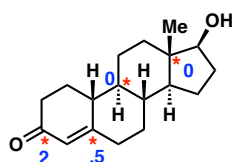
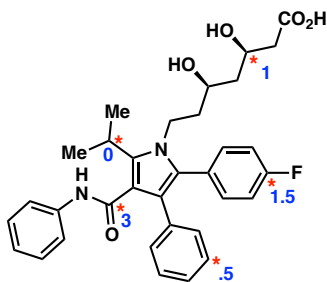


Problem Set 3
CHM 2211 – Prof. Joel M. Smith
1/7/2020

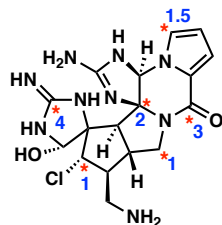
1. Identify the oxidation level of each carbon starred in the following molecules.



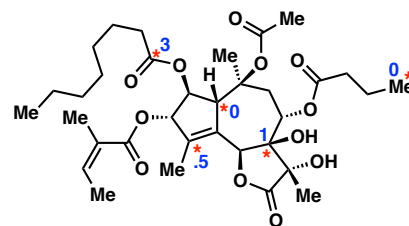
Nandrolone
 (illegal performance-enhancing steroid)



Atorvastatin
 (Lipitor)

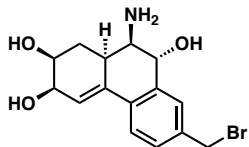


Palau'amine
 (a marine natural product)



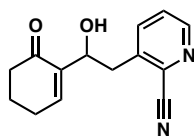
Thapsigargin
 (an anticancer natural product)

2. Identify both simple functionality and composite functionality in the following molecules.



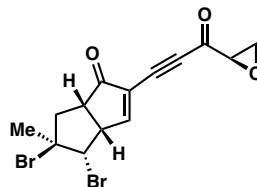
simple FG
 alcohol
 bromide
 amine
 alkene
 aromatic ring

composite FG
 allylic alcohol
 1,2-*syn*-diol
 1,2-*anti*-aminoalcohol
 benzylic bromide
 benzylic alcohol



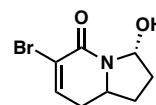
simple FG
 ketone
 alcohol
 alkene
 aromatic heterocycle
 nitrile

composite FG
 aromatic nitrile
 allylic alcohol
 enone



simple FG
 bromide
 ketone
 epoxide
 alkyne
 alkene

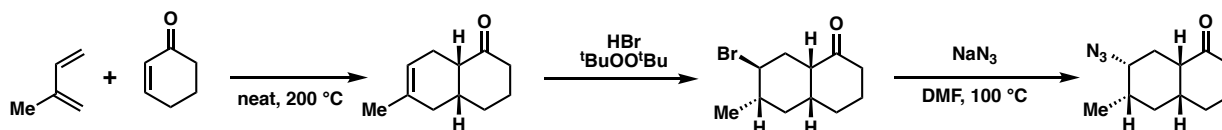
composite FG
 enone
 ynone
 1,2-*anti*-dibromide

