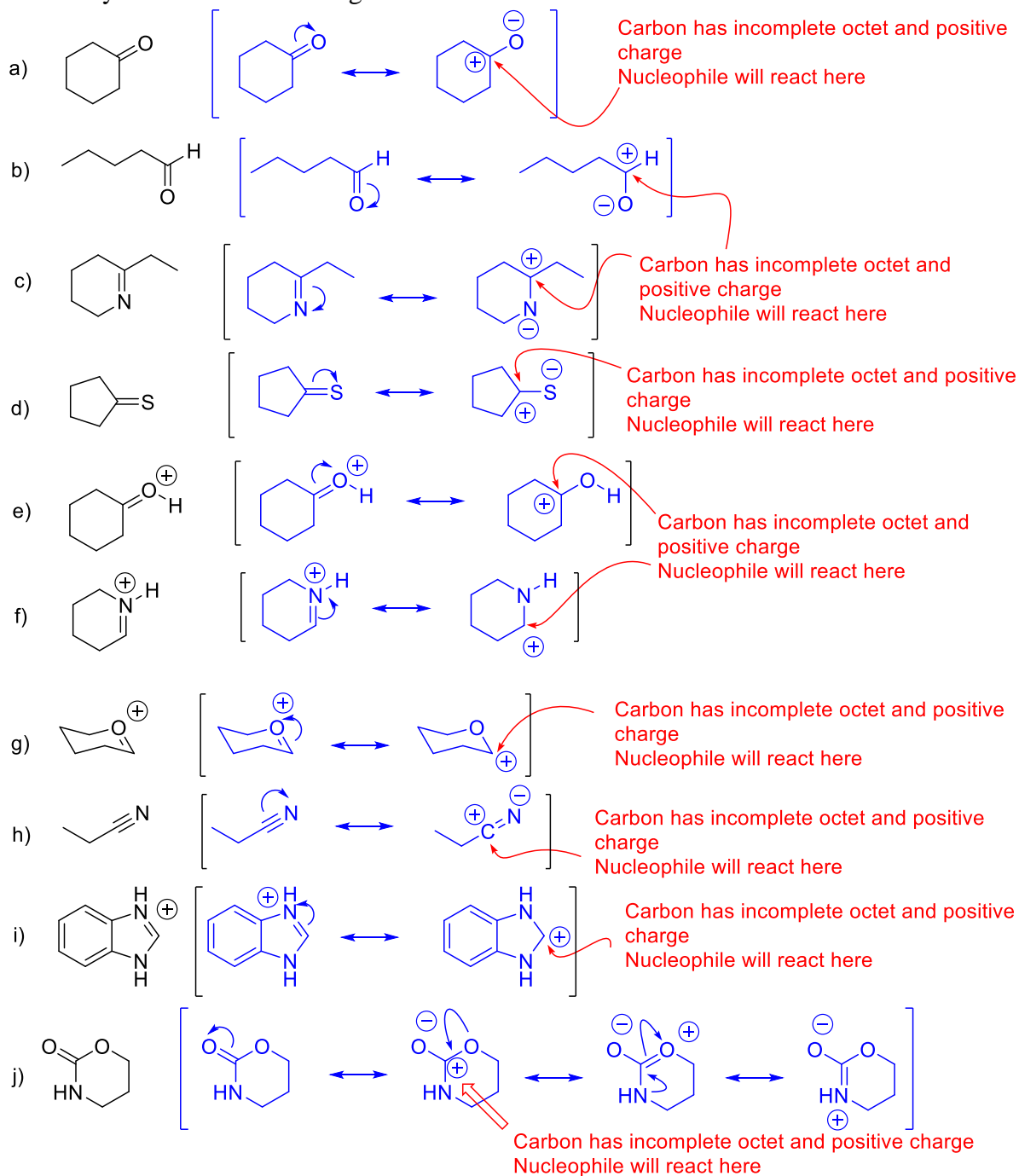


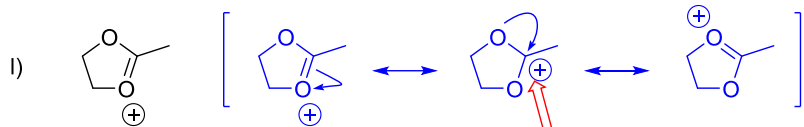
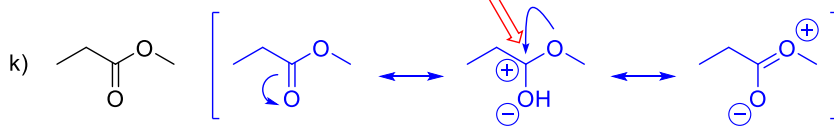
CHM 1321

Assignment 6 Answers

1) Use resonance structures of the following compounds to predict the site where a nucleophile will likely react on the following molecules

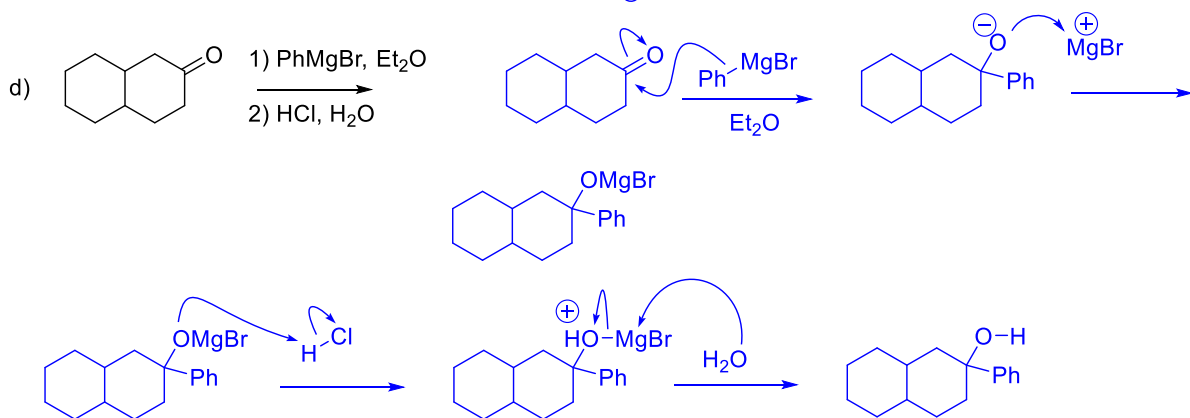
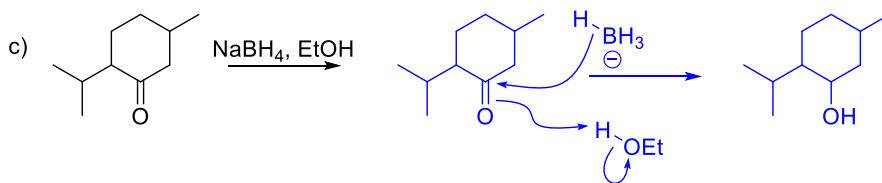
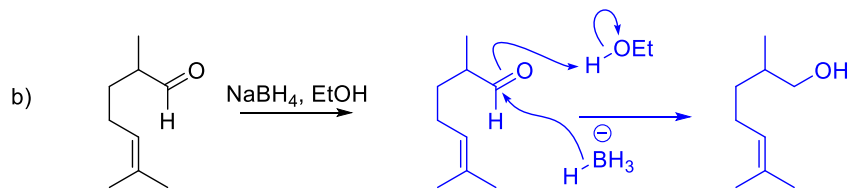
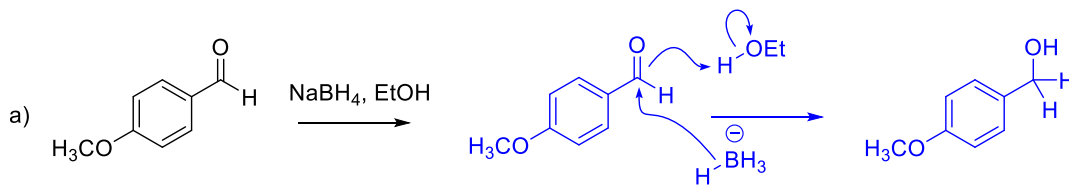


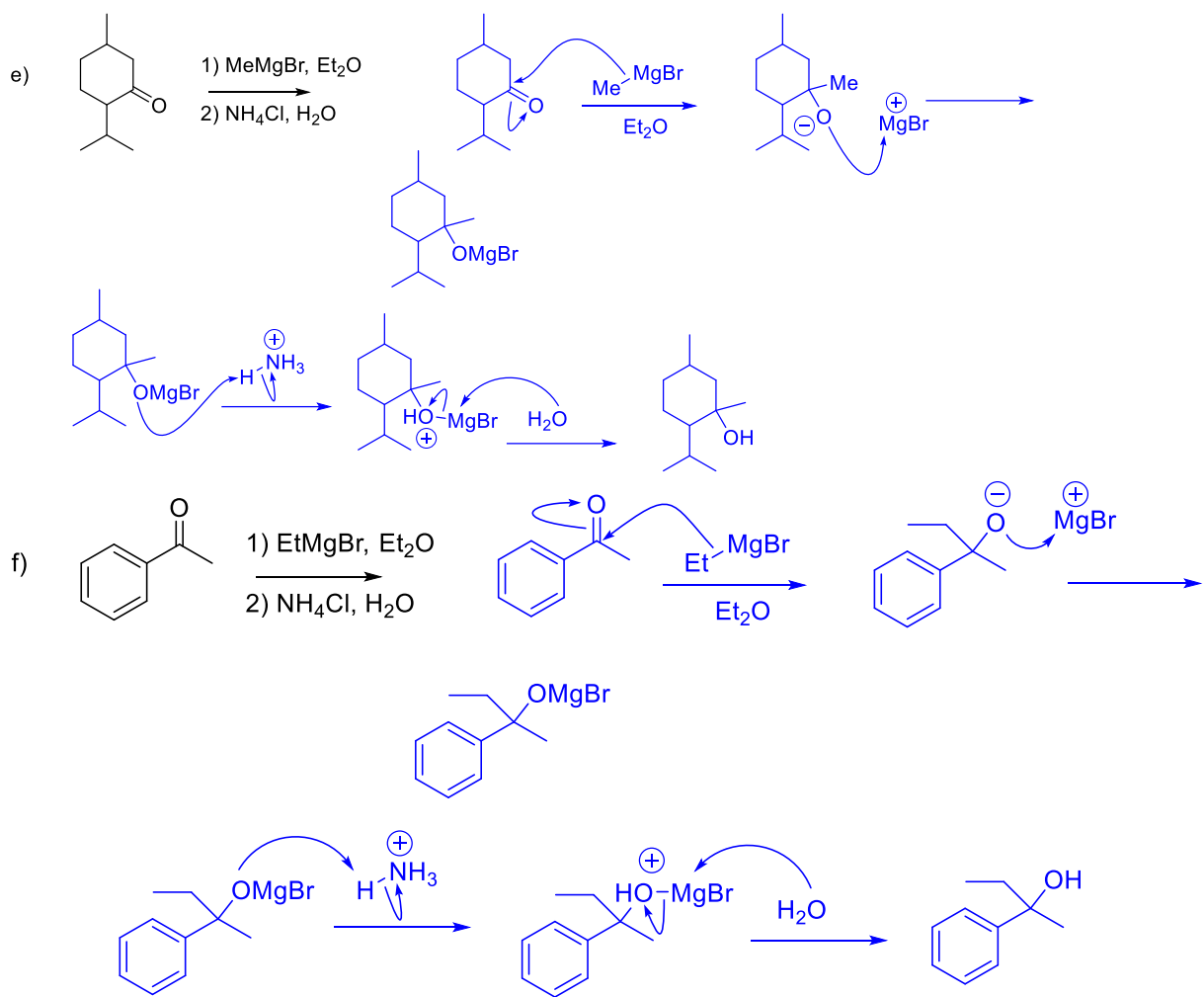
Carbon has incomplete octet and positive charge
Nucleophile will react here



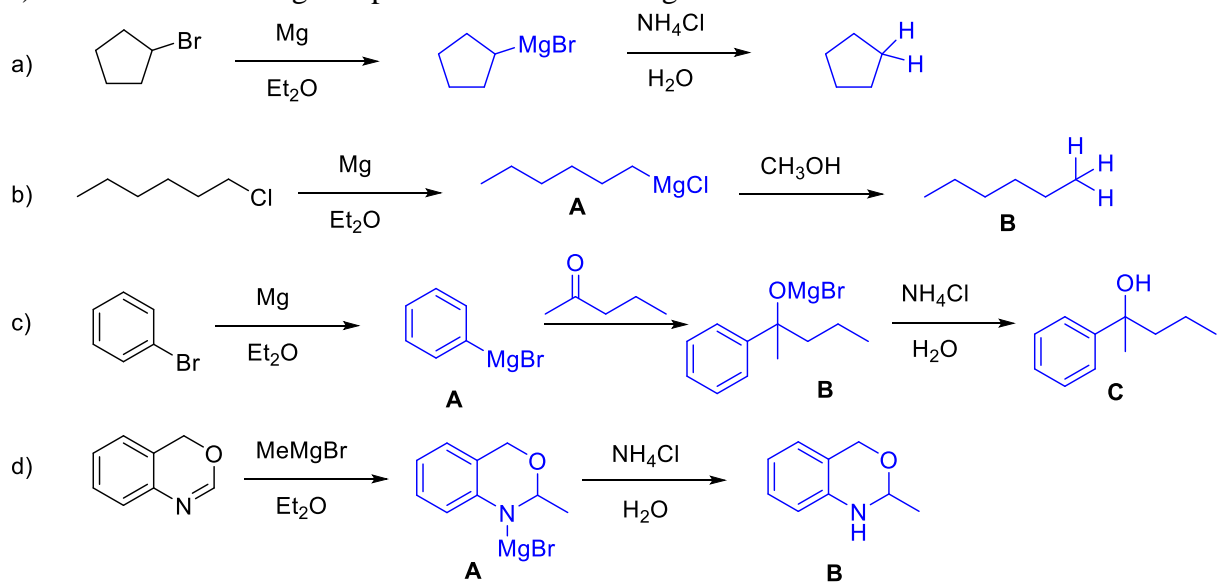
Carbon has incomplete octet and positive charge
Nucleophile will react here

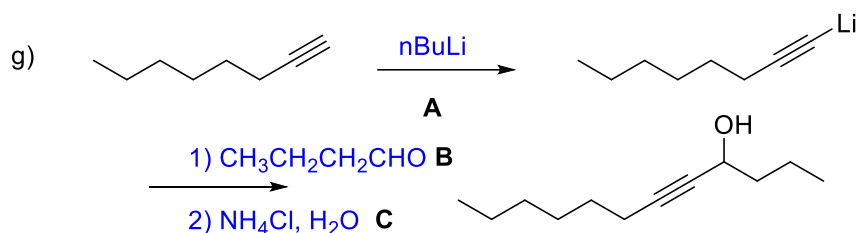
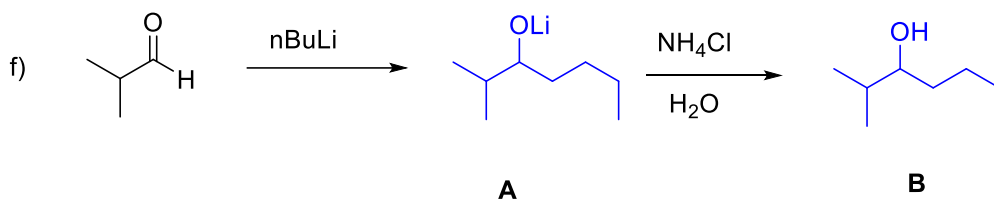
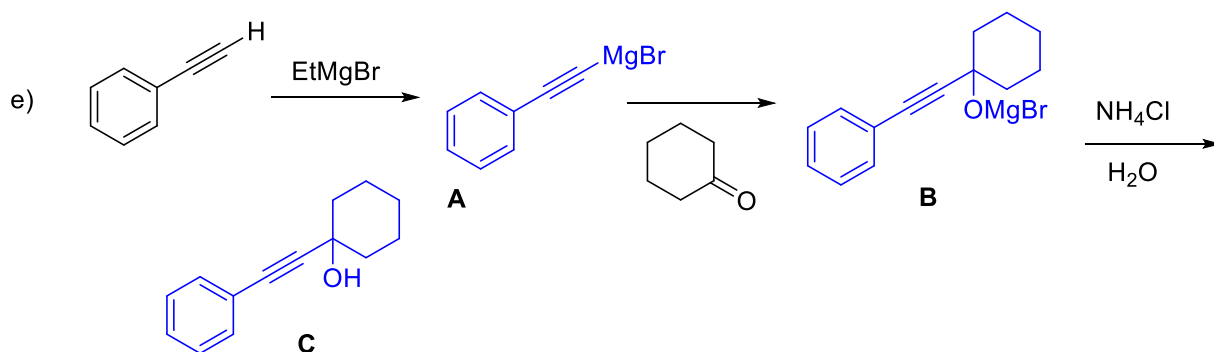
2) Give the products of the following reactions and give detailed mechanisms to show how they are formed:



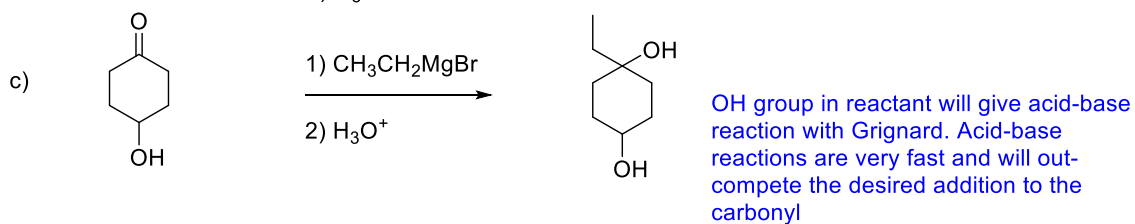
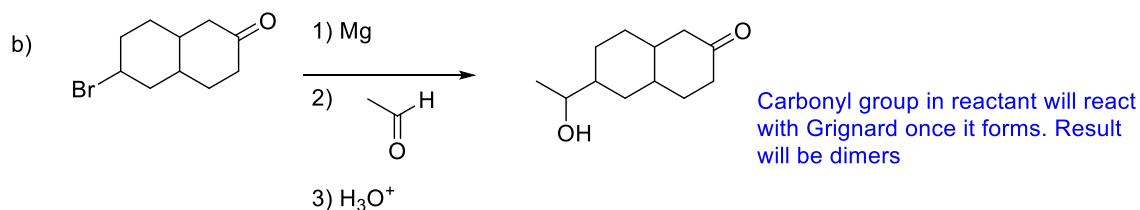
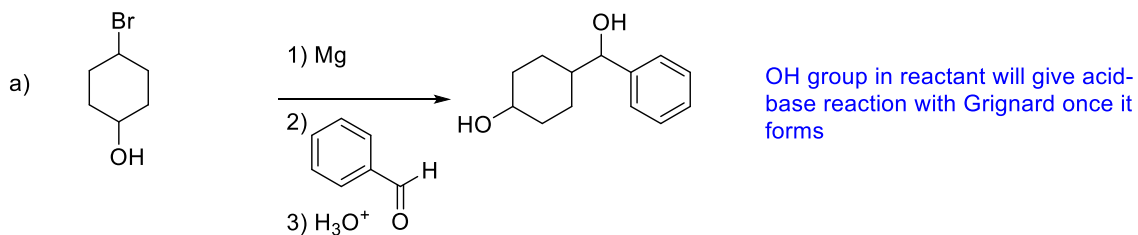


3) Provide the missing compounds of the following reactions.

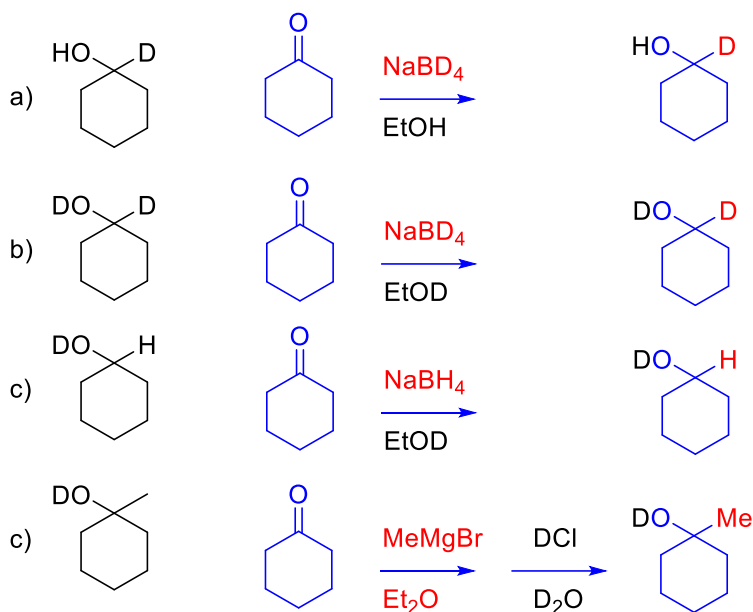




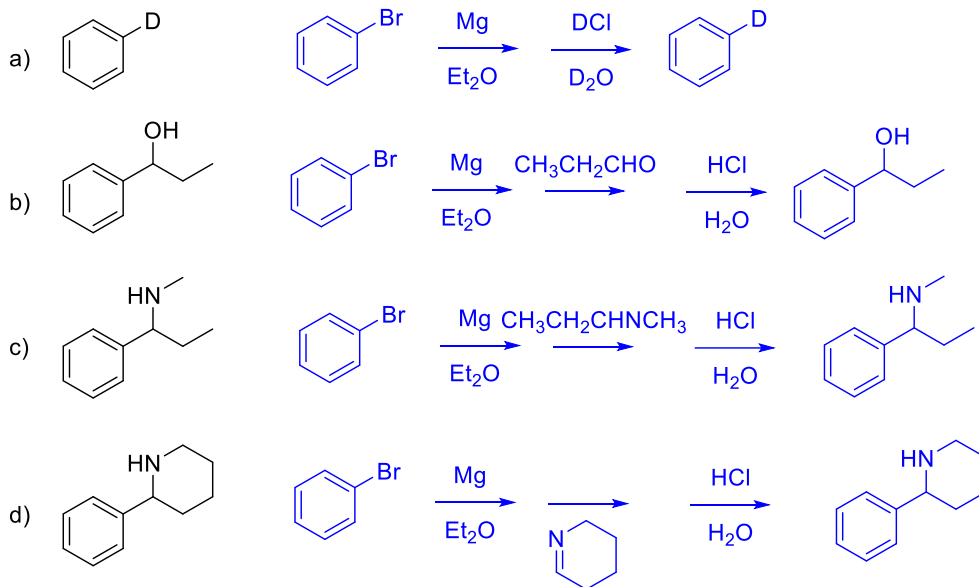
4) Point out all of the flaws in the following incorrect Grignard reactions.



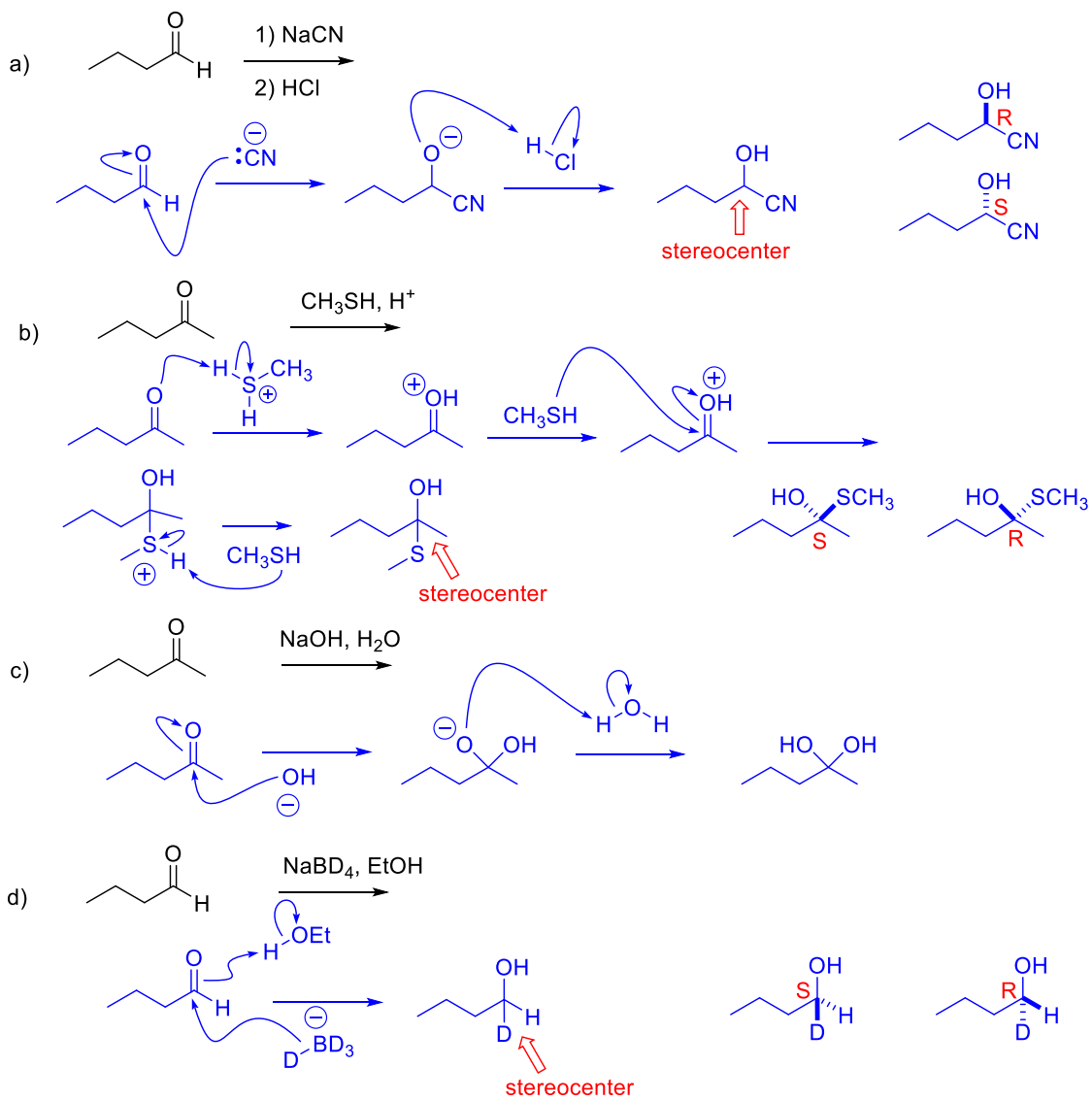
5) Suggest reagents and methods that could be used to prepare each of the following from cyclohexanone.
(D = ^2H , an isotope of hydrogen)

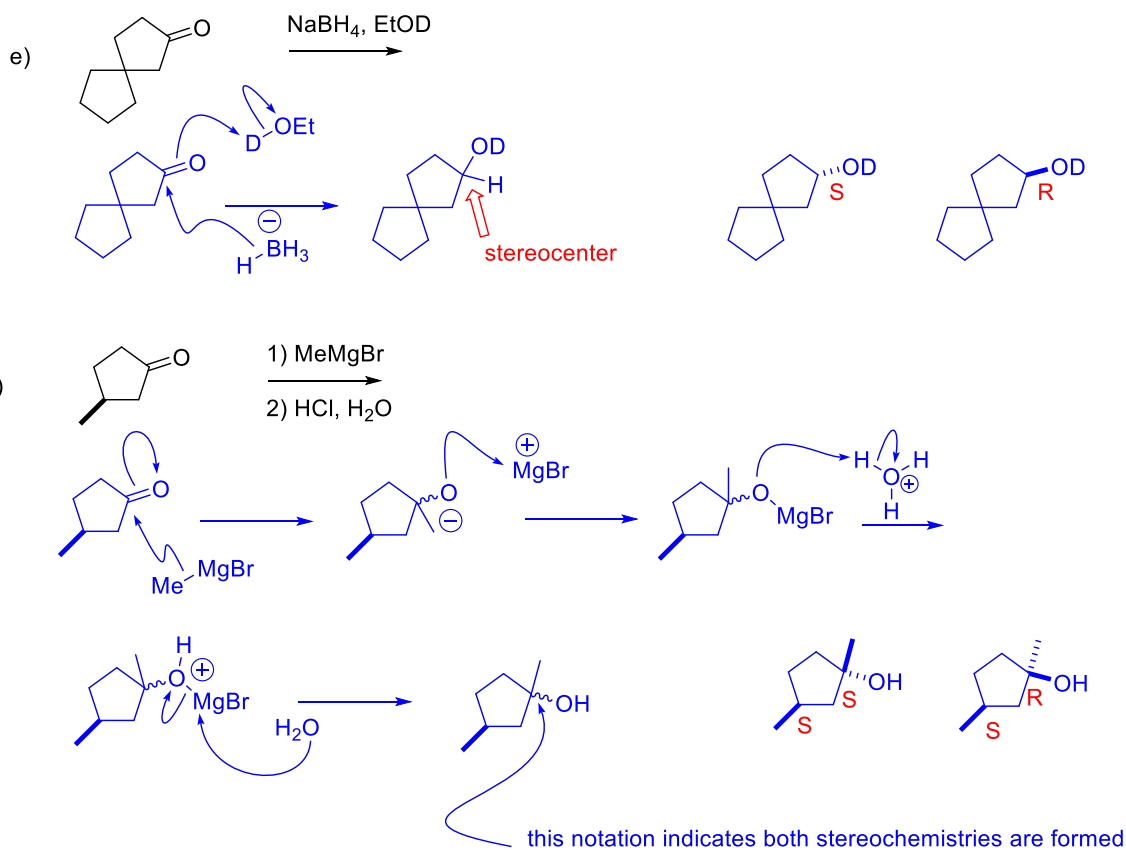


6) Suggest reagents that could be used to prepare each of the following from bromobenzene.

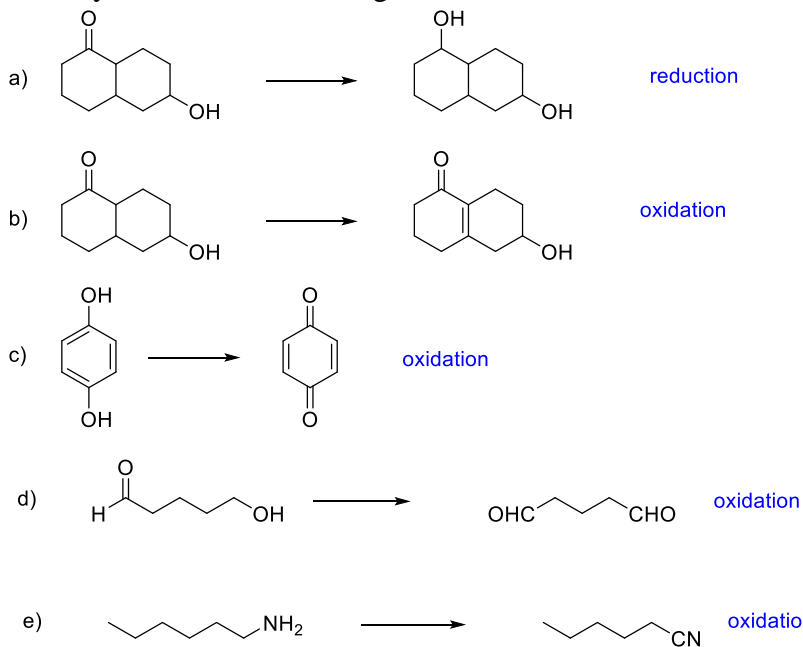


7) Use mechanisms to draw the structures of the products of the following reactions. Which of these products have stereocenters? Determine the configuration of any products with stereocenters.

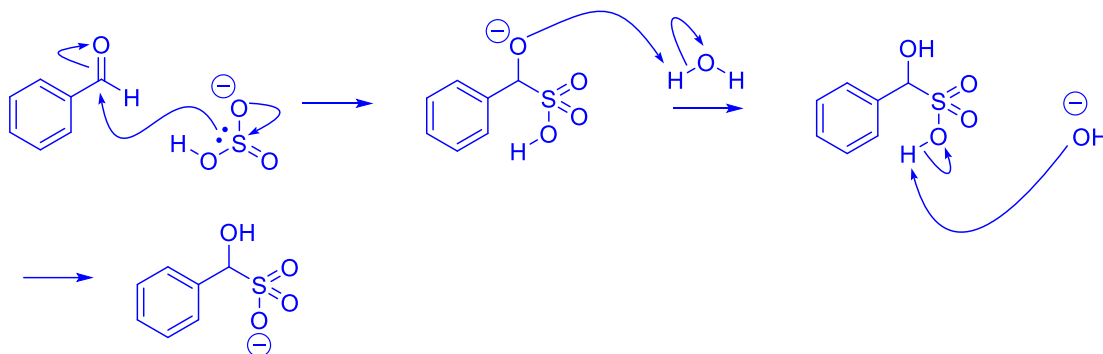
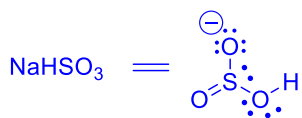




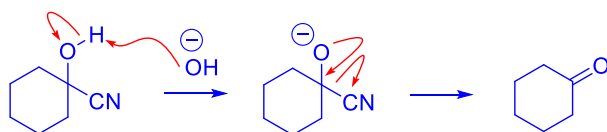
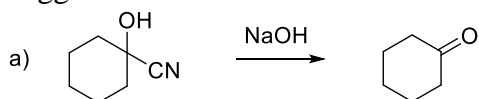
8) Classify each of the following transformations as either an oxidation or a reduction.



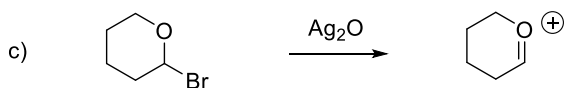
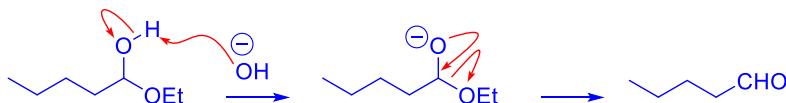
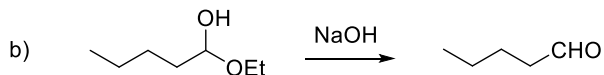
9) Aldehydes and many ketones react with bisulfite anions to form bisulfite addition products. These compounds tend to be water soluble, and are often used to purify aldehydes and ketones. The overall equation for the formation of a simple bisulfite adduct is shown below. Write a mechanism for the transformation.



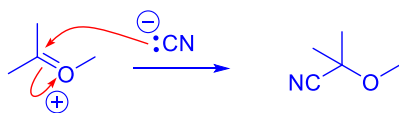
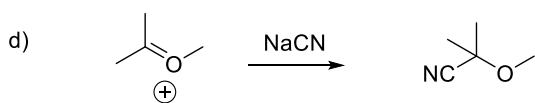
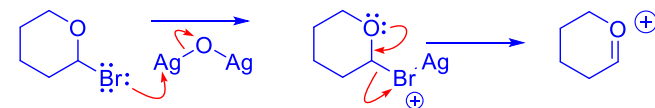
10) Suggest a mechanism for the following reactions



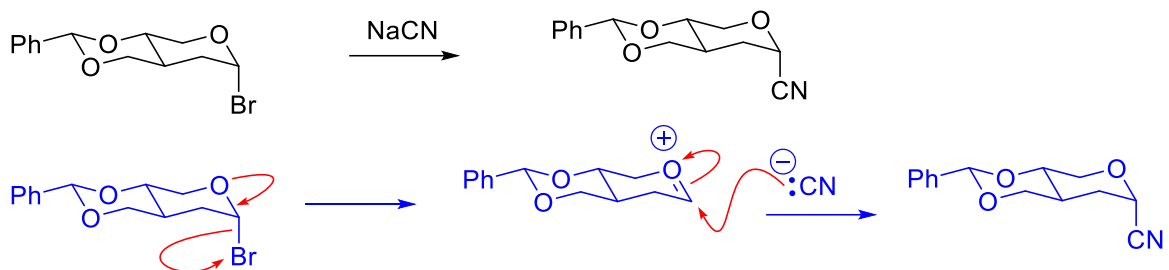
(can also be done in 1 step)



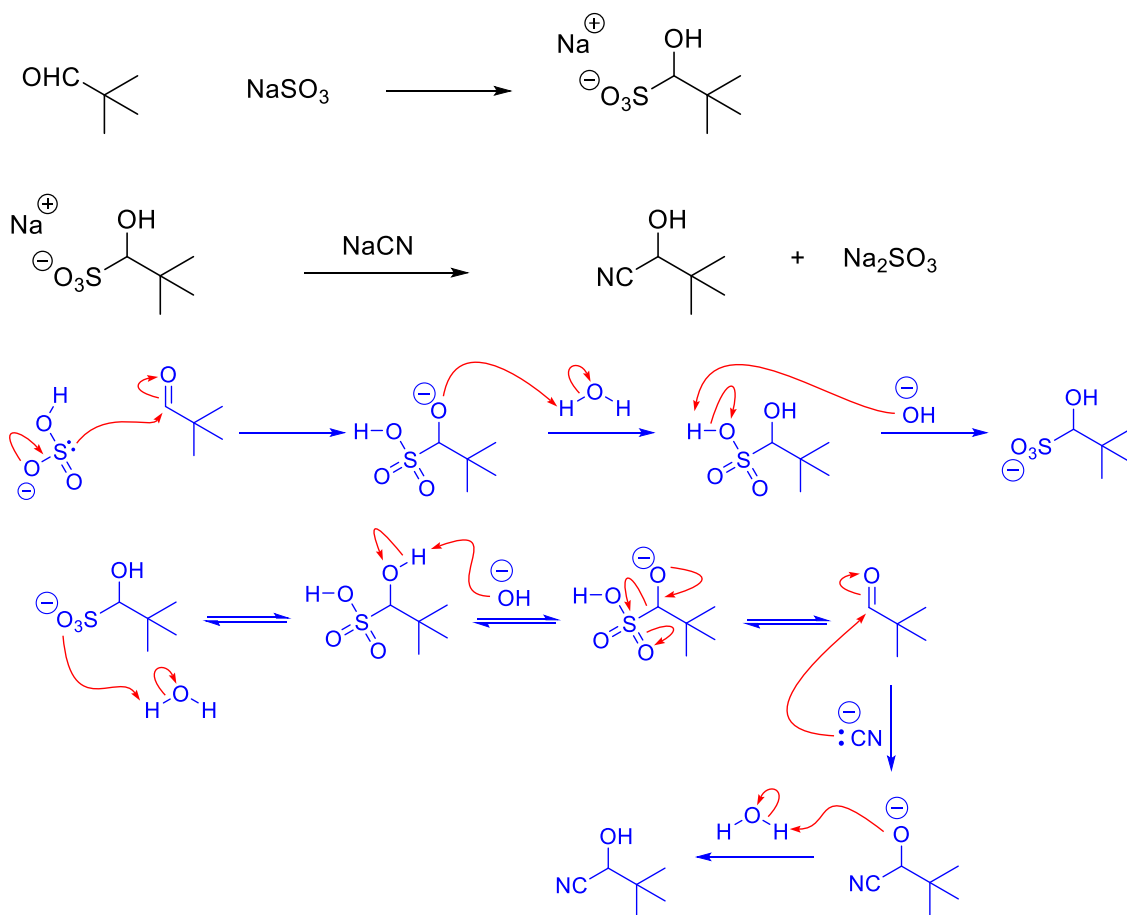
(hint : AgBr is a Lewis acid. The compound AgBr is an insoluble solid)



