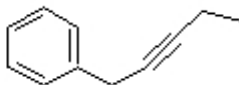


## I. Nomenclature:

1. Provide a common name for each of the following structures (6 points).

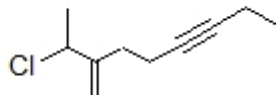
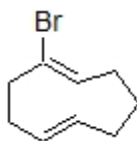


2. Provide the structures of each of the following compounds. (4 points)

**propargyl alcohol**

**3-methylenecyclopentene**

3. Provide a correct IUPAC name for each structure below. Be sure to include any necessary stereochemical descriptors. (6 points)



4. Circle all of the following structures capable of cis/trans or E/Z isomerism. (3 points)

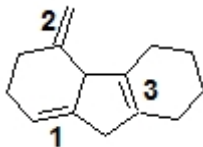
cycloheptene

$\text{CH}(\text{CH}_3)_2\text{CHCHCH}(\text{CH}_3)_2$

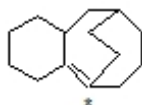
$\text{CH}_3\text{C}(\text{Br})\text{C}(\text{CH}_3)\text{OCH}_3$

## II. Theory:

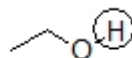
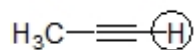
1. Which sequence ranks the following alkenes in order of increasing heat of hydrogenation values? (3 points)



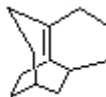
- a) 1<2<3    b) 2<3<1    c) 3<1<2    d) 3<2<1    e) 2<1<3    f) 1<3<2
2. Circle all atoms that must be coplanar with the starred carbon in the structure below. (4 points)



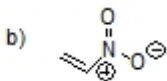
3. Predict the  $pK_a$  values of each of the indicated protons within 2 units. (4 points)



4. Circle all alkene structures below that are stable. (4 points)

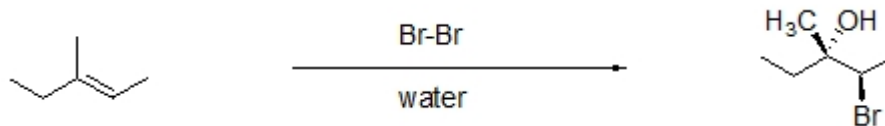


5. Which of the monomer units below would most likely polymerize when subject to sodium hydroxide? (2 points)



## III. Mechanism:

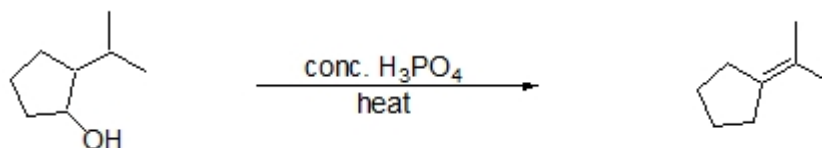
1. Provide an electron arrow pushing mechanism for the following reaction. Include all intermediate structures, formal charges and correct arrow pushing of electrons. (8 points)



2. Circle all reagents that react with an alkene through a concerted mechanism. (3 points)

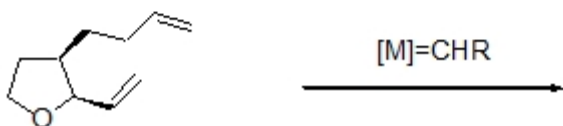
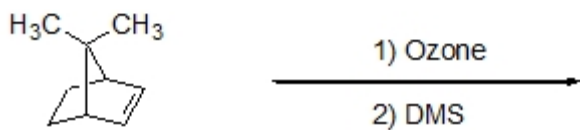
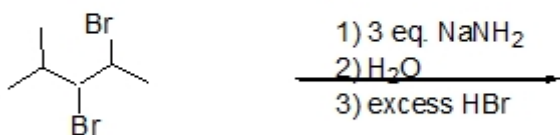
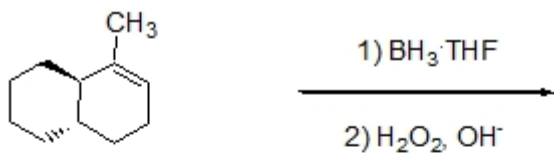
a)  $\text{BH}_3$       b)  $\text{H}_2 / \text{Pt}$       c)  $\text{HBr}$       d) mCPBA      e)  $\text{OsO}_4$

3. Provide an electron arrow pushing mechanism for the following reaction. Include all intermediates and any formal charges. (10 points)

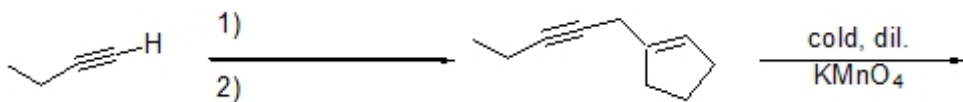


## IV. Reactions:

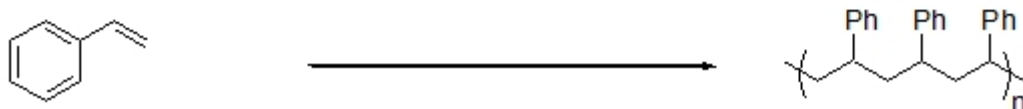
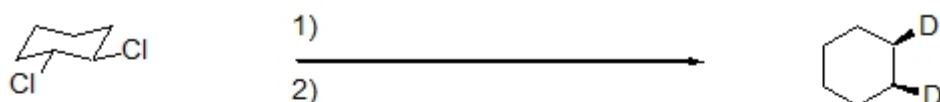
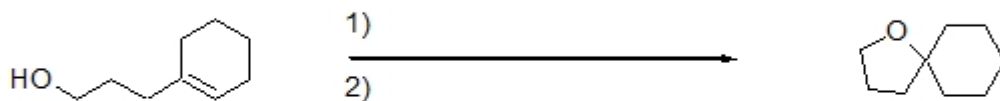
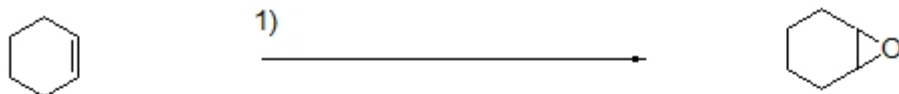
1. Predict the major products of each reaction below. Indicate any relevant stereochemistry. (16 points)



2. Fill in the missing reagents and product for the reaction below. Include any relevant stereochemistry. (8 points)

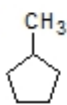


3. Provide the necessary reagents for the following transformations. (19 points)



V. **Extra Credit:**

1. Complete the following synthesis by filling in the necessary reagents. It may be helpful to work backwards. (5 points)



1)

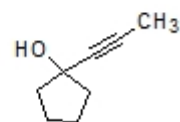
2)

3)



4)

5)

6)  $\text{H}_3\text{O}^+$ 

You received \_\_\_\_\_ points out of 100 points possible. To check your overall performance in lecture see <http://canvas.weber.edu>.