Third Exam

Chemistry 3331

November 21, 2008

Name (PRINT) KEY
Last, First

Signature _____

ID# _____

Please circle class time.

10:00 AM

1:00 PM

Page #	Score	
1. 16 pts.		
2. 24 pts.		
3. 18 pts.		
4. 18 pts.		
5. 12 pts.		
6. 12 pts.		

TOTAL_____

Note: Present your student ID when you return the exam booklet

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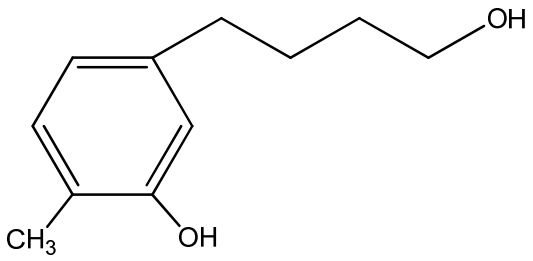
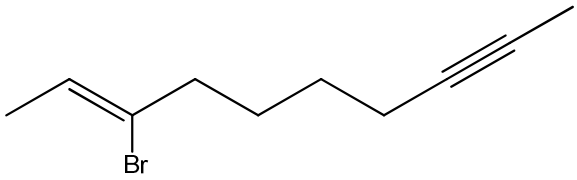
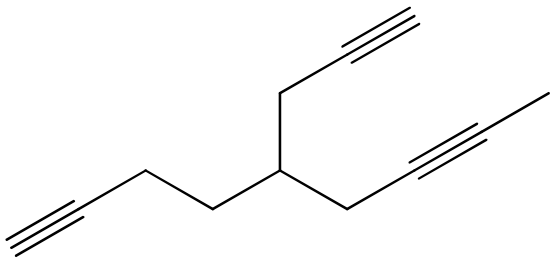
A. Nomenclature: (16 points)
Give an acceptable IUPAC name for each of the following compounds. Be sure to indicate the **stereochemistry** where appropriate.

1. 

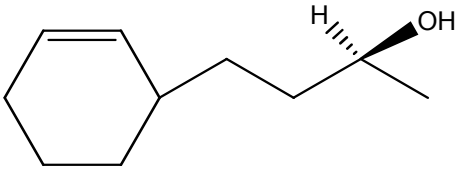
5-(4-hydroxybutyl)-2-methylphenol

2. 

(Z)-3-bromodec-2-en-8-yne

3. 

5-(prop-2-ynyl)nona-1,7-diyne

4. 

(2S)-4-(cyclohex-2-enyl)butan-2-ol

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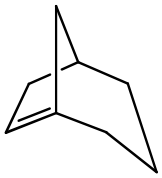
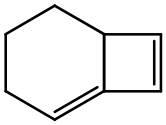
B. Facts: (24 points total)

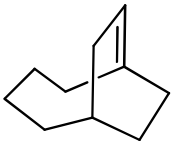
1. Label the following alkenes as stable (**S**) or unstable (**U**). (6 pts.)



U

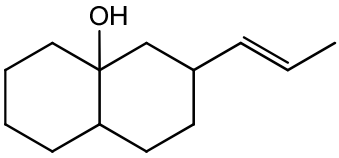


S

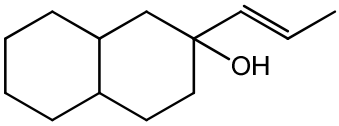


S

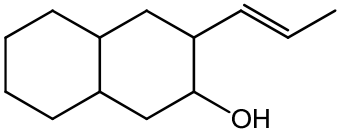
2. Place the following alcohols in order of increasing reactivity in an acid catalyzed dehydration. (1 = least reactive, 3 = most reactive) (6 pts.)



2



3



1

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

CH_3CH_2OH

3

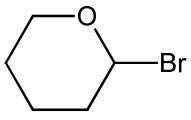
$CH_3CH_2NH_2$

1

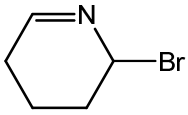
$CH{\equiv}CH$

2

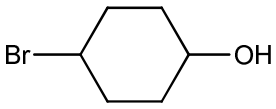
4. Place a **Y** in the box below any halide that will produce a useful Grignard reagent when reacted with Mg in dry ether. Place an **N** in the box below any that will not. (6 pts.)



