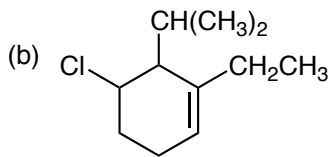
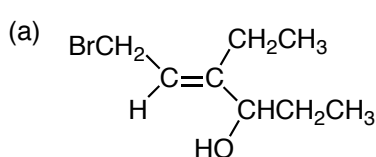
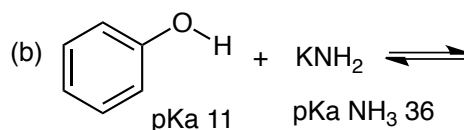
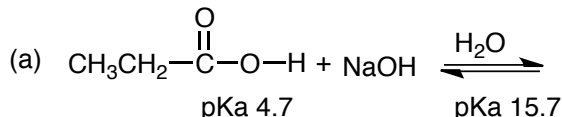


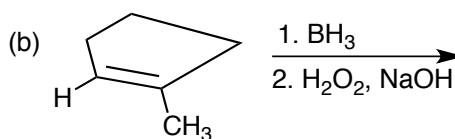
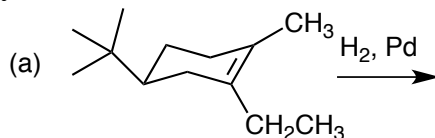
1. Name the following compounds. Be sure to specify E/Z where appropriate. (20 pts)



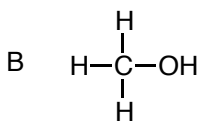
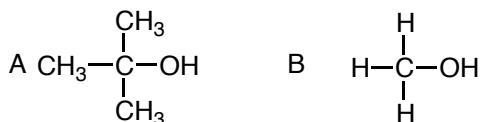
2. Give the products of the following acid-base reactions and in each case calculate the equilibrium constant. (30 pts)



3. Give the products of the following reactions. You do not need to show the complete mechanism but you must show the correct stereochemistry. (20 pts)



4. Which molecule would react faster with HBr? Explain by showing the full reaction mechanism for each molecule and make a careful potential energy versus reaction progress diagram for each reaction. Be sure to point out how the energy diagrams are different. (30 pts)



5. Explain why using 3,3-dimethyl-2-hexanol would not be a good starting material for the synthesis of 3,3-dimethyl-1-hexene. Show the reaction that would occur with H<sub>2</sub>SO<sub>4</sub>, giving all the individual steps of the reaction mechanism, and giving the actual major and minor products that are formed. (20 pts)

6. Molecule **A** reacts very slowly with sodium methoxide in methanol (NaOCH<sub>3</sub>/HOCH<sub>3</sub>) while molecule **B** reacts rapidly. Explain why by making careful three-dimensional chair drawings of each molecule and showing the reaction that occurs with each one, including the expected product. (30 pts)

