

I. Nomenclature

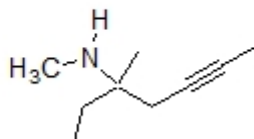
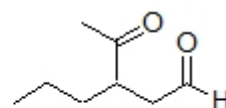
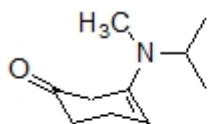
1. Draw a structure for each compound listed below. (6 points)

methyl vinyl ketone

oxime of benzaldehyde

 $C_5H_{11}NO$, an achiral amine oxide
(multiple answers)

2. Provide the systematic name for each of the following compounds: (9 points)



3. Provide a structure for paraformaldehyde. (2 points)

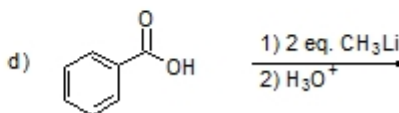
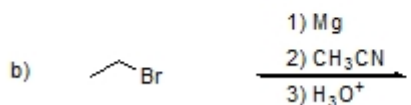
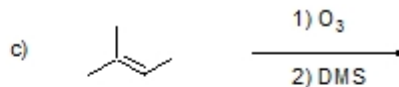
II. Theory

1. Which sequence ranks the following bonds in order of increasing bond strength? (3 points)

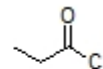
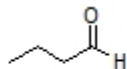
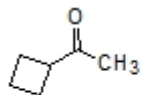
1) C=O 2) C-C 3) C=C

a) 1<2<3 b) 2<3<1 c) 3<1<2 d) 3<2<1 e) 2<1<3 f) 1<3<2

2. Circle all methods that would generate an aldehyde or ketone product. (4 points)



3. Which sequence lists the following carbonyl compounds in order of increasing reactivity toward nucleophilic addition? (3 points)



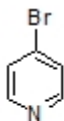
a) 1<2<3 b) 2<3<1 c) 3<1<2 d) 3<2<1 e) 2<1<3 f) 1<3<2

4. Given the pK_a values of each acid below, circle the acid that leads to the strongest conjugate base upon deprotonation **and** list the pK_b value of the conjugate base of this acid. (3 points)

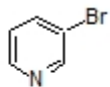
H-A	H-B	H-C
2	25	16

5. Provide a diagram showing how benzyl amine may be purified from anthracene by extraction. (4 points)

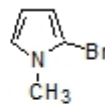
6. Which sequence ranks the following compounds in order of increasing reactivity in a nucleophilic aromatic substitution reaction? (3 points)



1



2

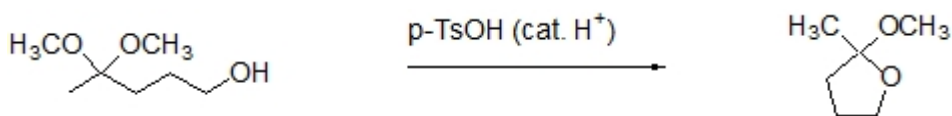


3

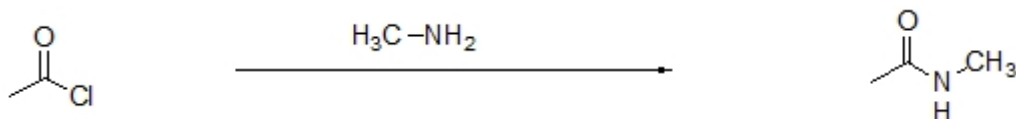
- a) 1<2<3 b) 2<3<1 c) 3<1<2 d) 3<2<1 e) 2<1<3 f) 1<3<2

III. Mechanisms

1. Provide an electron arrow pushing mechanism for the following reaction. Include all intermediates and formal charges. (10 points)

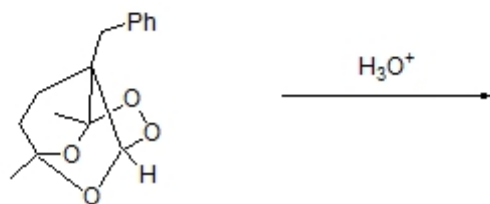
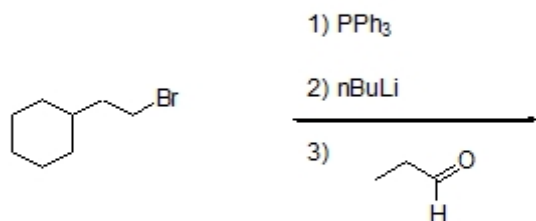
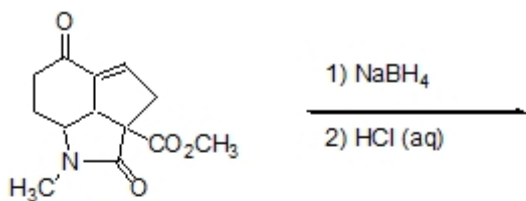


2. Provide a mechanism with correct arrow pushing, intermediate structures, and formal charges for the following transformation. (8 points)

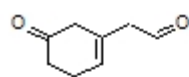


III. Reactions

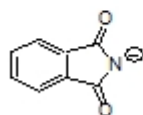
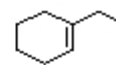
1. Complete the reactions below by drawing a structure for each major product. (10 points)



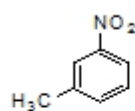
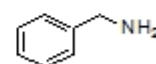
2. Provide the necessary reagents for each of the following transformation. (28 points)



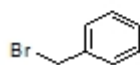
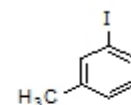
1) _____
2) _____



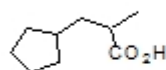
1) _____
2) _____



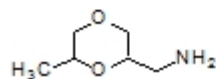
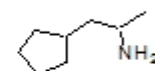
1) _____
2) _____
3) _____



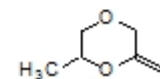
1) _____
2) _____



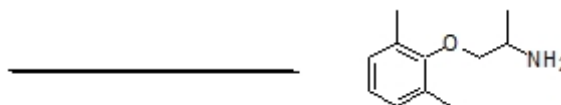
1) _____
2) _____
3) _____



1) _____
2) _____
3) _____



3. Mexiletine, an antiarrhythmic, is shown below. Show how this compound might be made using reductive amination. (7 points)



IV. Extra Credit (5 points possible)

1. Provide 5 different methods (different reagents) of producing 2-phenylethanal from 5 different starting materials.

You received _____ points out of 100 points possible. To check your overall performance in lecture see <http://canvas.weber.edu>