

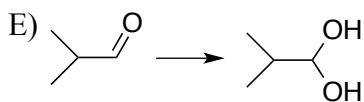
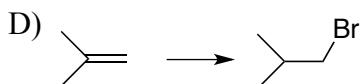
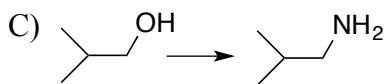
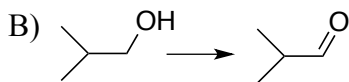
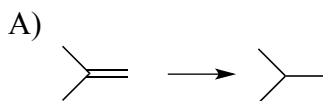
1. Draw the structure of the following compounds (6 pts).

A) 2-ethoxy-5-methylhexane

B) 2,3-pentanediol

C) 2-ethyl-3-methyloxirane

2. Indicate whether each of the following transformations is an oxidation, a reduction, or neither (10 pts).



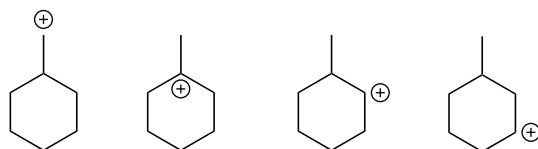
3. Arrange the following alcohols in order of increasing acidity in aqueous solution (3 pts).



4. Draw a dashed line indicating the hydrogen bond between the following pair of molecules. Identify the hydrogen bond donor and acceptor (6 points).

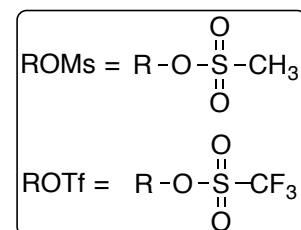
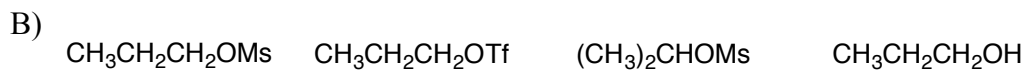


5. Which of the following is the most stable carbocation (3 pts)?

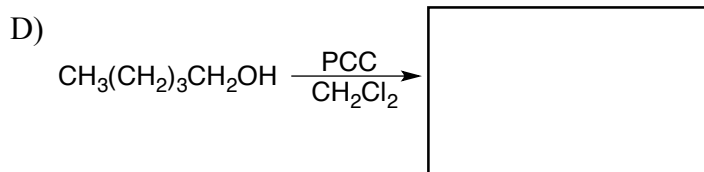
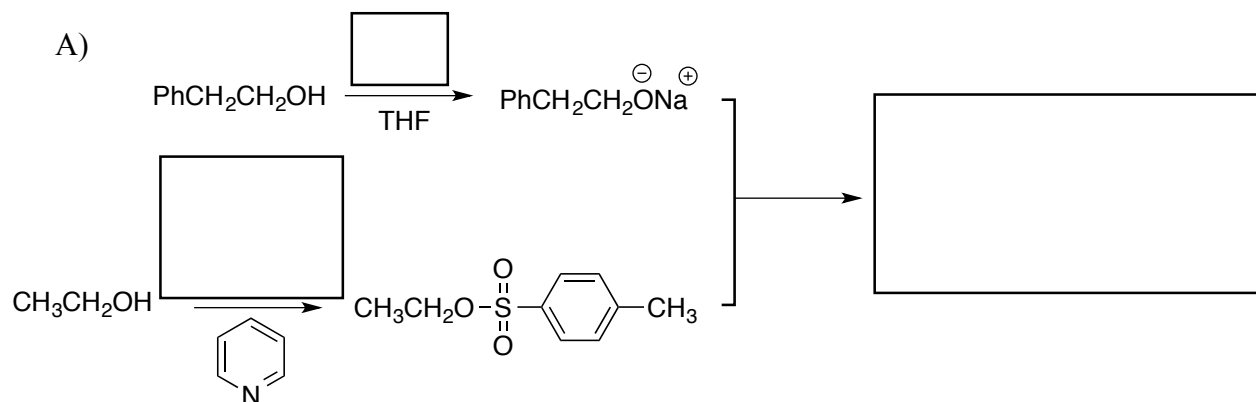


6. Rank the following electrophiles in order of increasing reactivity in an $\text{S}_{\text{N}}2$ reaction (6 pts)?

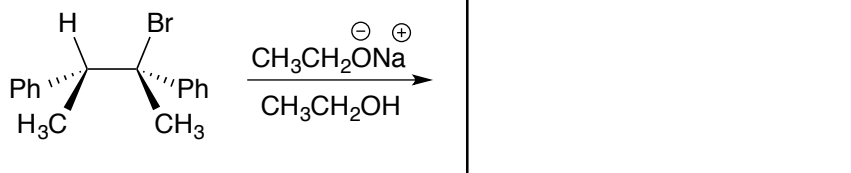




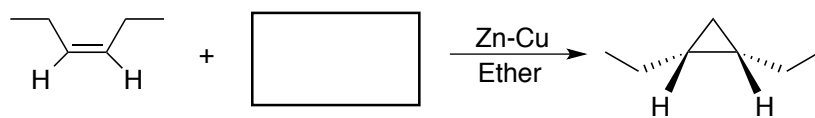
7. Provide the missing reagents and products for the following reactions (30 pts).



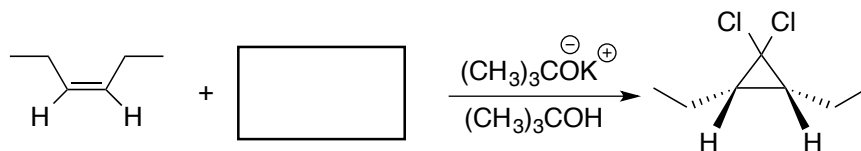
E)



F)



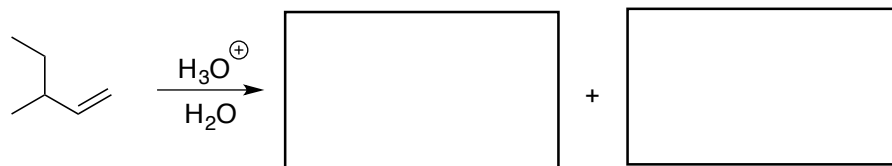
G)



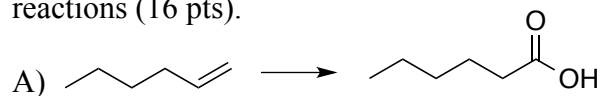
H)

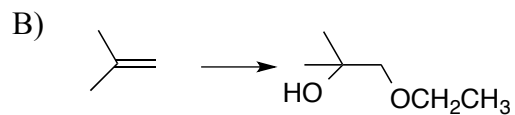


I)

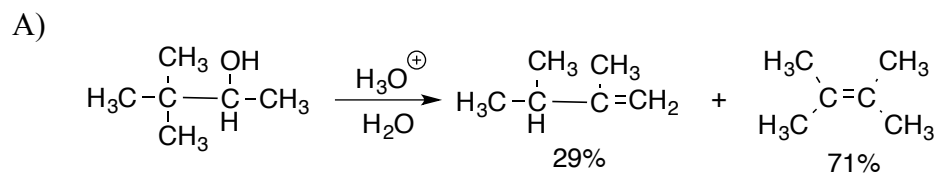


8. Complete the syntheses shown below. Each synthesis may involve a sequence of several reactions (16 pts).





7. Provide the mechanisms for the following reactions. Show every intermediate and all the arrows required for each step of the reaction (20 pts).



B)