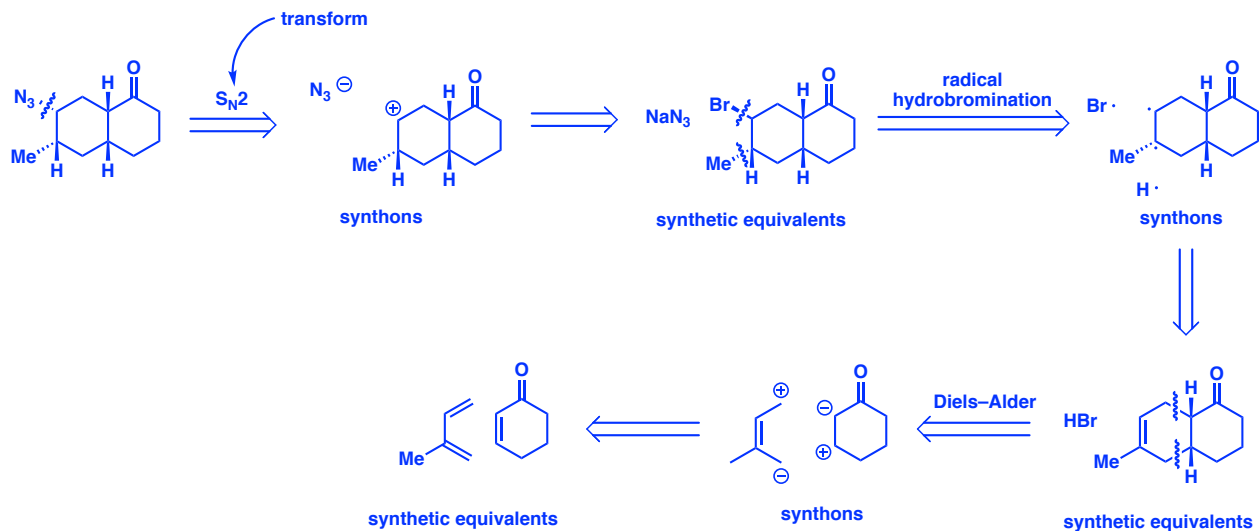


simple FG
 bromide
 amide
 alcohol
 alkene

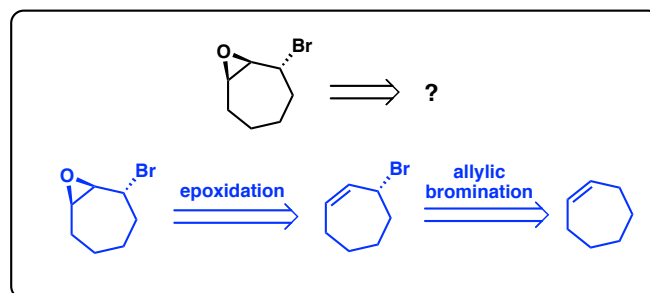
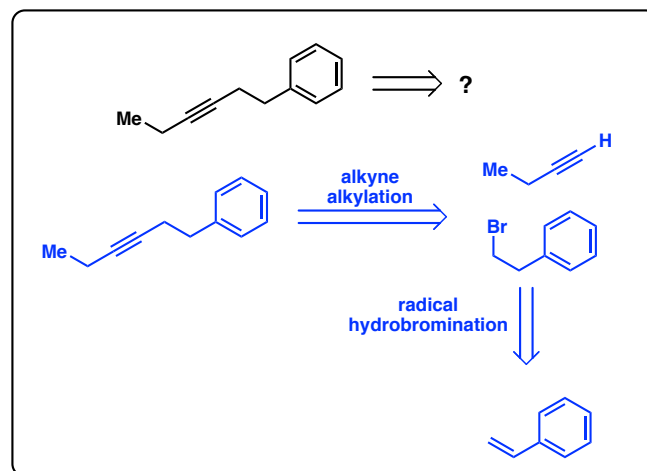
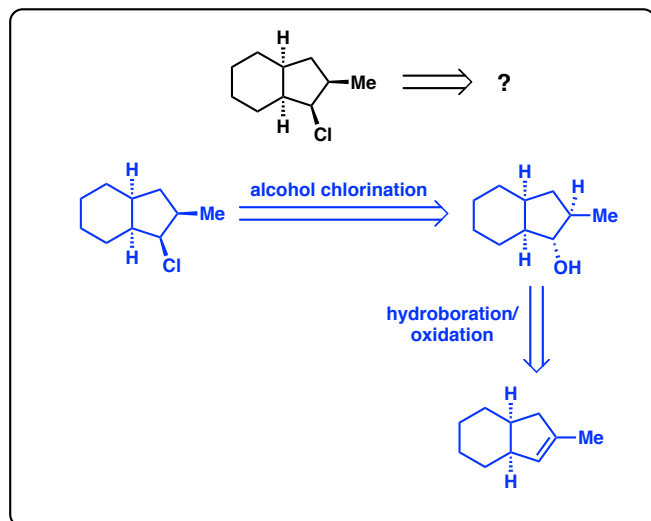
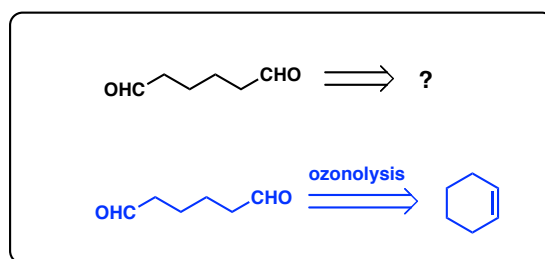
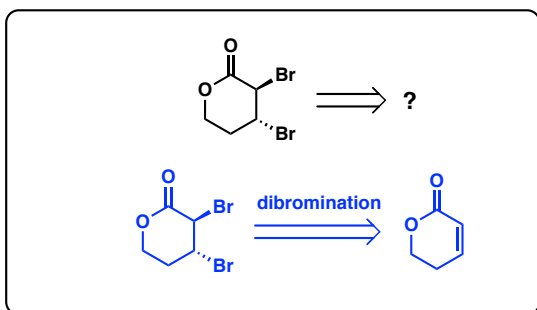
composite FG
 vinyl bromide
 lactam
 enamide
 hemiaminal*
 *(this one was new and tricky)

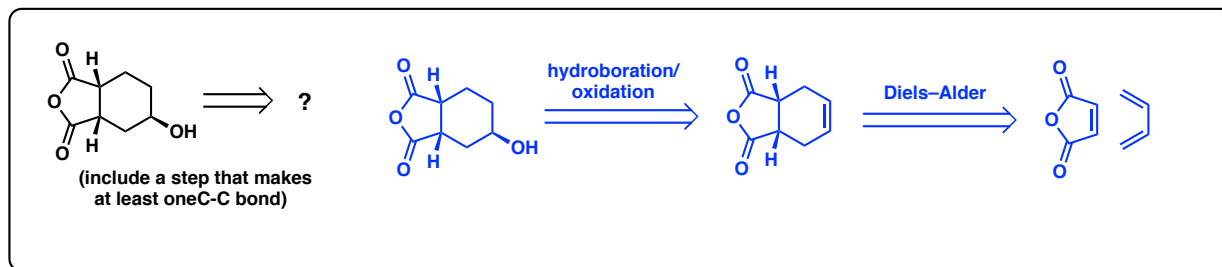
3. Given the following forward synthesis, provide a retrosynthetic analysis including synthons, transforms, and synthetic equivalents starting from the final product and going back to the starting materials shown.



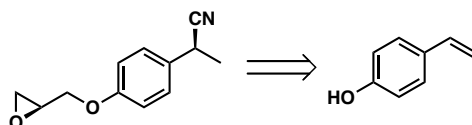


4. Identify an alkene starting material to forge the following products over either one or two transformations (do not just employ a hydrogenation!). These are all transformations from CHM 2210.

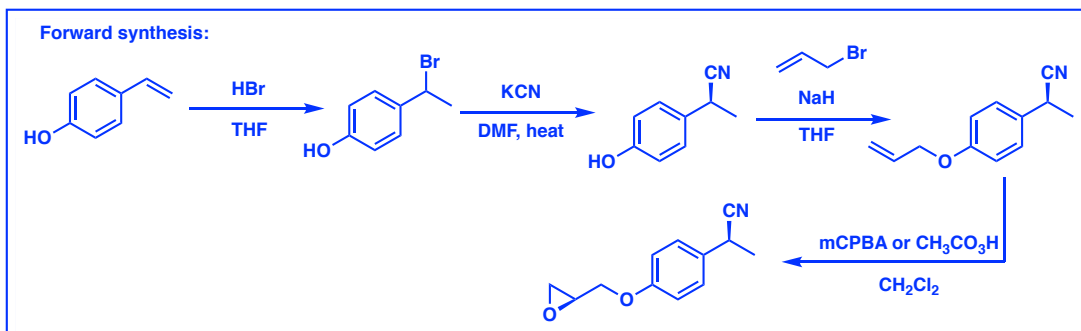
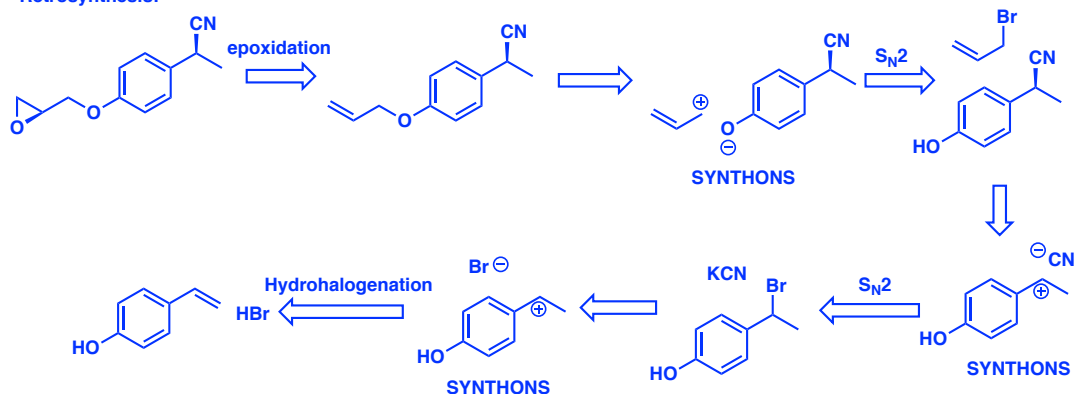


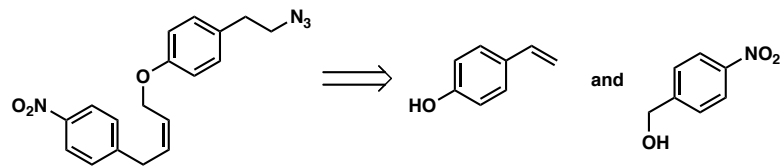


5. Provide a retrosynthetic analysis including synthons, transforms, and synthetic equivalents for the following two target molecules from the given starting materials and synthetic equivalents of 3 carbons or fewer. Then, provide a forward synthesis based off of your retrosynthesis.



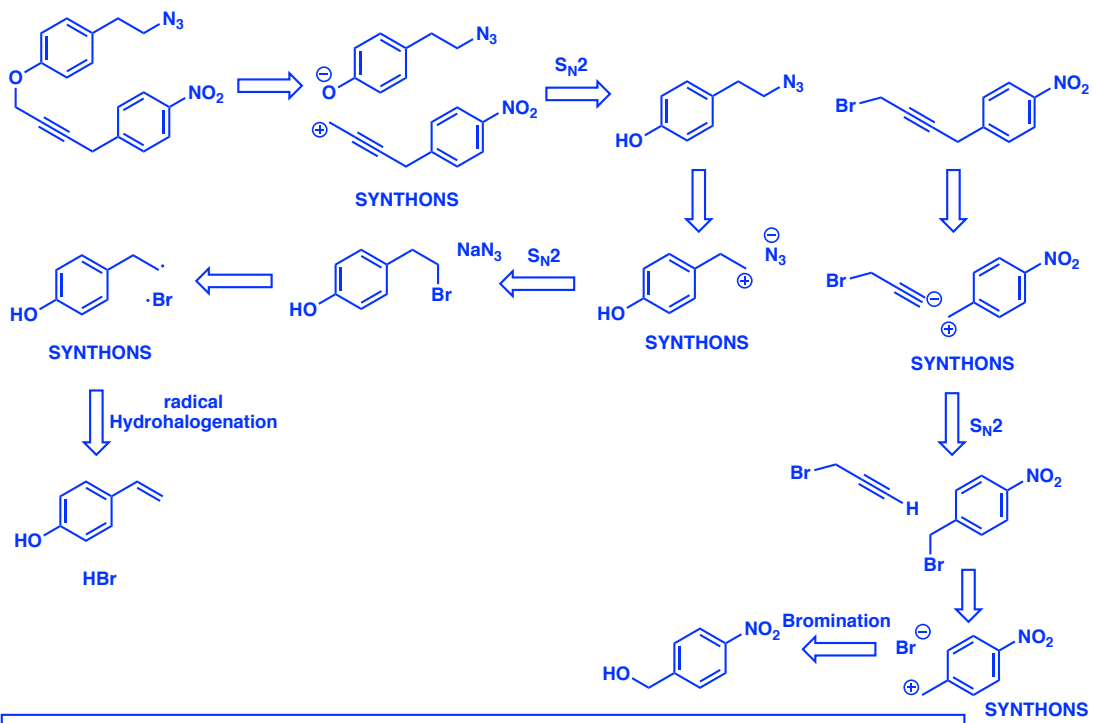
Retrosynthesis:





Retrosynthesis:

semihydrogenation



Forward synthesis:

