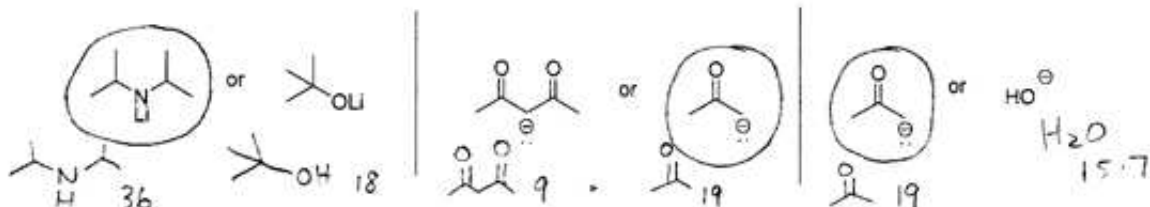
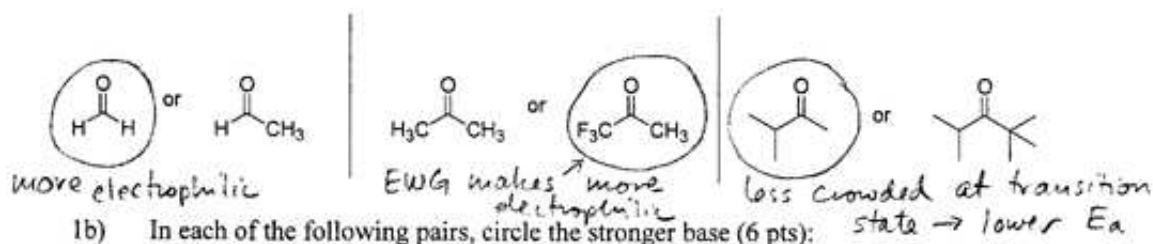
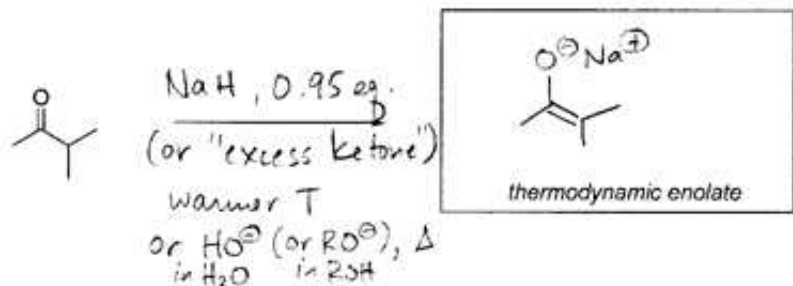
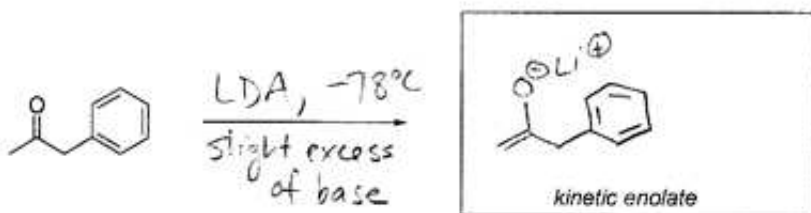


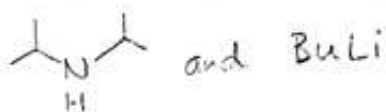
1a) In each of the following pairs, circle the carbonyl compound that will have a larger K for hydration (6 pts):



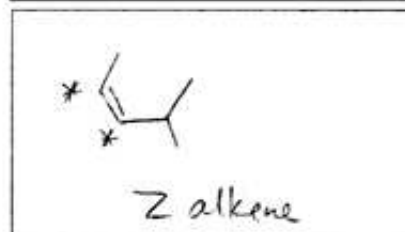
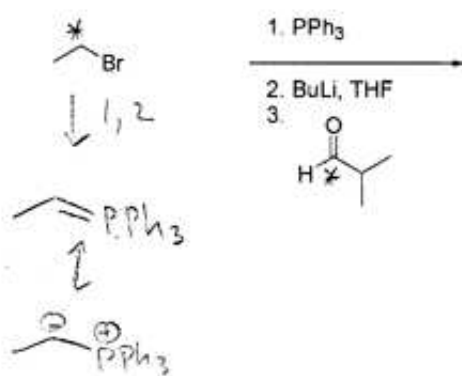
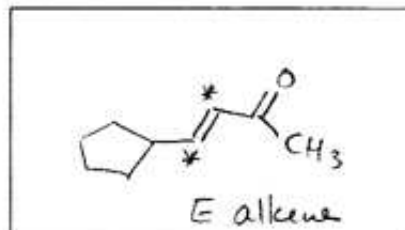
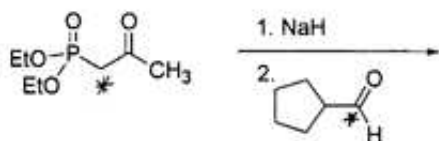
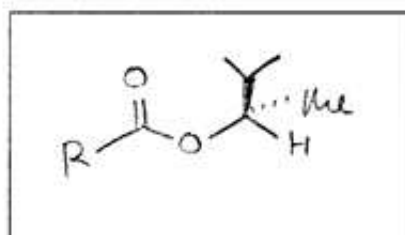
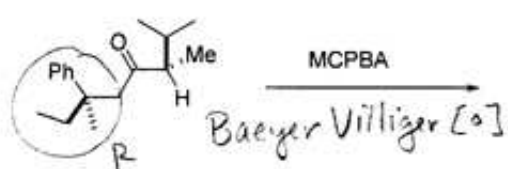
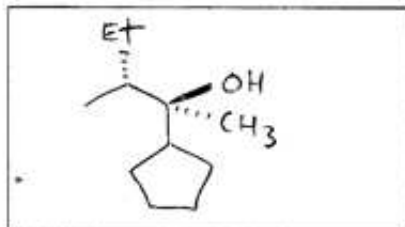
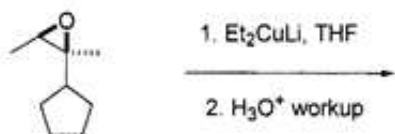
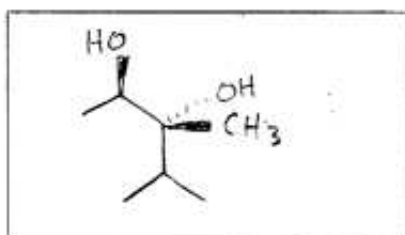
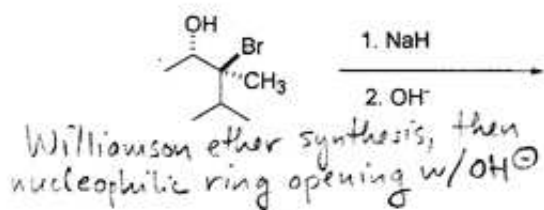
1c) For each of the following ketones, draw the structure of the enolate indicated and provide reagent(s) and conditions that would lead to the formation of the desired enolate (6 pts):



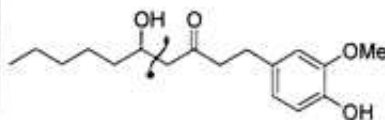
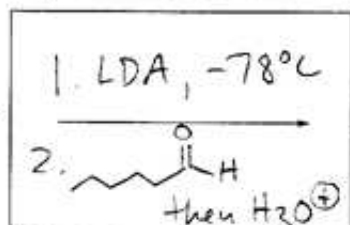
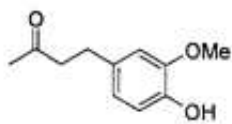
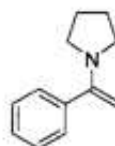
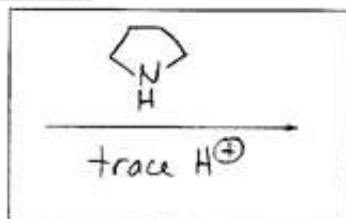
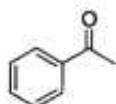
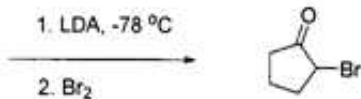
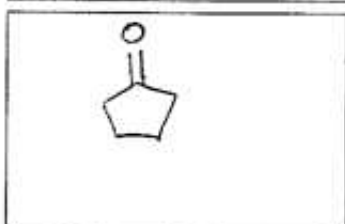
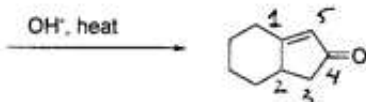
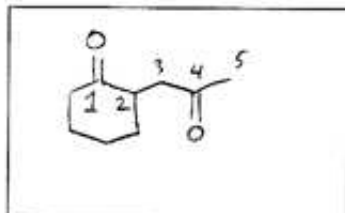
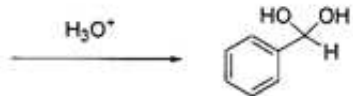
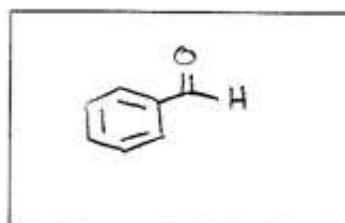
1d) What reagents would you combine to synthesize LDA in the laboratory? (2 pts)



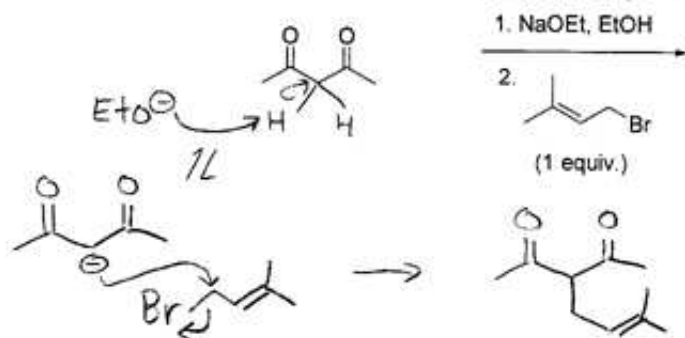
2) Predict the major organic product of each of the following reactions or reaction sequences. Assume aqueous workup for all reactions. Show the correct stereochemistry expected in each product (20 pts).



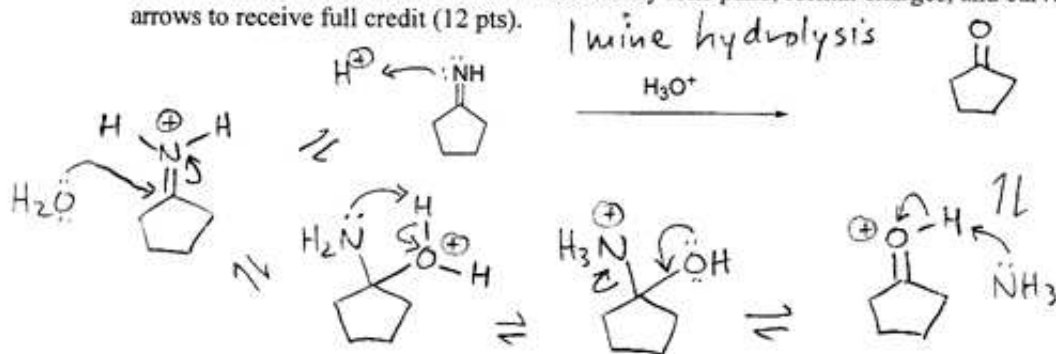
3) Provide the missing starting materials or reagents for each of the following transformations. Some transformations may require more than one step. Assume aqueous workup for all reactions (20 pts).



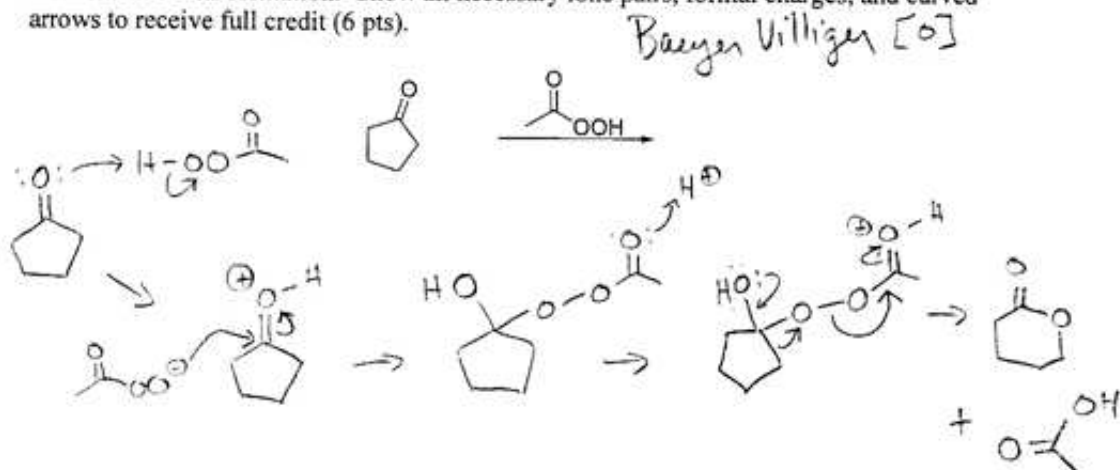
4a) Predict the product of the following transformation and provide an arrow-pushing mechanism for its formation. Show all necessary lone pairs, formal charges, and curved arrows to receive full credit (6 pts).



4b) Predict the product of the following transformation and provide an arrow-pushing mechanism for its formation. Show all necessary lone pairs, formal charges, and curved arrows to receive full credit (12 pts).



4c) Predict the product of the following transformation and provide an arrow-pushing mechanism for its formation. Show all necessary lone pairs, formal charges, and curved arrows to receive full credit (6 pts).



5) Propose multi-step syntheses for the following target molecules using the indicated starting materials and reagents of your choice. For full credit, show the reagents for each step and the product after each step (16 pts).

