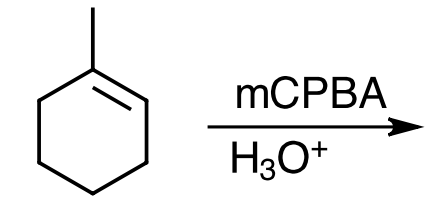
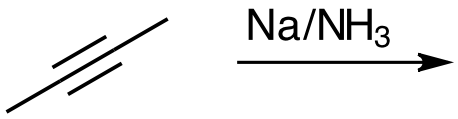
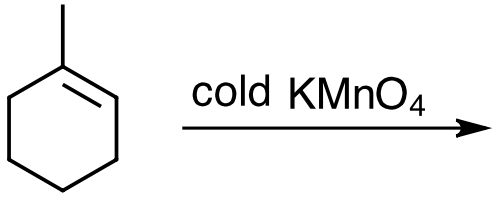
CHM 3343 Exam 2

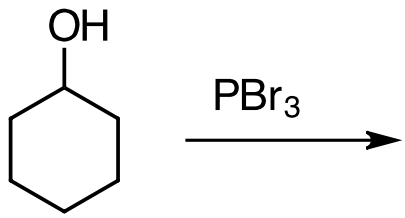
TUD Department of Chemistry
Spring 2017

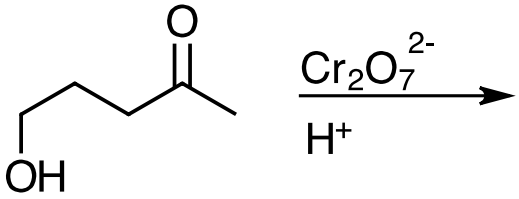
1) [40 pts] Show the expected major product for the following reactions:



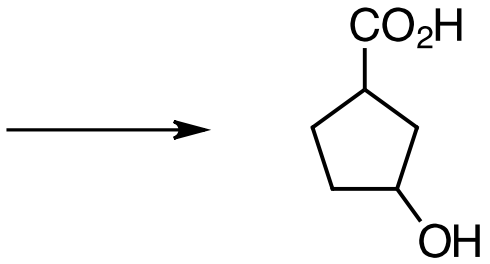


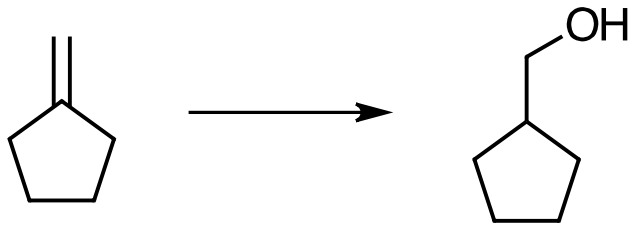


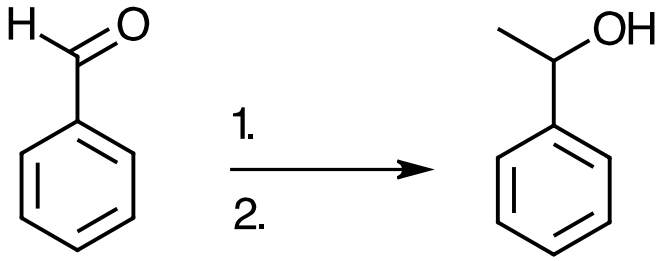


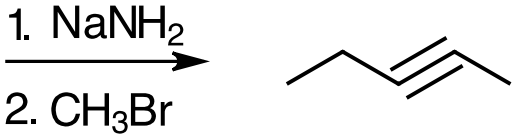


2) [40 pts] Show the starting materials or reagents necessary to carry out the following transformations:

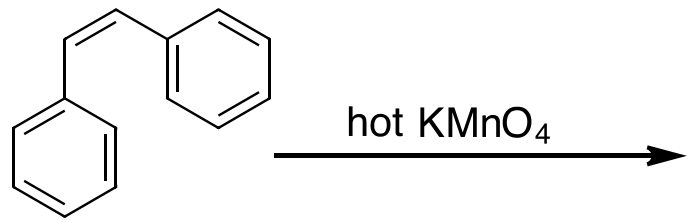


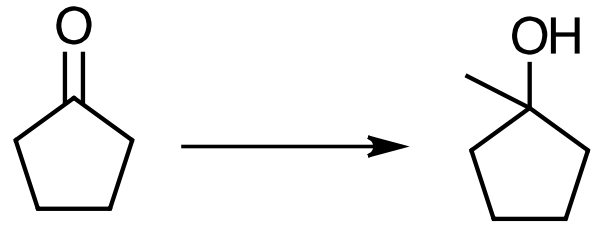


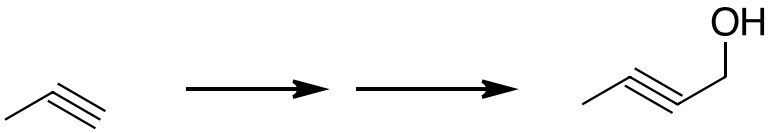


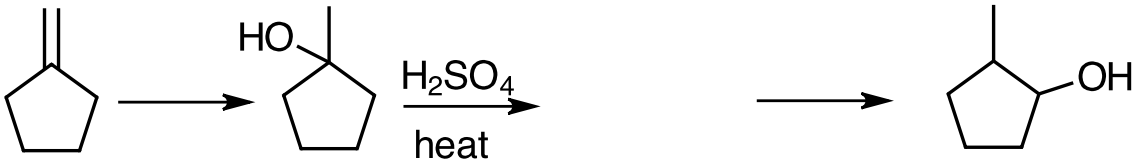


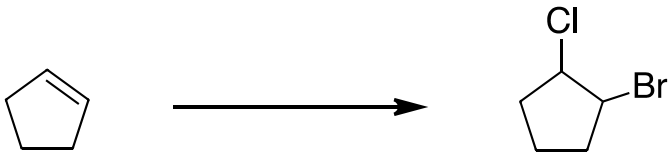
3) [20 pts] Fill in reagents or products as appropriate:











4) [40pts] What reagents would you use to bring about the following functional group conversions:

a) alcohol to carboxylic acid

b) epoxide to diol

c) alcohol to ketone

d) primary alcohol to aldehyde

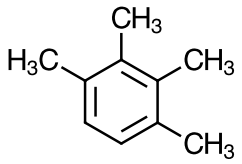
e) ester to alcohol

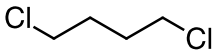
f) alkene to diol

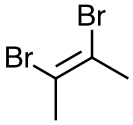
g) alkyne to alkane

h) terminal alkyne to aldehyde

5) [20pts] Write the number of types of different protons and types of different carbons below each structure:







Different protons

Different carbons

6) [10pts] Sketch the expected proton NMR spectrum for

7) [10pts] Provide structures for the following based on the provided proton NMR data:

a) $C_6H_{10}O_2$ ∂ 2.2 singlet, ∂2.7 singlet

b) C_8H_{18} ∂ 0.9 singlet

8) [10pts] Describe simple chemical tests to distinguish between the following compounds:

3-octanone 1-octanol n-octane cyclooctene t-butanol octanoic acid

9) [10pts] Starting with cyclopentyl bromide and anything else you need, show how you would synthesize: