Name: _____

Whittier College

Organic Chemistry: CHEM 231A

Test # 1

125 Points Total

February 24, 2003

1. Answer the following questions: (28 points – 7 pts each)

1a. In regards to alcohols, what is meant by the term amphoteric? Explain briefly and provide a sufficient number of specific example reactions to assist in making your point.

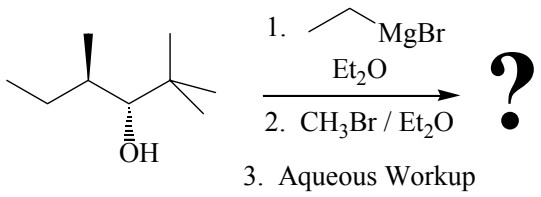
1b. Compare and contrast the physical properties of alcohols to alkanes. What accounts for these physical properties? Explain briefly

1c. What is a grignard reagent? Briefly explain why it reacts the way it does.

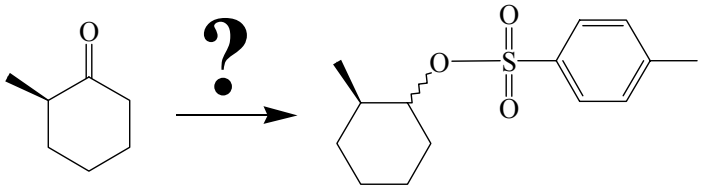
1d. What is the difference between a retrosynthetic analysis and a synthesis? Explain briefly.

2. Consider the following reactions. Provide an answer that satisfies the question mark: Either predict one major product for each reaction **OR** provide the reagents for each synthesis (more than one reaction may be required). Extremely briefly explain your rationale: (40 points – 8 points for each)

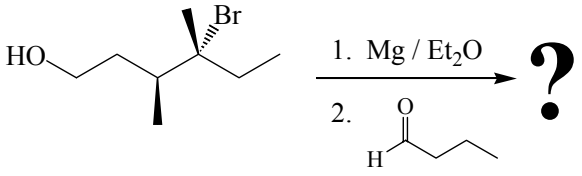
2a.



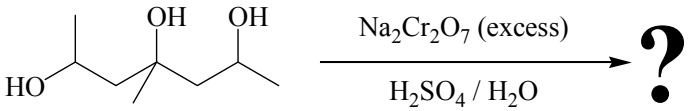
2b.



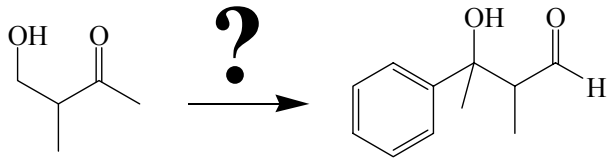
2c.



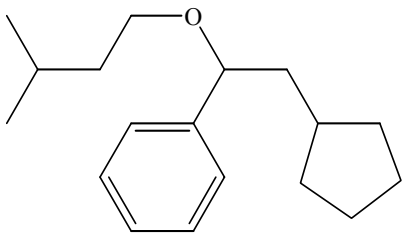
2d.



2e.



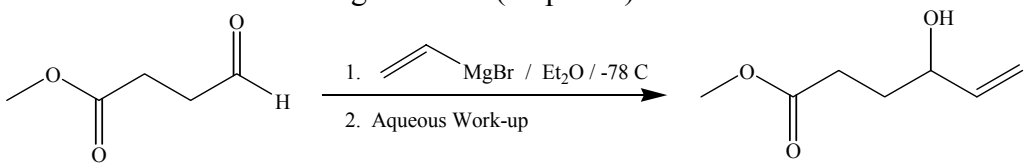
3. Consider the following molecule: (33 points)



3a. Provide a retrosynthetic analysis for this molecule with at least three different synthetic pathways starting with a 6 carbon or less organic halide molecule (containing only 6 carbons or less, hydrogen and a halogen) and/or formaldehyde (CH_2O). Do not provide a mechanism and ensure that you think about this problem in the proper manner (24 pts)

3b. Choose the best route and provide an appropriately presented synthesis of this molecule (9 points)

4. Bob wanted to conduct the following reaction: (24 points)



4a. How would he specifically use spectroscopy (NMR, IR, & GC-MSD) to determine whether this reaction occurred as predicted? Provide specific and complete NMR data, pertinent IR data and the important GC-MSD data that would provide proof that this reaction occurred. (17 points)

4b. What would you predict the product(s) would be if this reaction were done at room temperature. That is, what is the relevance of the temperature for this experiment? Explain Briefly. (7 points)

Extra Credit (5 points = don't even think about doing this until you have finished the rest of the test!!!)
If an excess of the Grignard reagent were added to the molecule, what would the product be? Explain briefly.