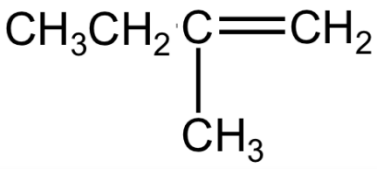


1. KOH / 200°C
2. Na / NH_3
3. CH_2I_2 / Zn(Cu)

4. 

5. 

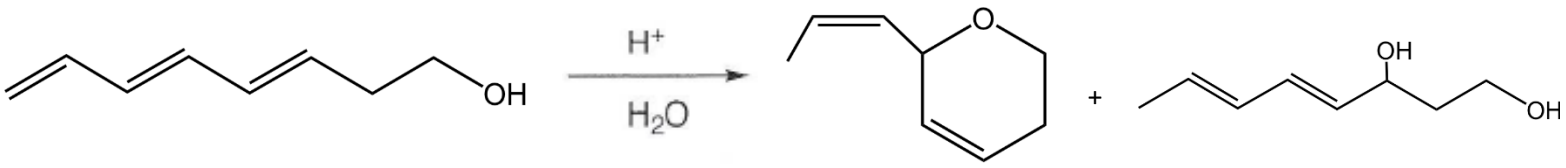
1. BH_3•THF
2. H_2O_2 / OH^-
3. $Na_2Cr_2O_7$ / H_2SO_4 / H_2O
4. $CH_3C{\equiv}C{:}^-$ Na^+, then H_3O^+

6. 

1. MCPBA
2. H_3O^+
3. PCC / CH_2Cl_2

D. Mechanism: (12 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: 12 Points

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