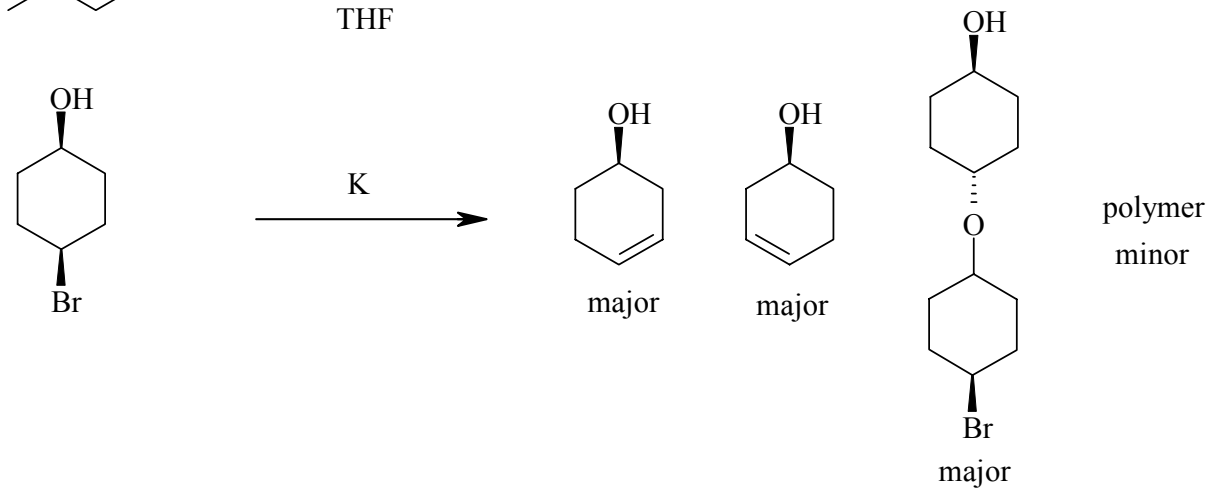
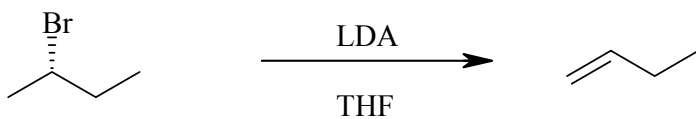
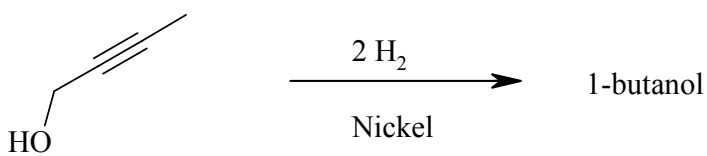
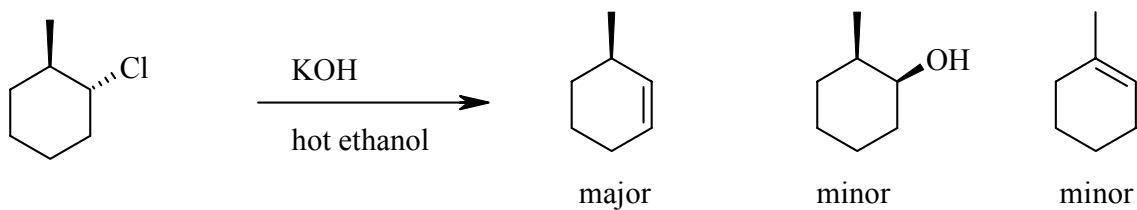
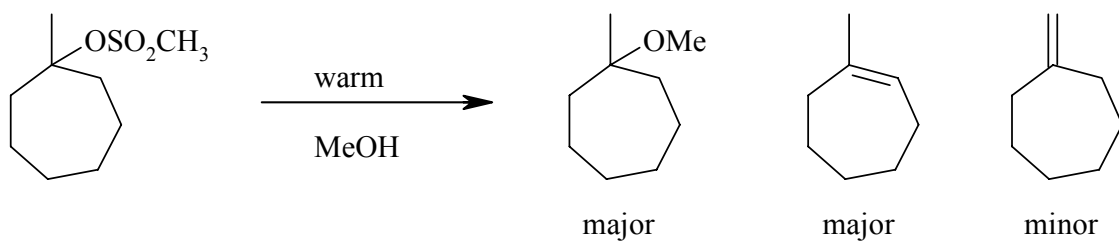
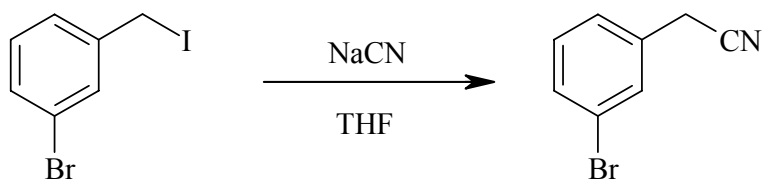


