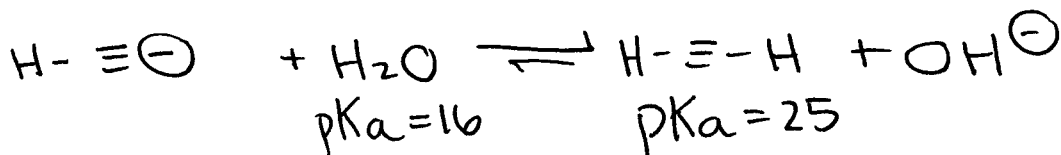


Problem Set IV

KEY

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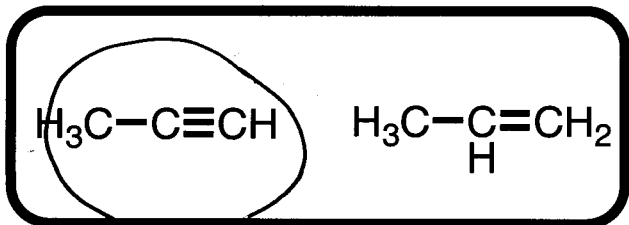
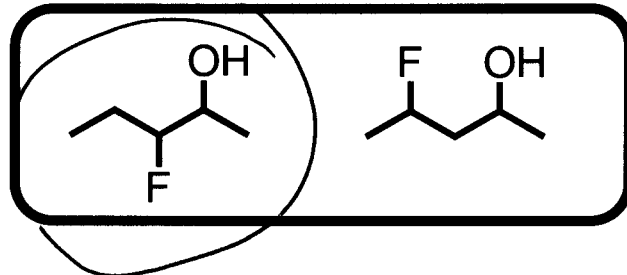
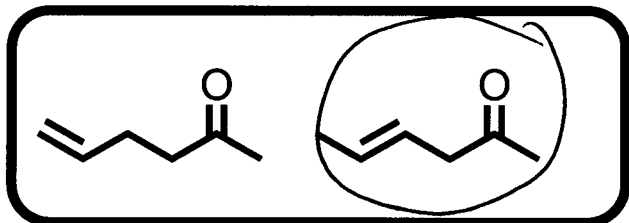
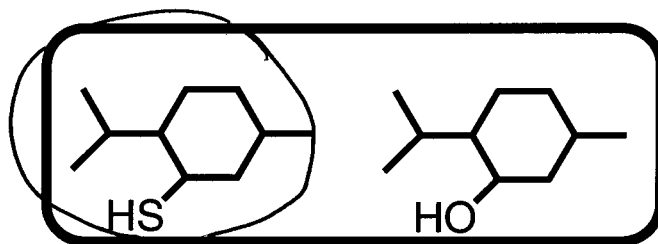
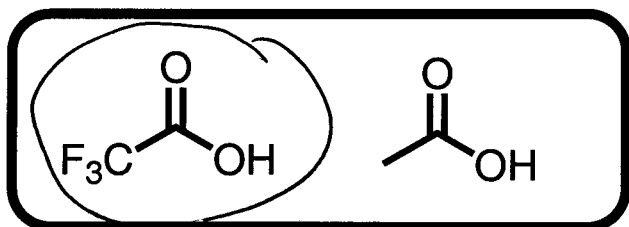
1. Given that the pKa of acetylene is 25, and the pKa of water is 16, write out the reaction that occurs between the acetylide anion and water. State whether the reaction will proceed as written and why.



