

I. **Nomenclature:**

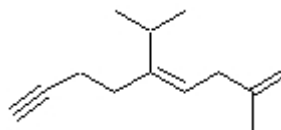
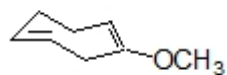
1. Provide the structures of each of the following compounds. (6 points)

**styrene****benzyl ethyl acetylene****propargyl alcohol**

2. Provide an example of the following intermediates. (4 points)

**mercurinium ion****ozonide**

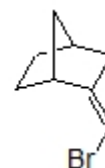
3. Provide a correct systematic name for each compound. (6 points)



4. Circle all structures capable of E/Z isomerism. (6 points)

3-methylhex-2-ene

3-ethylhept-3-ene

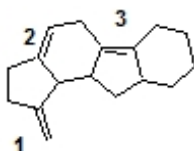


## II. Theory:

1. The pi bond of an alkene is \_\_\_\_\_ and \_\_\_\_\_ than the pi bond of an alkyne. (3 points)

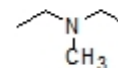
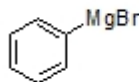
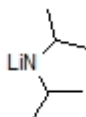
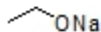
a) shorter, stronger    b) shorter, weaker    c) longer, stronger    d) longer, weaker

2. Which sequence ranks the following pi bonds in order of increasing magnitude of heat of hydrogenation? (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

3. Circle all bases below that may be used to favorably deprotonate a terminal alkyne. (3 points)

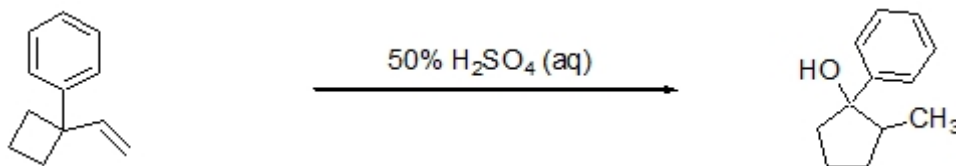


4. Compound X, C<sub>8</sub>H<sub>10</sub>, is a stable bridged bicyclic compound. Provide a possible structure for compound X. (4 points)

5. Draw a segment of poly(isobutylene) that contains at least two repeating units. (3 points)

## III. Mechanism:

- Circle all reagents that proceed with an anti addition when reacting with an alkene. (3 points)
  - $\text{H}_2 / \text{Pd}$
  - mCPBA /  $\text{H}_3\text{O}^+$
  - $\text{Br}_2$
  - $\text{CH}_2\text{N}_2$
- Circle all reagents that react with an alkene in a concerted mechanism. (3 points)
  - mCPBA
  - $\text{H}_2 / \text{Pt}$
  - HBr
  - $\text{BH}_3$
- Provide a mechanism for the following reaction. Include correct pushing of electrons, all intermediates and formal charges. (10 points)

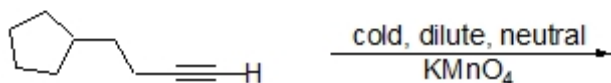
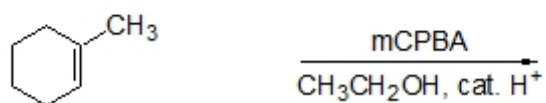
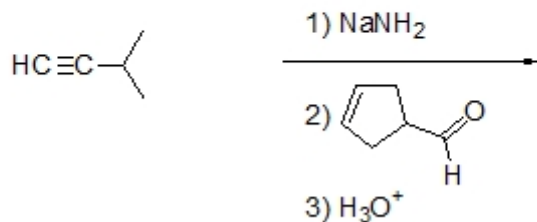
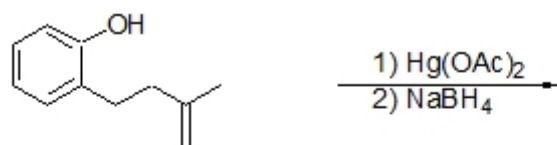


## IV. Reactions:

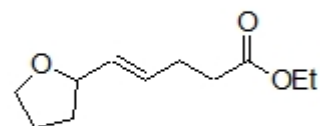
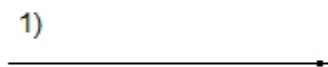
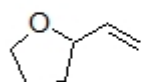
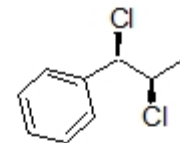
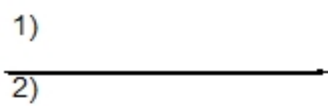
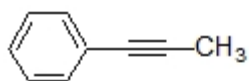
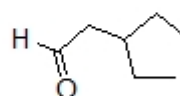
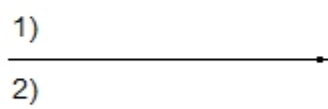
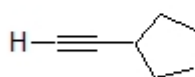
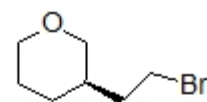
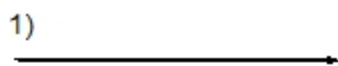
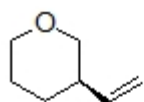
- Complete the following reaction by filling in the necessary reagents. (4 points)



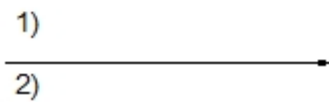
2. Provide the expected product for each of the following reactions. Include any relevant stereochemistry. (19 points)



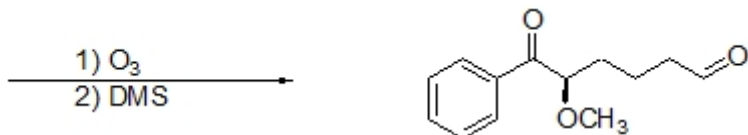
3. Fill in the necessary reagents to accomplish the following conversions. (17 points)



acetylene

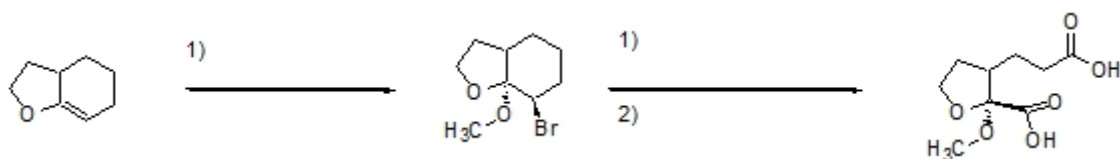


4. Complete the following reactions by drawing a correct structure for the expected starting material. Include correct stereochemistry where appropriate. (6 points)



V. **Extra Credit:**

1. Fill in the necessary reagents to accomplish the following transformation. (5 points)



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