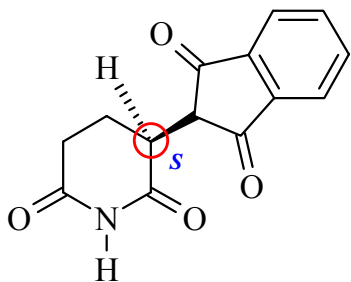
Chem 2P20 Assignment 3
Due Friday Nov. 8, 5 pm

Name: _____
ID Number: _____

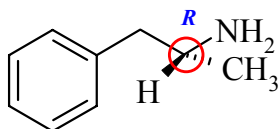
1. Draw the major (and minor, if any) organic products for each reaction, paying attention to stereoisomerism where appropriate. Indicate which are the major and which are the minor products in cases where there is more than one product. (16 marks)



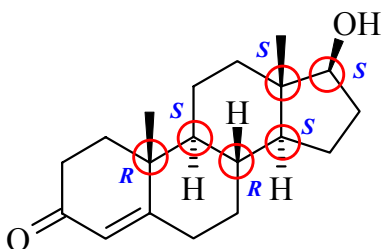
2. For each interesting molecule below, clearly circle any and all chiral centers and assign either the R or S configuration at each. (10 marks)



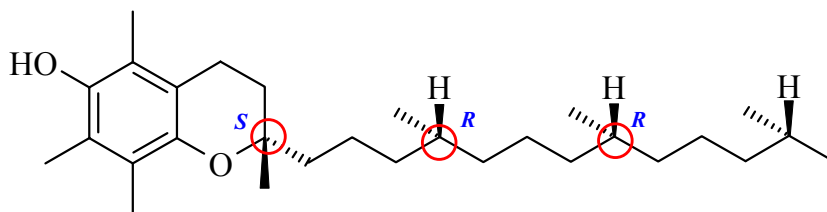
thalidomide
(sedative that causes birth defects
in its racemic form)



amphetamine
(stimulant)



testosterone
(male sex hormone)

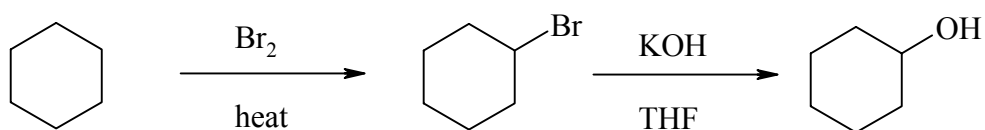
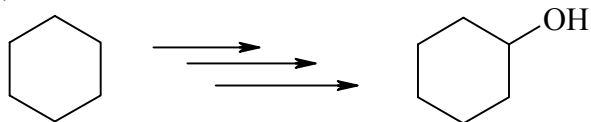


one of the 8 diastereomers
of Vitamin E

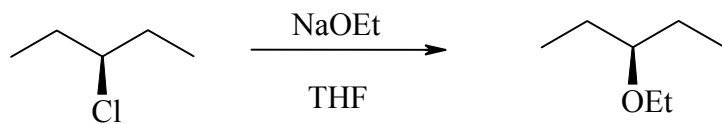
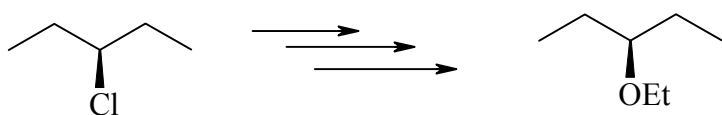
3. Organic synthesis involves multiple reactions performed in a logical, high-yielding manner, starting from cheap, available materials to the more expensive and more desirable final product.

Show how to transform the starting material at the left into the product at the right *in high yield* using any other reagents. If multiple reactions are required, make sure to separate the steps. Be sure to list appropriate solvents and conditions such as heat. (14 marks)

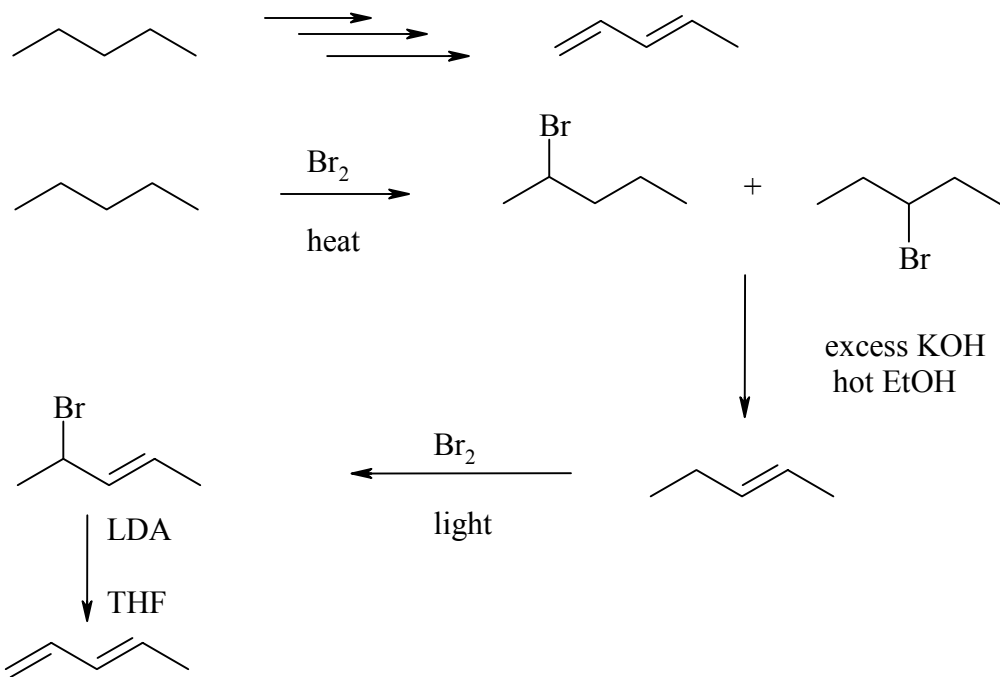
a)



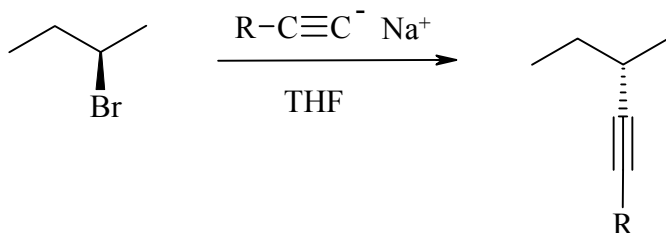
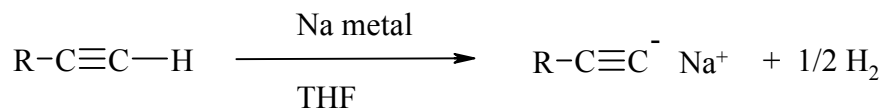
b)



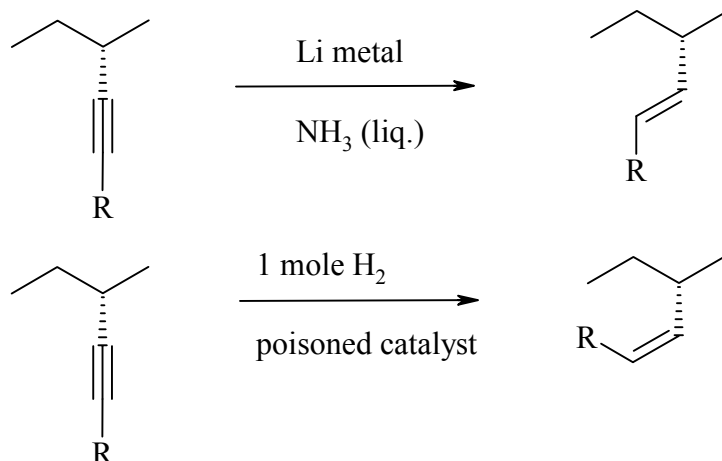
c)



4. Alkynes can be turned into nucleophiles in the presence of alkali metals:



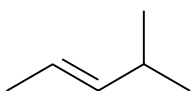
Alkynes can be *partially* hydrogenated over a poisoned catalyst to produce *Z*-alkenes, or treated with Li metal in liquid ammonia to give *E*-alkenes:



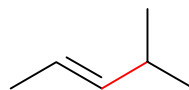
Combine these ideas to perform the preparations below, using any inorganic reagents but only the organic starting materials "allowed". Once again, separate different steps and list solvents and pertinent conditions. (10 marks)

a) *E*-4-methyl-2-pentene, using starting compounds contain 3 carbons or less

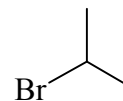
Draw the target:



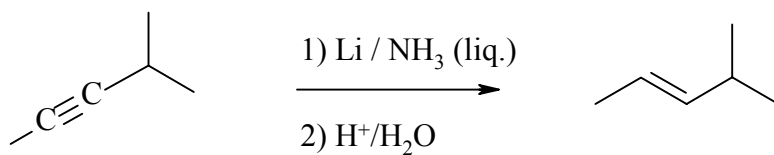
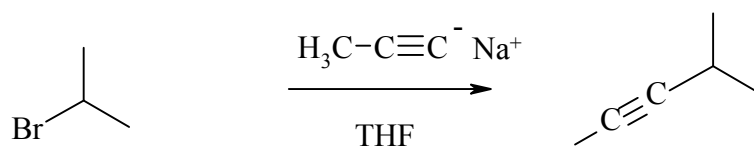
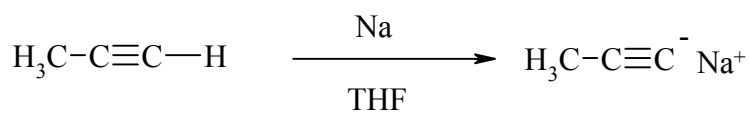
Identify which bond is a likely "new bond":



Put the synthetic components (synthons) together:



Do the chemistry:



b) Racemic *Z*-4(*R,S*)-methyl-2-hexene, using starting compounds containing 4 carbons or less:

