

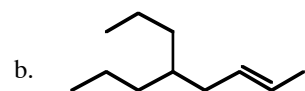
1. Rank the following alkenes in order of stability, 1 being most stable, 4 being least stable. (3 points)



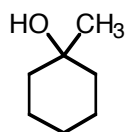
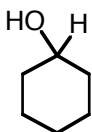
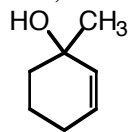
2. Determine the number of elements of unsaturation for C_5H_8O . (2 points)

3. Give the proper IUPAC name or the structure for the following compounds. (3 points each)

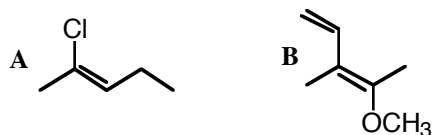
a. 4-vinylcyclopentene



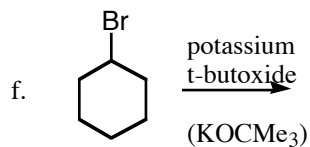
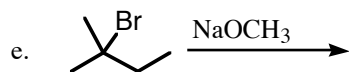
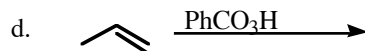
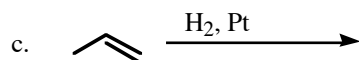
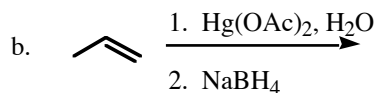
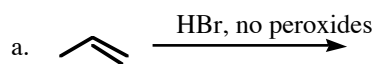
4. Rank the reactivity of the following alcohols towards H_2SO_4/Δ catalyzed dehydration, 1 being the fastest reactant, 3 being the slowest reactant. (3 points)



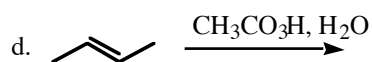
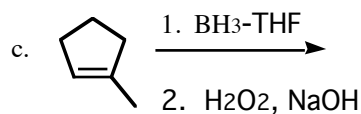
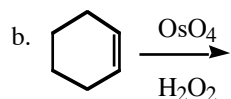
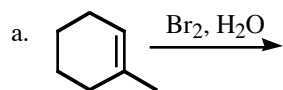
5. Which of the following statements is true for the structures shown: (3 points)
- A** is Z and **B** is Z
 - A** is Z and **B** is E
 - A** is E and **B** is Z
 - A** is E and **B** is E



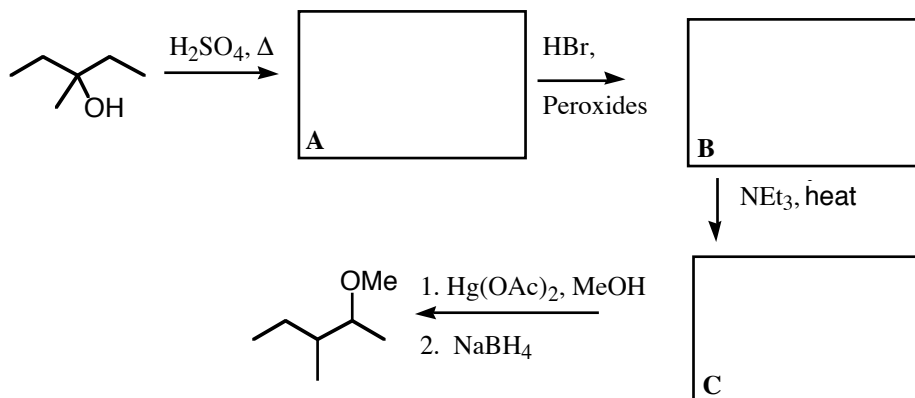
6. Predict the major product for the following reactions. You needn't bother to show any side products or minor products. Pay careful attention to orientation, which is important in many of these problems. (3 points each)



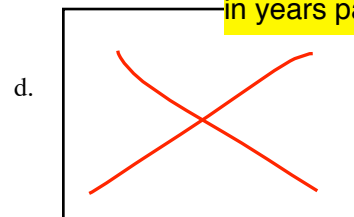
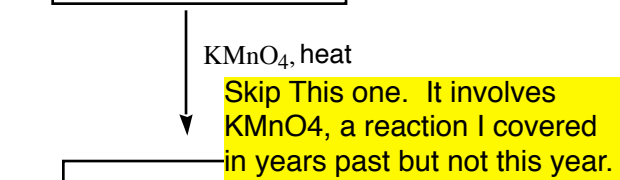
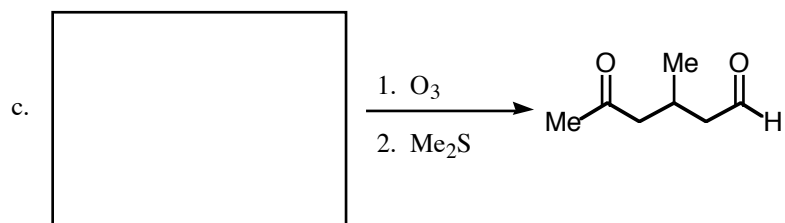
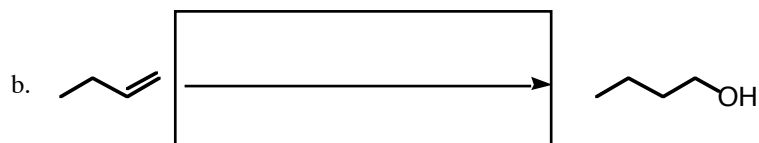
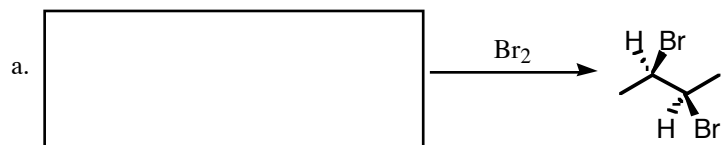
7. Predict the major product in each of the following reactions. Pay careful attention to stereochemistry: stereochemistry is involved in each of these problems! (3 points each)



8. Fill in the intermediates in the following transformation. (3 points each)

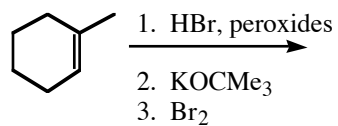
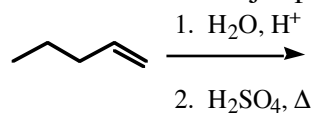


9. For the following reactions, fill in the missing starting materials, reagents, or products. (3 points each)

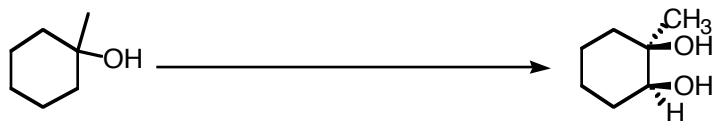
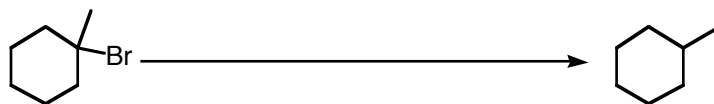


Skip This one. It involves KMnO₄, a reaction I covered in years past but not this year.

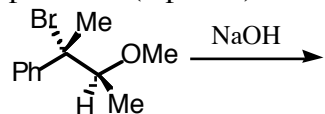
10. Provide the major product of the following reaction sequences. (4 points each)



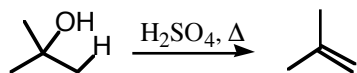
11. Provide reagents to accomplish the following transformations. (4 points each)



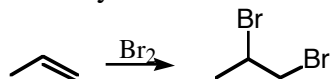
12. Provide the product for the following reaction. Be sure to show the stereochemistry of the product. (3 points)



13. Draw the mechanism for the following reaction, and write "slow" next to the rate determining step. Be sure to draw all intermediates, and to correctly draw "electron-movement" arrows or half-arrows. (4 points)



14. Draw the mechanism for the following reaction. Be sure to draw all intermediates, and to correctly draw "electron-movement" arrows or half-arrows. (4 points)



15. Formula: C_4H_8

Reactivity: reacts with H_2/Pt to give C_4H_{10}

DRAW ALL POSSIBLE ISOMERS, INCLUDING STEREOISOMERS. (4 isomers are possible!) (5 points)