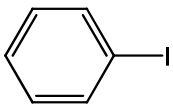
Y



N



N



Y

$Cl{-}CH_2CH_2C{\equiv}CH$

N

$CH_3CH_2CH{=}CHCl$

Y

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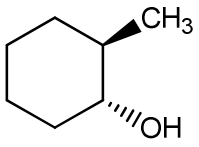
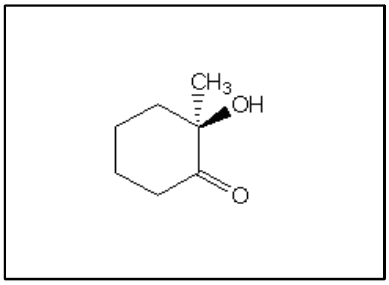
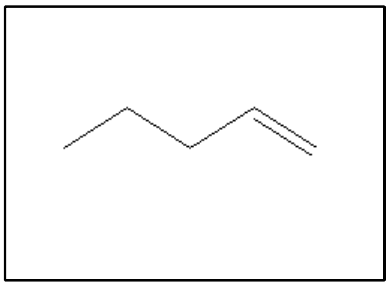
C. Reactions: Total = 36 points, 6 points each
Please provide the major product, the starting material, or the reagents in the answer box. Be sure your drawing indicates stereochemistry if applicable. Partial credit is awarded only when intermediate products in a multi-step reaction are shown below the reaction.

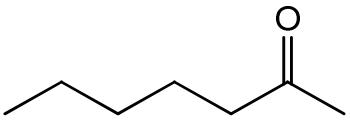
1. 

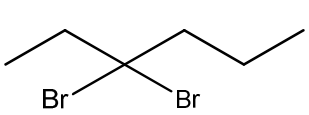
1. H_2SO_4 / HEAT
2. OsO_4 / H_2O_2 / OH^-
3. CrO_3 / H_2SO_4 / H_2O / acetone / 0°C

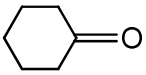


2. 

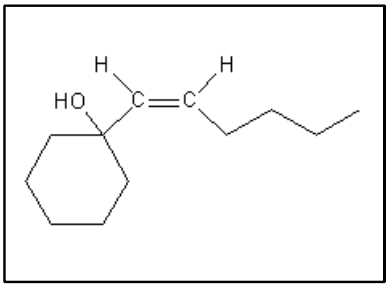
1. HBr / peroxide
2. HC ≡C :$^{\ominus}$
3. H_2SO_4 / H_2O / $HgSO_4$



3. 

1. $NaNH_2$ / 150 °C
2. 

, then H_3O^+
3. H_2 / Pd($BaSO_4$) / quinoline



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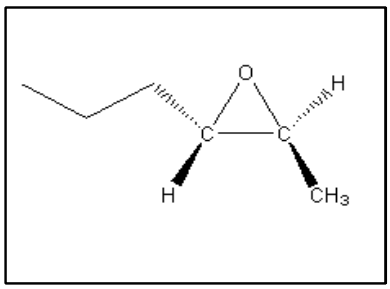
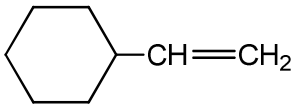
4. $CH_3CH_2CH_2C{\equiv}CCH_3$ → (1. Li / NH_3 (l); 2. MCPBA / CH_2Cl_2)

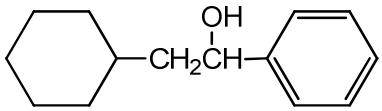
Note: MCPBA = meta-chloroperbenzoic acid

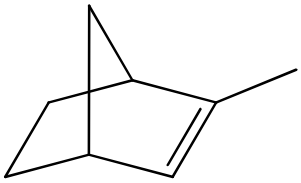


5. 

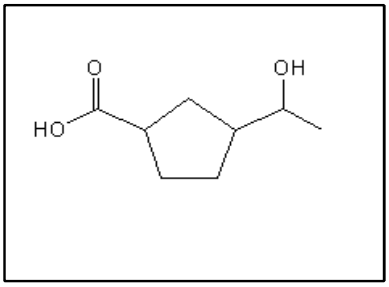
1. BH3 THF
2. H2O2 / NaOH
3. PCC

4. Ph-MgBr
5. H3O+



6. 

1. $KMnO_4$ (warm, conc.)
2. $NaBH_4$ / ethanol



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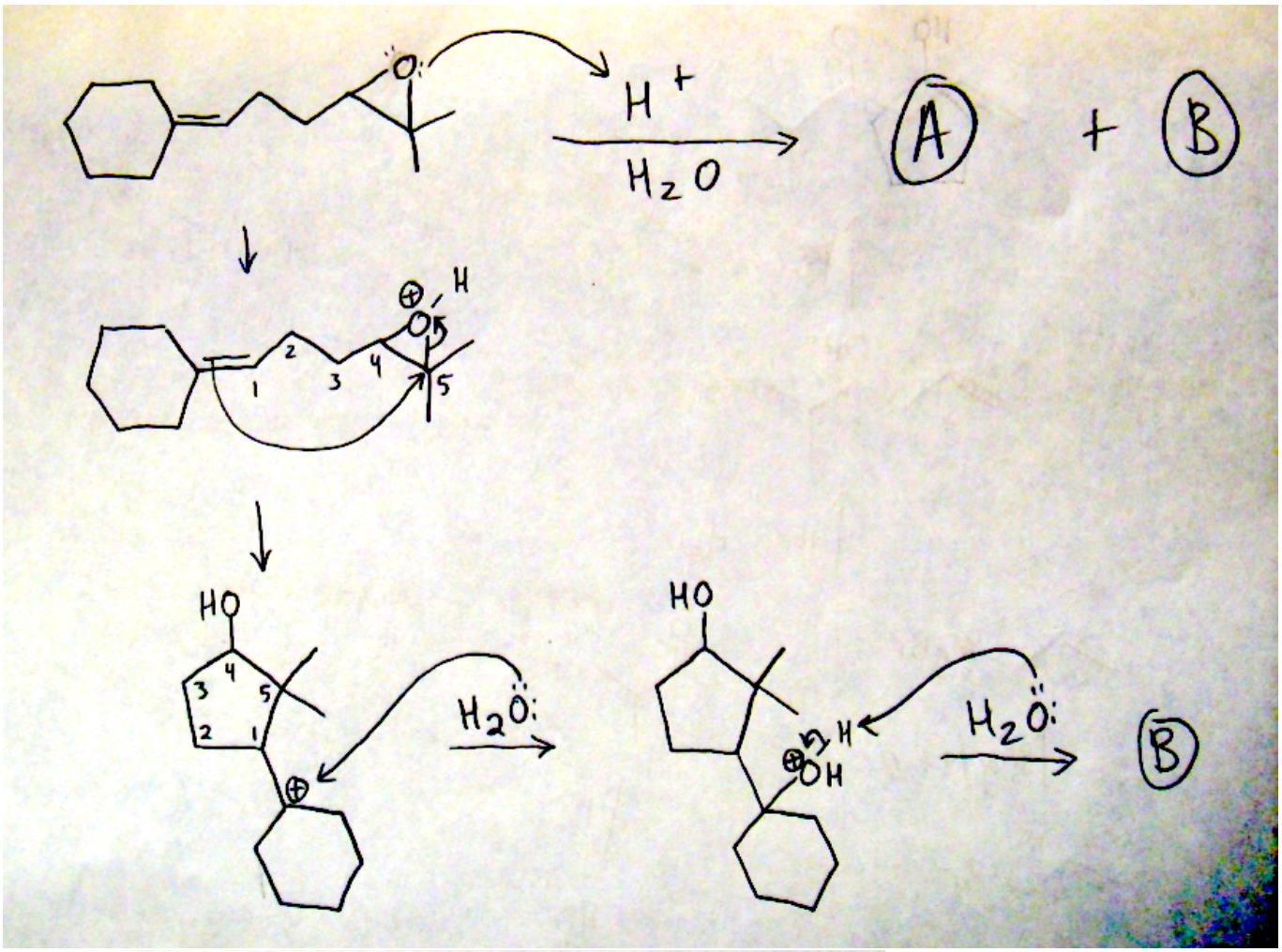
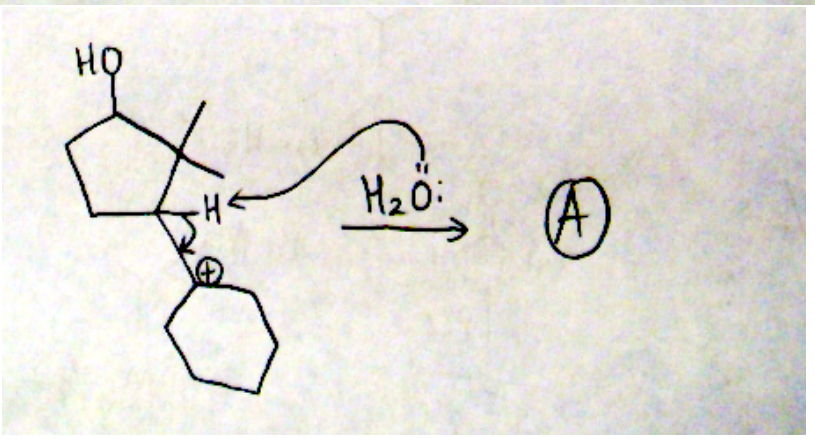
D. Mechanisms: (12 points)

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.**





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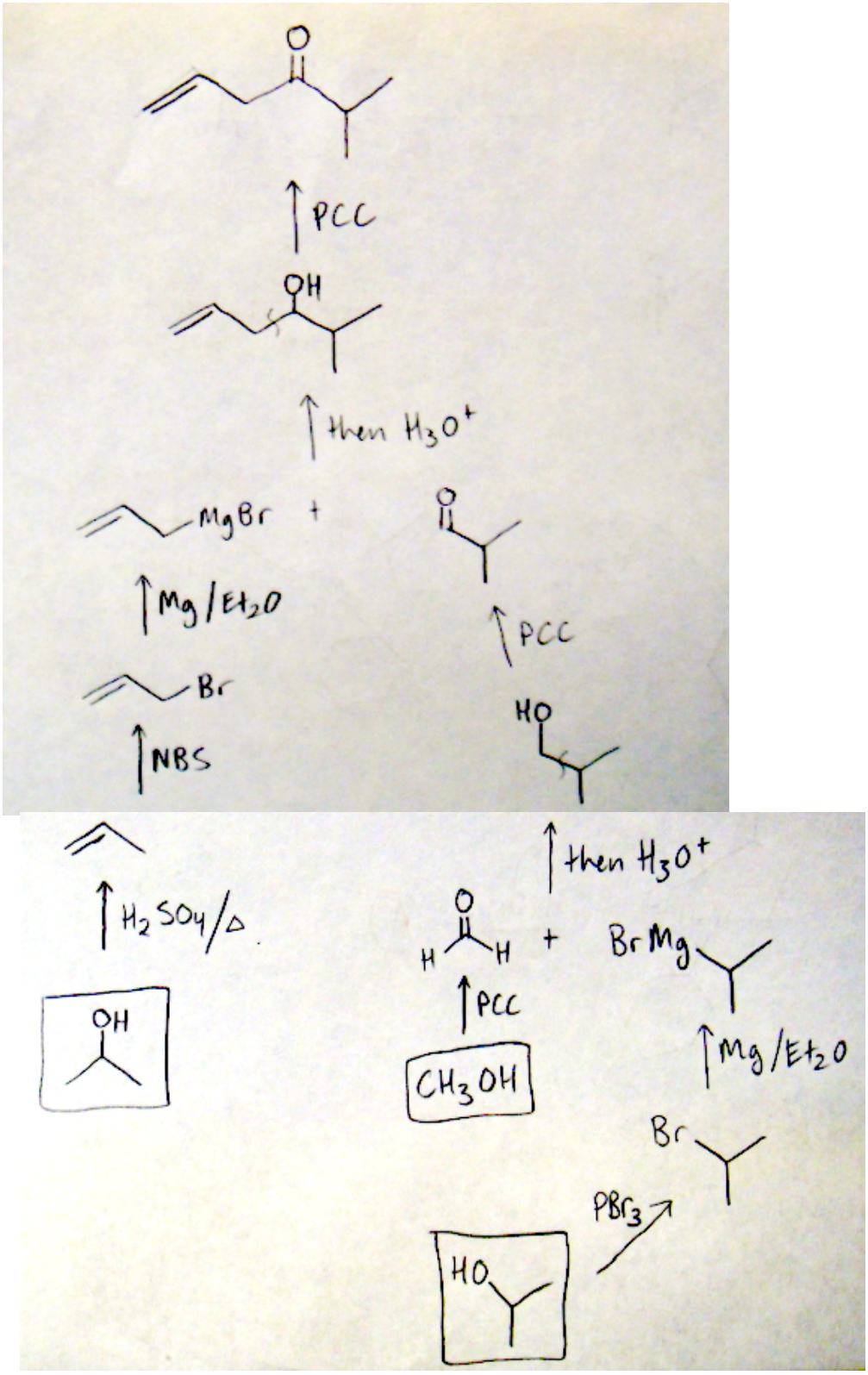
E. Synthesis: 12 Points

Synthesize the molecule below using any of the following reagents: alkanes or alcohols of **three carbons or less**, any inorganic reagents, any oxidizing or reducing agents.



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