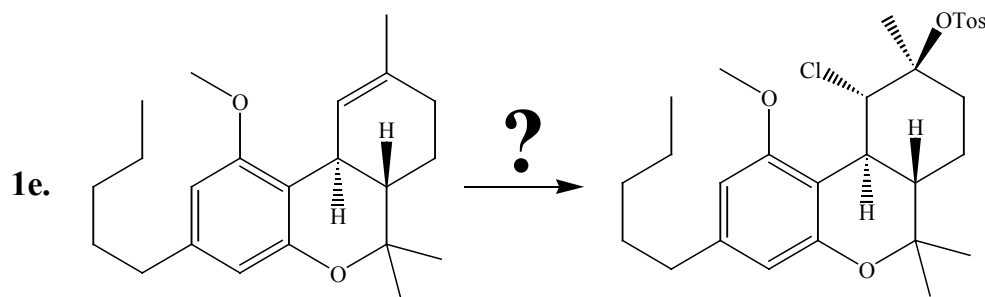
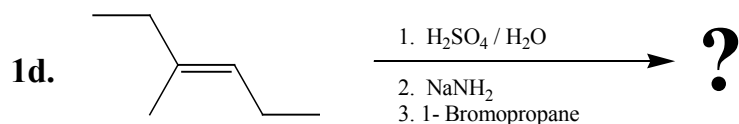
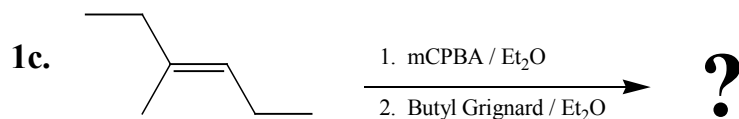
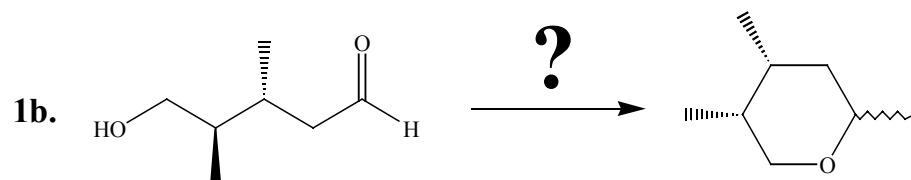
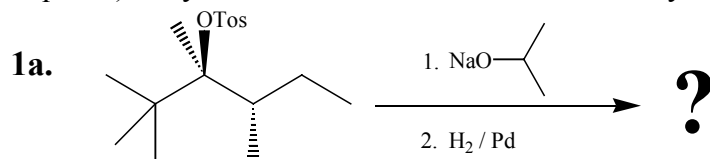


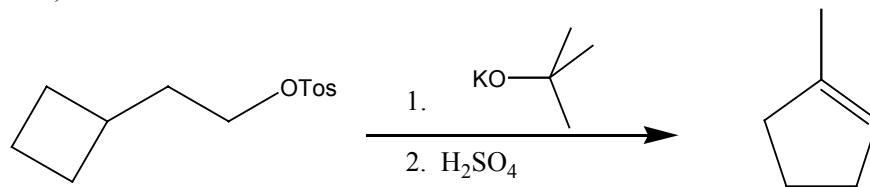
Whittier College
Organic Chemistry: CHEM 231B
Problem Set # 2
 40 Points Total
 Due Thursday, March 13, 2003 @ 12:00 p.m.

1. Consider the following reactions. Provide an answer to satisfy the missing component as represented by the '?'. Provide either one major product or the missing reagents (more than one reagent may be required). Pay close attention to the stereochemistry of the reactions (15 points = 3 points each)

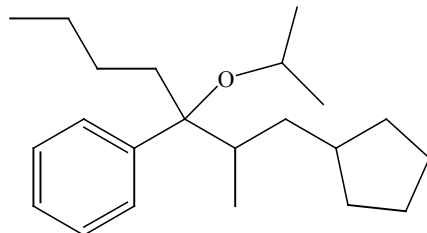


O-Methyl TetrahydroCannabinol (M-THC)

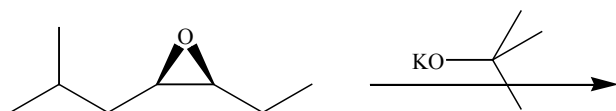
2. Provide an arrow pushing mechanism to explain the formation of the product from the following reaction: (4 points)



3. Provide a retro synthetic analysis for the following compound. Provide at least three alternate pathways starting with any halocarbon of 6 carbons or less. Choose the best route and provide a detailed synthesis of the compound. (11 points = 9 pts for retro and 2 pts for synthesis)



4. Bob wanted to investigate the following reaction: (10 points)



He thought that since the oxygen of the epoxide was supposedly a good leaving group, that it might be able to undergo an E2 reaction. He picked the starting material because it was the first epoxide he found in the stockroom. Much to his chagrin, he found four products upon analysis using GC-MSD, all with nearly identical mass spectra and a molecular ion peak at 128 m/z. He purified each compound using column chromatography. Upon analysis using IR spectroscopy, he saw nearly identical spectra. The main features were a broad peak between 3450 & 3200 cm^{-1} , a few medium peaks at $\sim 3100 \text{ cm}^{-1}$, a few medium peaks at $\sim 2950 \text{ cm}^{-1}$, a medium peak at $\sim 1650 \text{ cm}^{-1}$ and a strong peak at $\sim 1100 \text{ cm}^{-1}$. When he tried to interpret the NMR spectra, he could not make sense of them (you see, Bob does not understand complex NMR spectra).

- 4a. What are the four possible elimination products (2 points)?
- 4b. Using NMR, how would you be able to differentiate between the compounds? Be specific in your analysis of any characteristic peaks, including chemical shift, integration, and coupling. For any non-simple peaks, show a picture of the predicted peak, including any relevant J values (8 points).