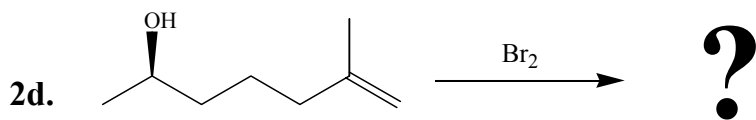
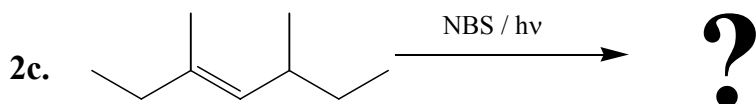
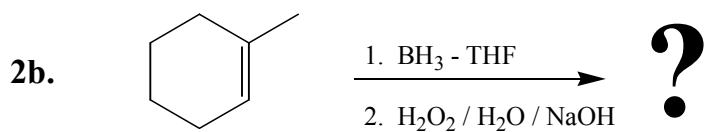
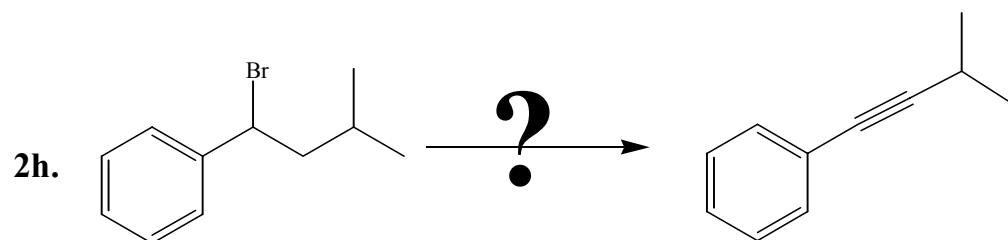
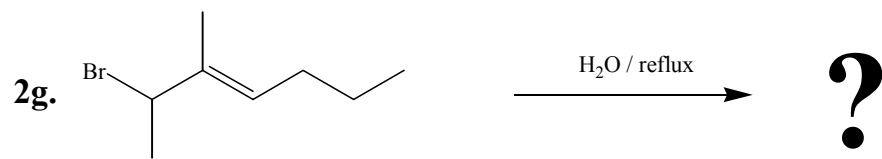
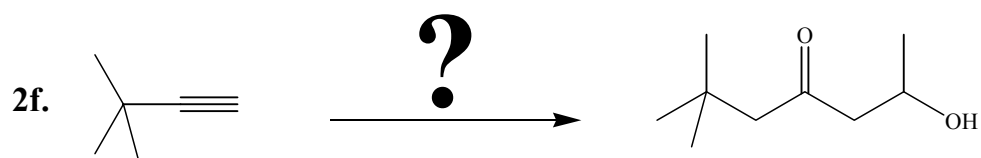
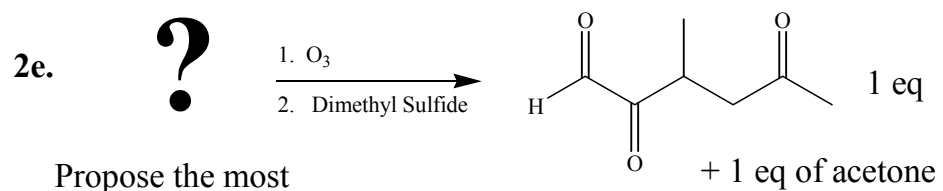




2. Consider the following reactions. Provide an answer that satisfies the question mark: Either predict the major product for each reaction **OR** provide the reagents for each synthesis (more than one reaction may be required). Pay Close attention to stereochemistry. Concisely explain your rationale: (64 points – 8 points for each)

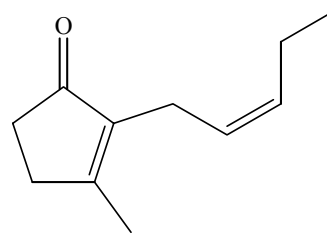


2cont.



3. Consider the following molecule: (21 points)

3a. Provide a retrosynthetic analysis for this molecule with **at least** two different synthetic pathways, each resulting in the synthesis of jasmine from 1-methylcyclopentene and any molecule containing three or less carbons. It would be beneficial to think of several different routes. Do not provide a mechanism and ensure that you think about this problem in the proper manner (15 pts)



Jasmone (The pleasant smelling odor of Jasmine flowers)

3b. Choose the best route and provide an appropriately presented synthesis of this molecule (6 points)

4. Bob was working in lab with his partners and tried to convince them that they could use either hydroboration or oxymercuration to form the same product from achiral 3,5-diethyl cyclopentene. He thought that achiral 3,5-diethyl cyclopentene would react both with:
- A. diisopropylborane in THF followed with sodium hydroxide, peroxide and water  
and
  - B. mercuric acetate in water followed with sodium borohydride in aqueous sodium hydroxide to form the same product. Since everyone hated Bob and they were afraid that his marijuana-induced paranoia might turn dangerous, his lab partners let him do what he wanted. When Bob analyzed his products using NMR and normal GC, he discovered that each reaction formed a different major product and that the minor product was the other reactions major product. (Hydroboration afforded A as the major product, with a small amount of B and oxymercuration afforded B as the major product, with a small amount of A). When they analyzed their reaction using a chiral GC column, they noticed that each compound was in fact two compounds, that is, hydroboration gave two major products (A & A') with a minor amount of B & B'. Furthermore, oxymercuration gave two major products (B & B') with a minor amount of A & A'. Try to help Bob's poor, abused lab partners make sense of the data so that they can write their lab report, by answering the following questions. (20 points)
- 4a. What is the structure of achiral 3,5-diethylcyclopentene? Why is it considered achiral? (what does that mean?) (2 pts)
- 4b. How are A, A', B & B' all related to each other? Why are different experimental results obtained using the different techniques? (2 pts)
- 4c. Show a mechanism that accounts for the formation of the major products A & A' from the hydroboration reaction and explain briefly. (6 pts)

- 4d. Why are B & B' from the hydroboration reaction the minor products? Make reference to your above reaction and provide any additional structures that might help you make your point. (2 pts)
- 4e. Show a mechanism that accounts for the formation of the major products B & B' from the oxymercuration reaction and explain briefly. (6 pts)
- 4f. Why are A & A' from the oxymercuration reaction the minor products? Make reference to your above reaction and provide any additional structures that might help you make your point. (2 pts)