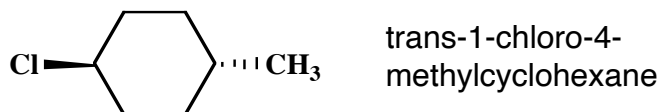


Answers

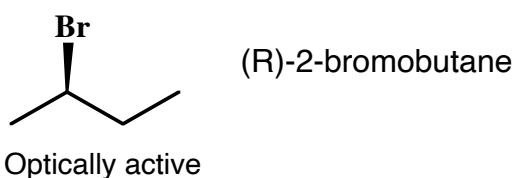
JASPERSE CHEM 350 FINAL EXAM
150 points total

VERSION 1

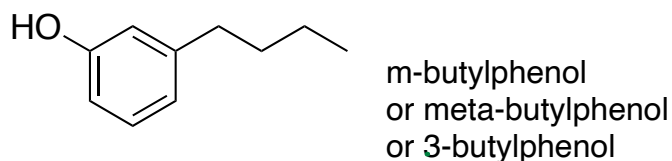
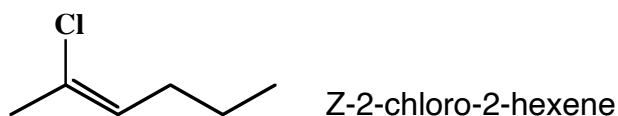
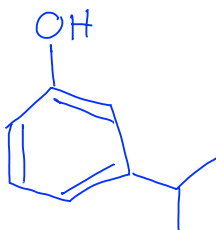
1. Provide names or structures for the following. 2 points each. Specify stereochemistry when appropriate!



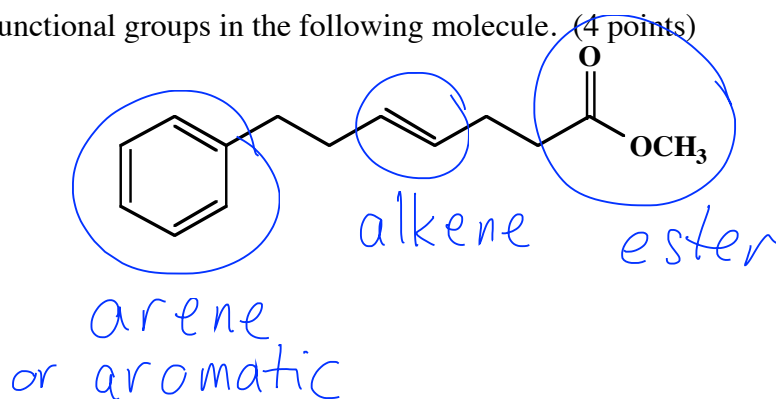
Note: Version 1 is relatively representative in terms of length. Version 2 is longer than the real test will be. But provides lots more practice.



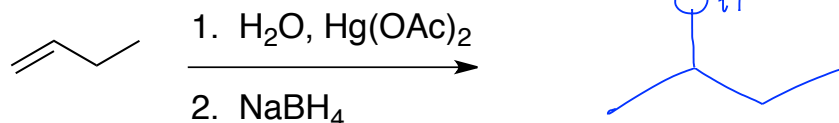
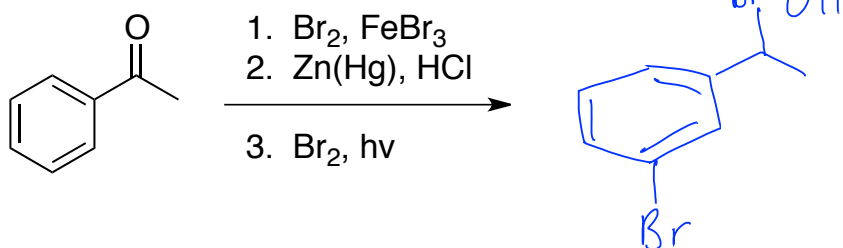
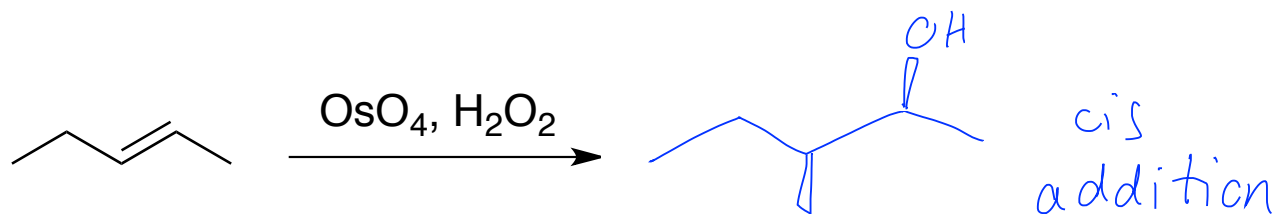
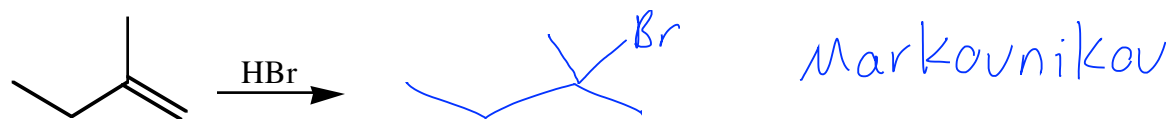
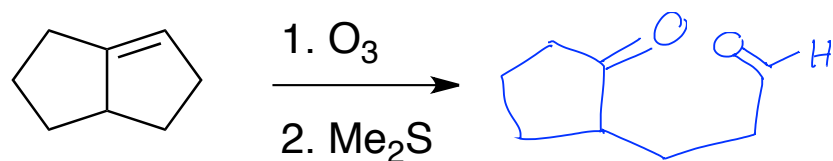
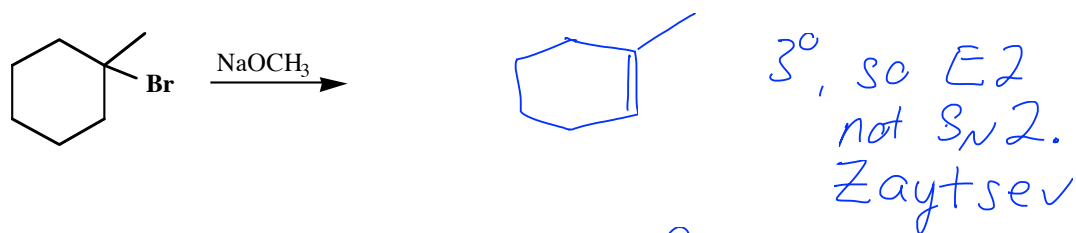
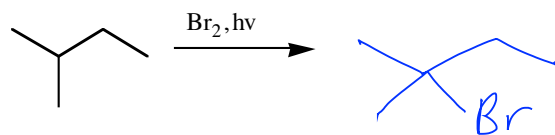
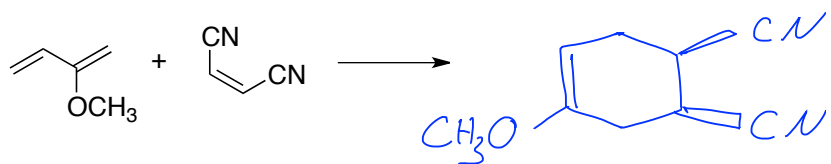
m-isopropylphenol



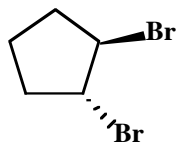
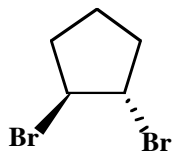
2. Identify the functional groups in the following molecule. (4 points)



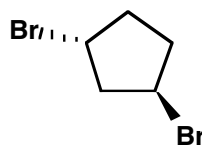
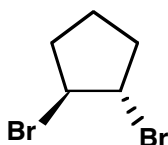
3. Predict the major products for the following reactions. Pay careful attention when orientation is a factor. Draw just one major product in each case. (3 points each)



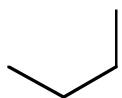
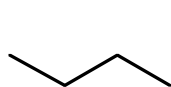
4. Classify the pairs of molecules as totally different, identical, structural isomers, diastereomers, or enantiomers. (2 points each)



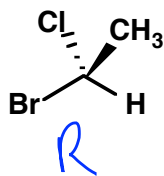
enantiomers



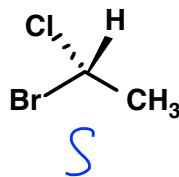
structural isomers



identical



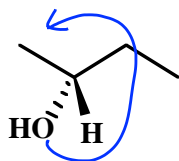
R



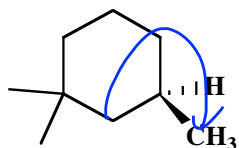
S

enantiomers

5. Classify each chiral carbon as R or S. (2 points each)

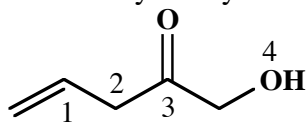


R



R

6. Classify the hybridization and bond angles (109, 120, or 180) at the labelled atoms. (5 points)



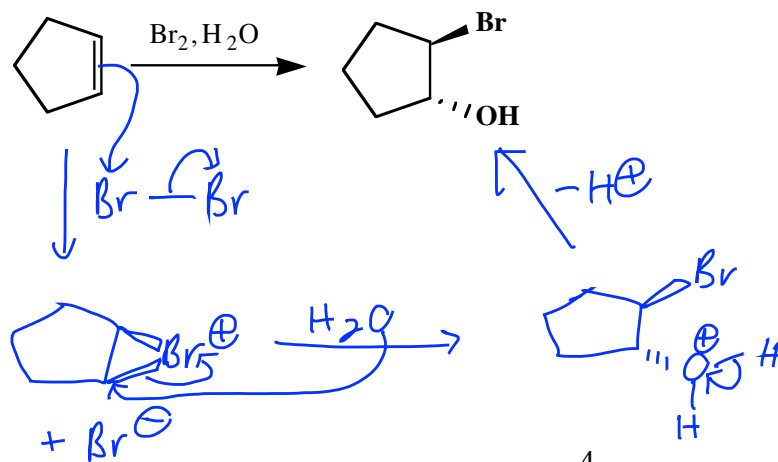
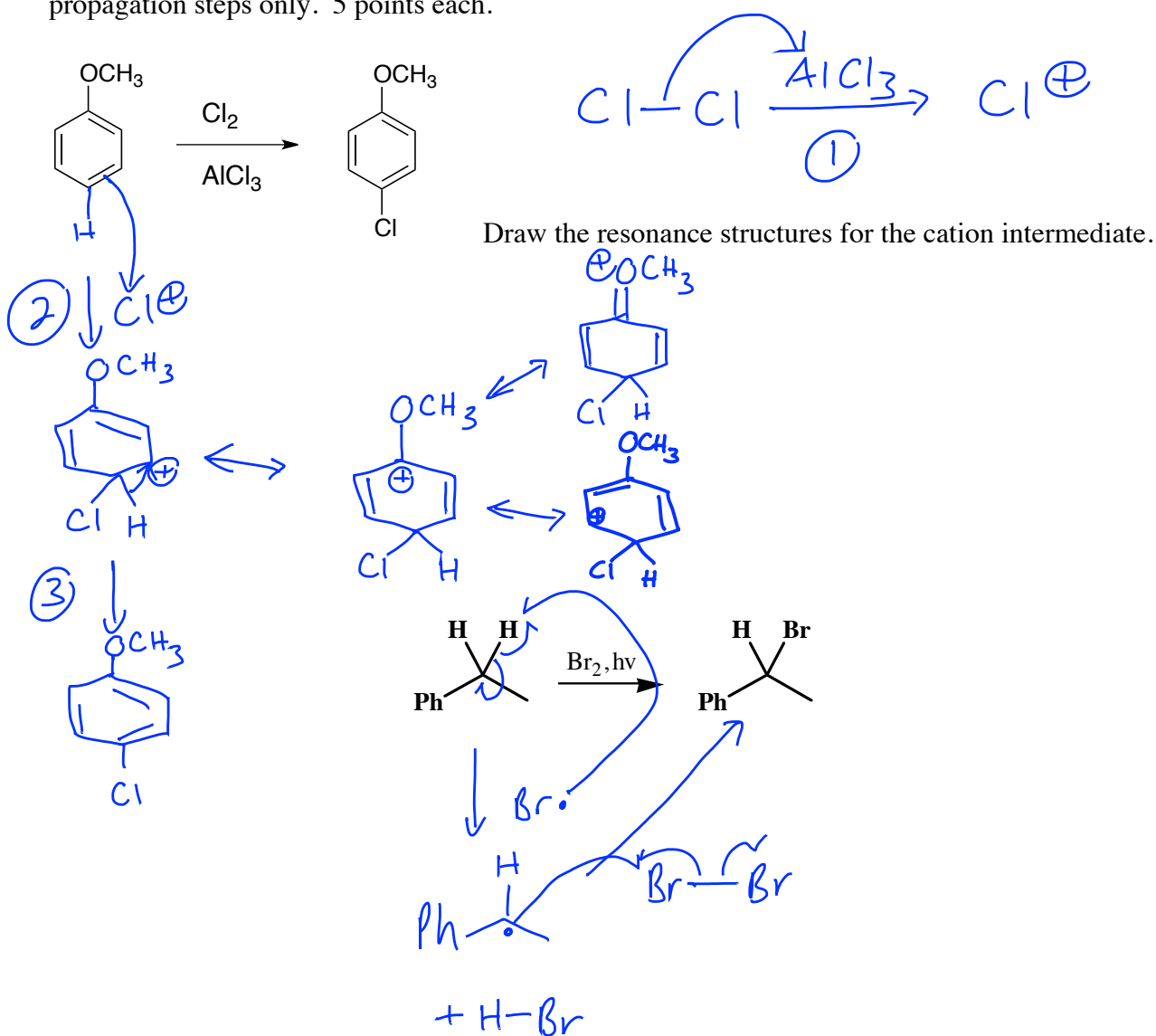
C-1 sp^2
120

C-2 sp^3
109

C-3 sp^2
120

O-4 sp^3
109

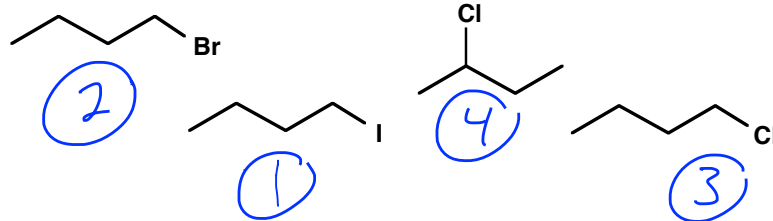
7. Draw the mechanisms for the following reactions. For any radical reactions, draw propagation steps only. 5 points each.



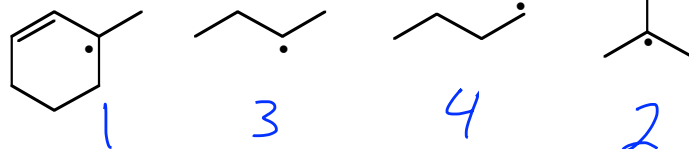
10. Rank the Following, from most to least. 2 points each.

a. Reactivity toward S_N2

$I > Br > Cl$
 $1^\circ > 2^\circ$

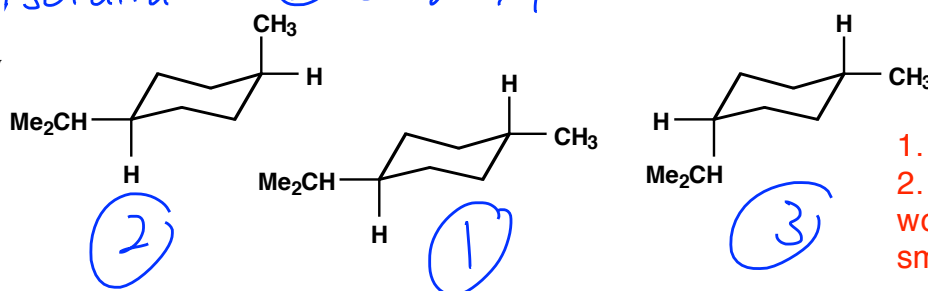


b. Stability



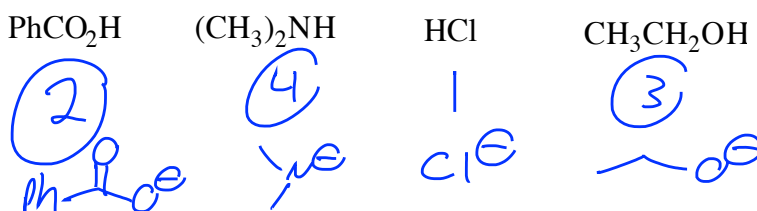
① allylic > isolated ② $3^\circ > 2^\circ > 1^\circ$

c. Stability



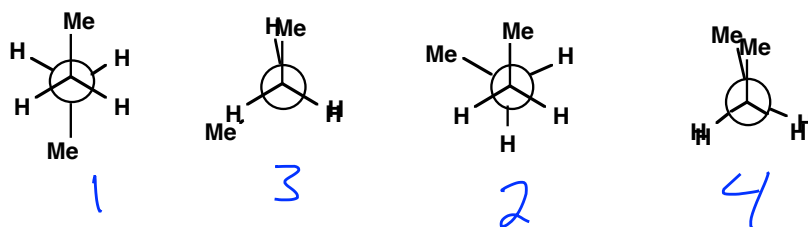
1. Equatorial preferred
 2. If forces to be axial, worse for big group than for smaller group

d. Acidity



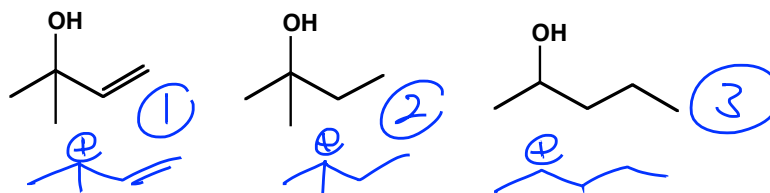
1. Anion stability
 2. HCl by memory is strong
 3. Electronegativity factor
 4. Resonance factor

e. Stability



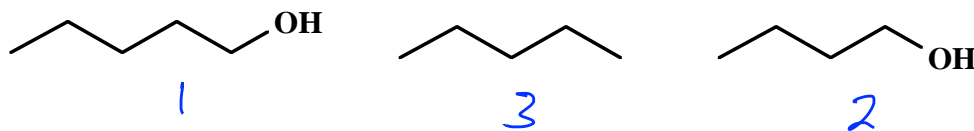
1. staggered vs eclipsed
 2. Anti > gauche
 3. Eclipsed > total eclipsed

f. Reactivity toward H_2SO_4 catalyzed dehydration



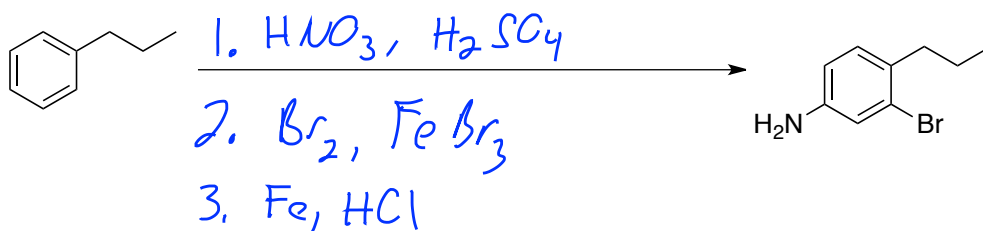
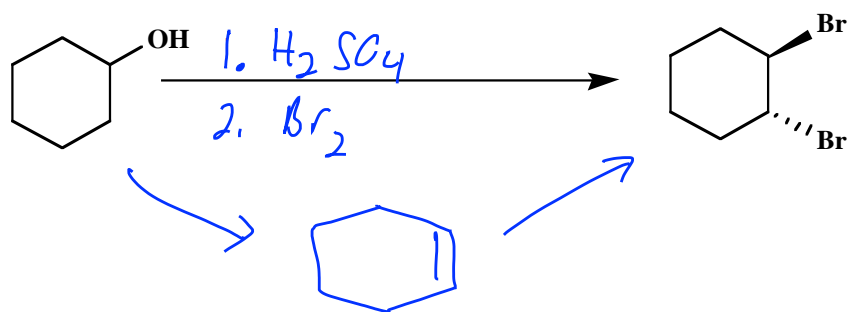
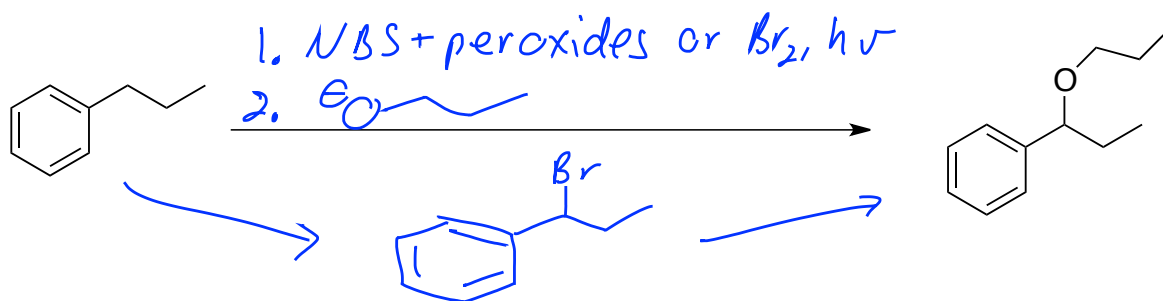
Cation stability is key

g. Boiling Point

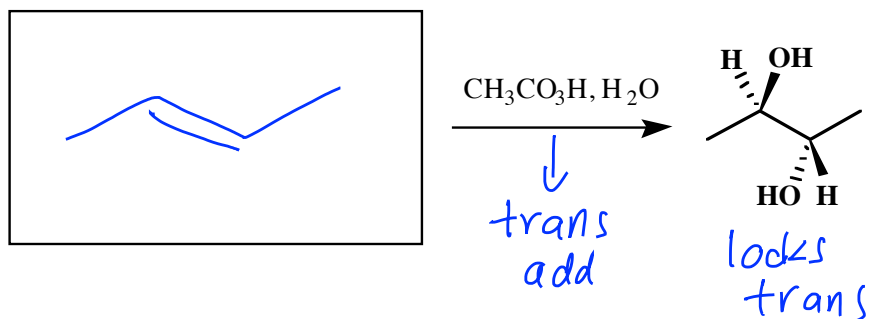


1. Hydrogen bonding
 2. Molecular weight factor

11. Provide reagents for the following transformations. You may use anything you like. Each can be done within ≤ 3 steps. (4 points each)



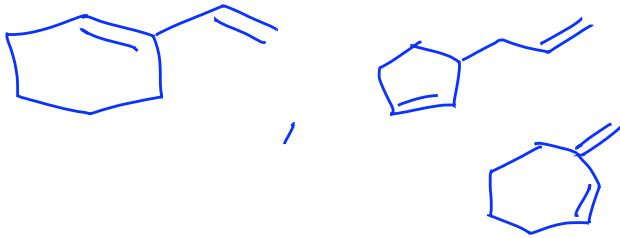
12. Provide the appropriate reactant for the following transformation. (3 points)



13. Suggest a structure for X, given the following info: (5 points)

Theory =
Actual = 12
EU = 3

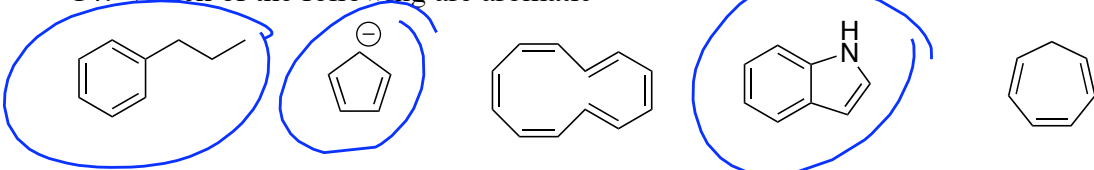
- Formula: C_8H_{12}
- It Reacts With excess H_2/Pt to produce C_8H_{16}
- When it reacts with O_3/Me_2S , one of the products is $CH_2=O$.



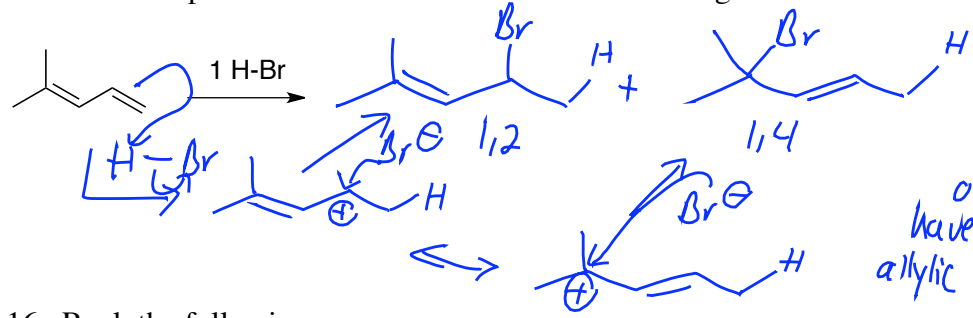
18
→ 2 alkenes
=CH₂ 1 ring

1 ring
2 alkenes
1 of the alkenes is on an end, =CH₂

14. Which of the following are aromatic

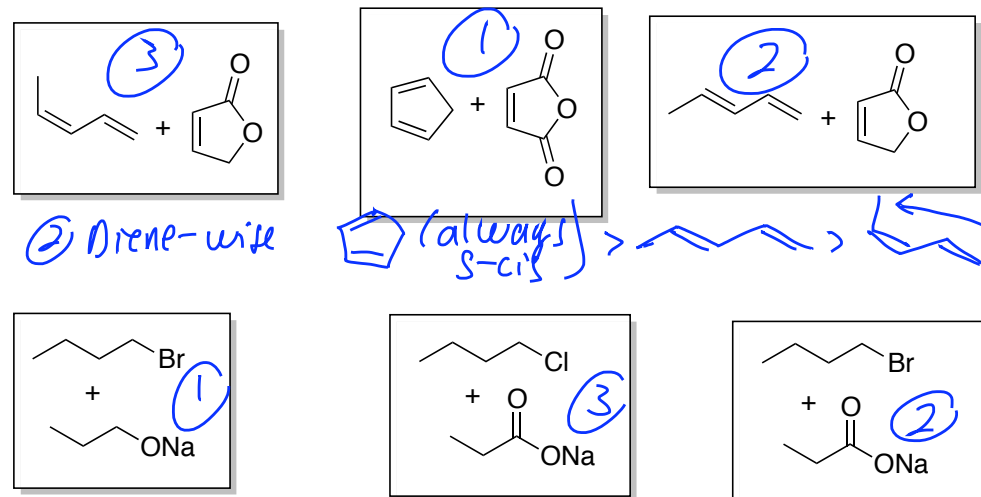


15. Draw the products and mechanism for the following reaction:



Protonation gives asymmetric allylic cation, leading to two isomers. Protonation on left end would have given an inferior allylic cation

16. Rank the following:



① Dienophile-wise better, two w groups

Z-methyl bad for s-cis

Combined S_N2 Reactivity