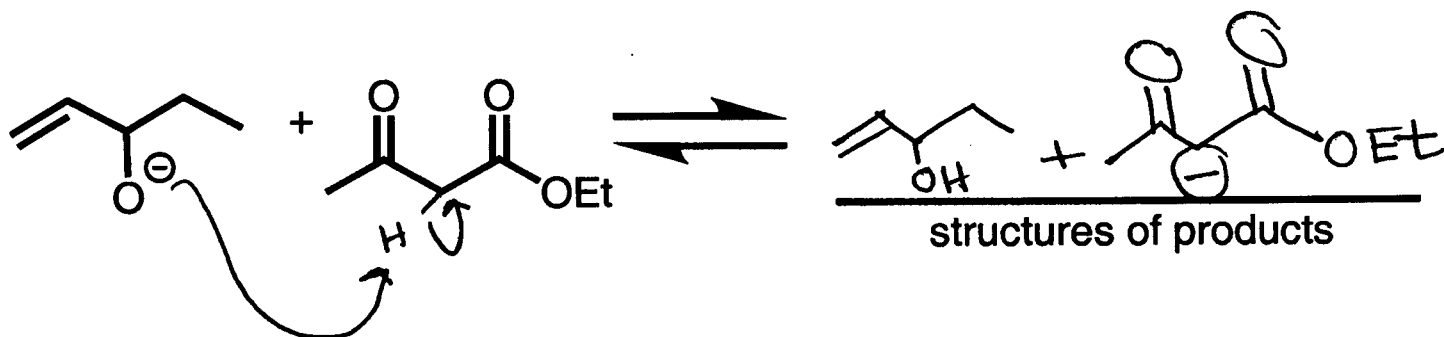
Yes - Equilibrium lies in the direction of greater pKa.

$$K_{eq} = 10^{-(16-25)} = 10^9$$

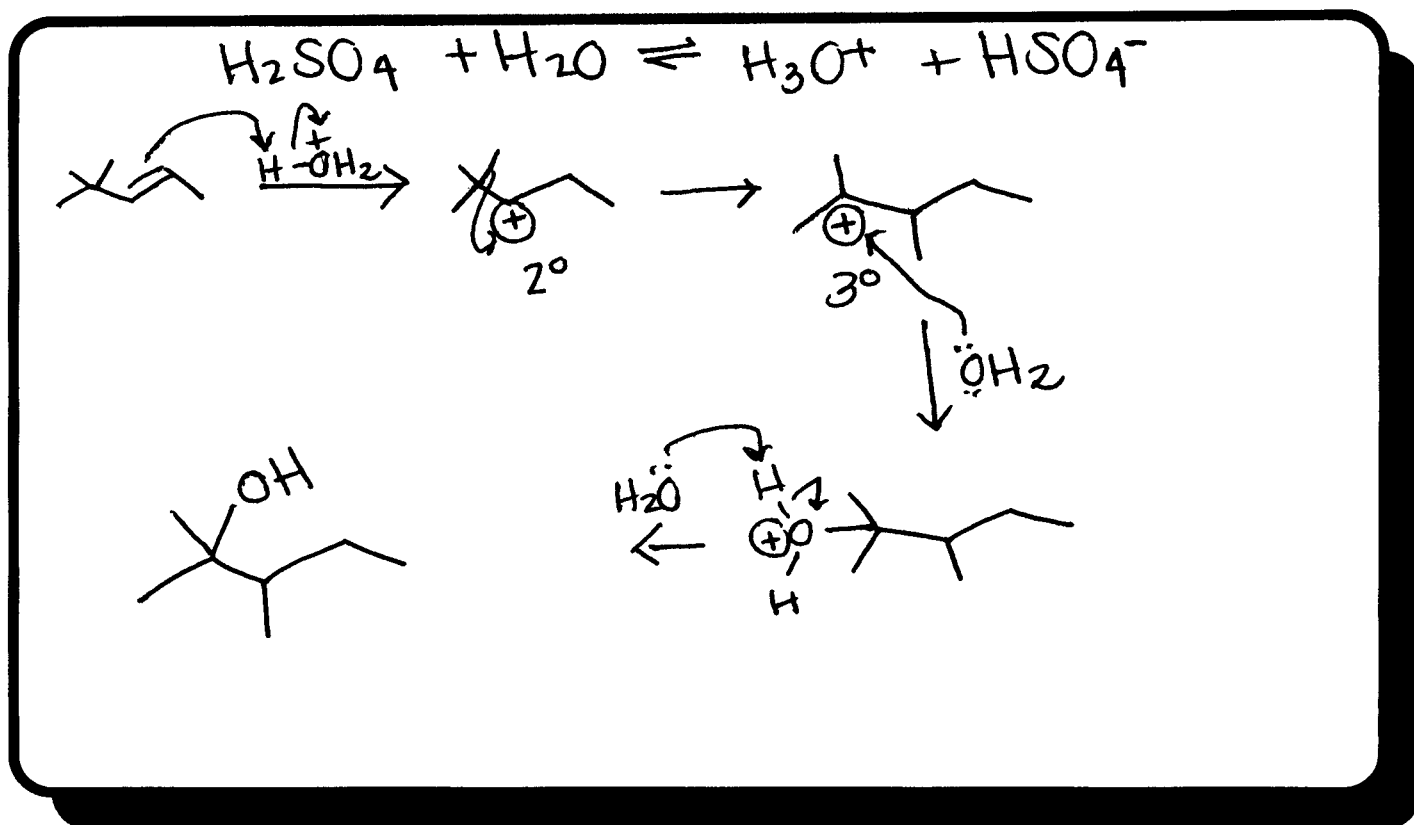
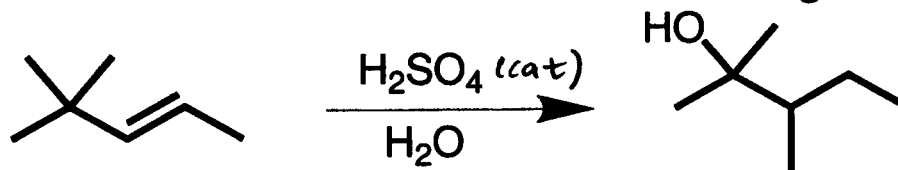
2. Circle the strongest acid of each pair.



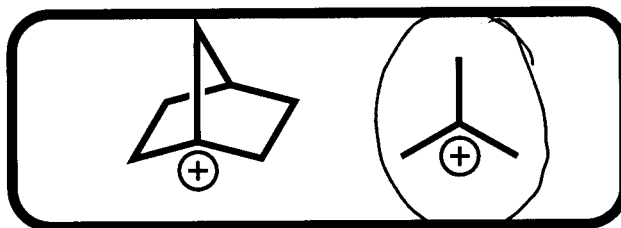
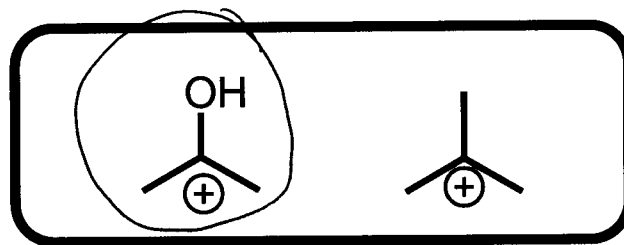
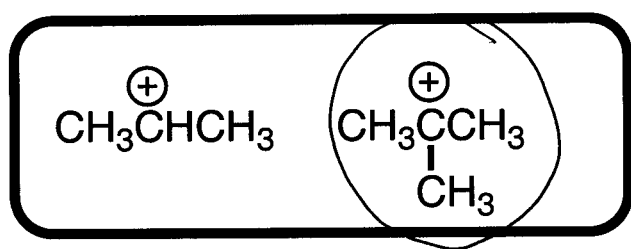
3. Draw the structures of the major products of the following acid-base reaction. Use arrow notation to show the flow of electrons in the reaction mechanism.



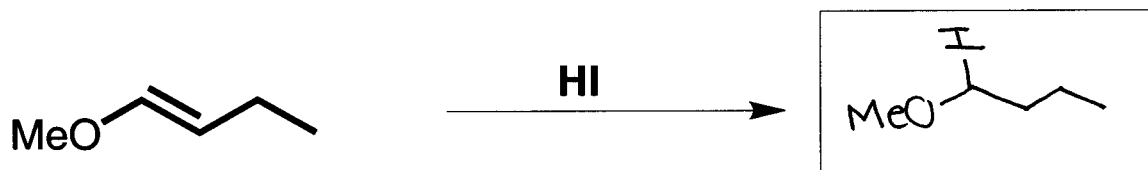
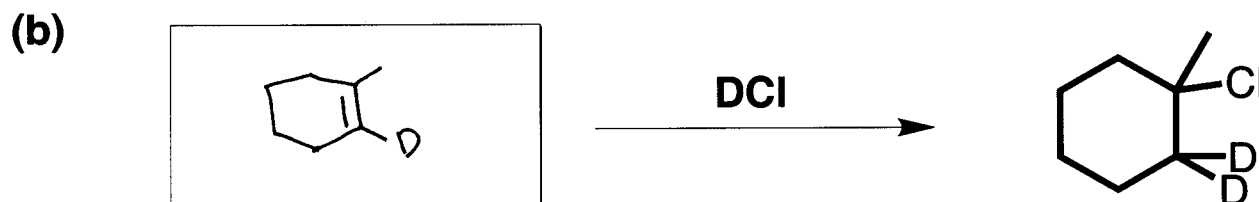
4. Write out a detailed mechanism for the following reaction:



5. Circle the most stable carbocation of each pair.

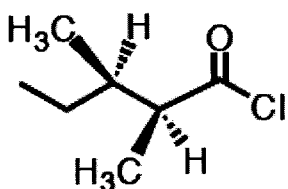
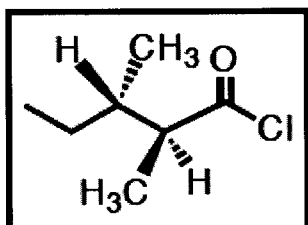


6. Fill in the blanks (reactant or product) for each transformation.

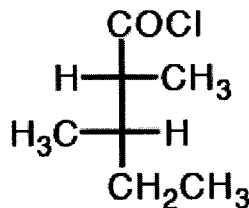


7. Label each structure compared to that in the box as **SAME**, **ENANTIOMER**, **DIASTEREOMER** or **STRUCTURAL ISOMER**.

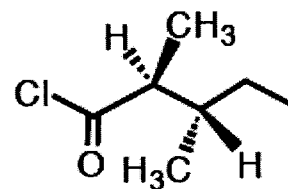
(a)



diastereomer

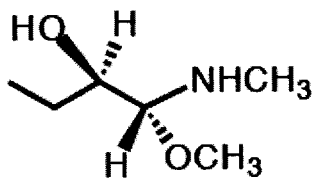
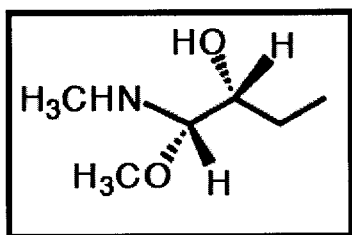


Diastereomer

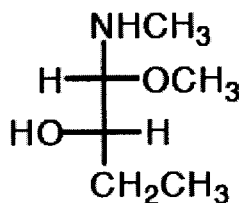


same

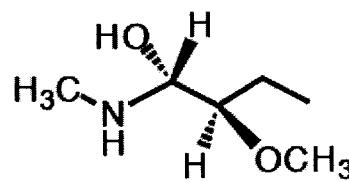
(b)



diastereomer



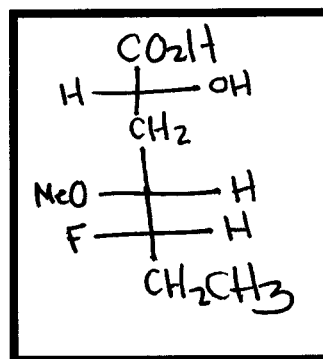
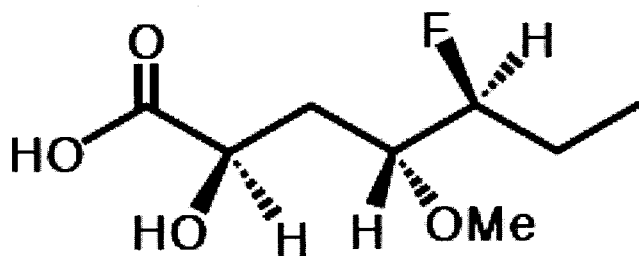
enantiomer



structural isomer

8. Draw the Fischer projection corresponding to the structure provided.

(a)



(b)