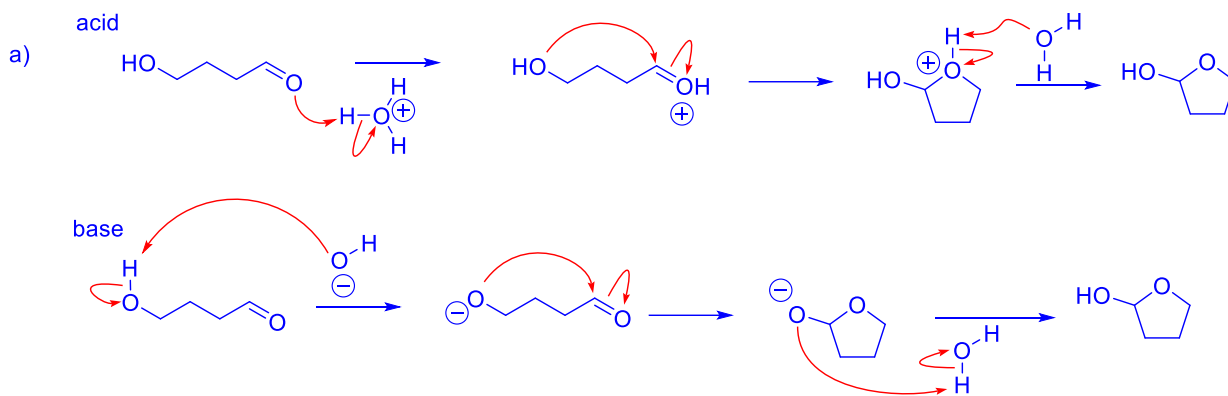
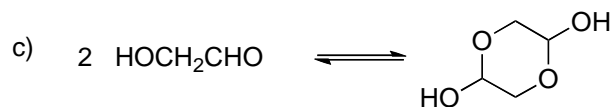
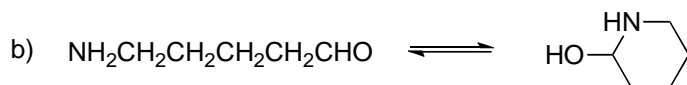
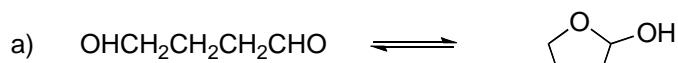
11) Alternative methods of forming cyanohydrins involve oxonium ions, structures having a positively charged oxygen connected by a double bond to a carbon. The following reaction describes the formation of a cyanohydrin starting with a bromohydrin compound. Propose a mechanism to show how this reaction proceeds.



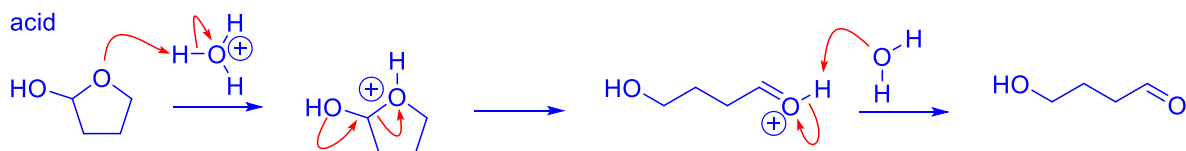
12) Cyanohydrins are often made from bisulfite addition adducts. The advantage of this process is that it is not necessary to add acid, and so the method is safer (no HCN generated). The mechanism for the second reaction is related to the mechanism of the reaction described in question 11. Knowing this, suggest mechanisms for all the steps in this process.



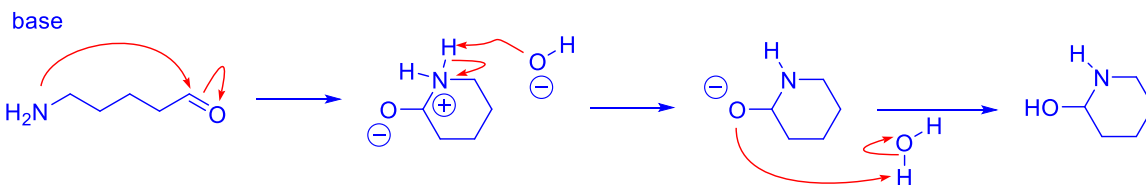
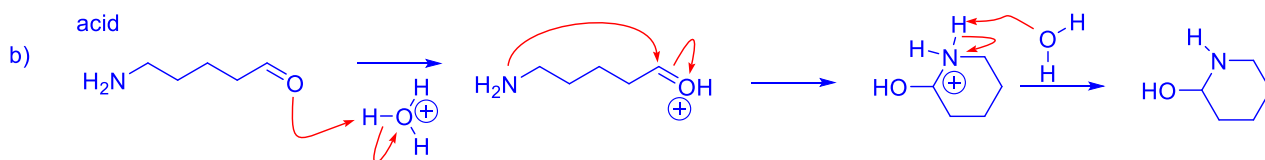
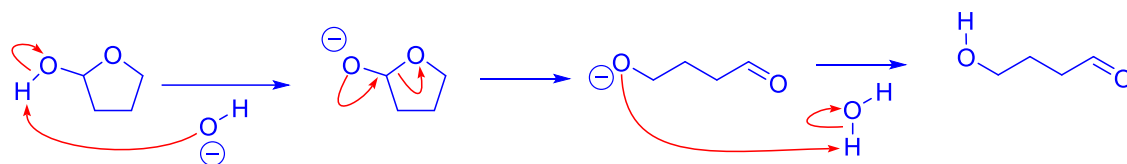
13) Hydroxyaldehydes and similar compounds can exist as mixtures of the free aldehyde and a cyclic hemiacetal. Propose a mechanism for the formation of the products shown below (hint: this transformation is catalyzed by the presence of trace amounts of acid or base). How many different stereoisomers are formed? Propose a mechanism for the reverse of each of the reactions shown below.



the product is formed as a racemic mixture of enantiomers. no stereochemistry is shown because it is assumed that this racemic mixture is obtained

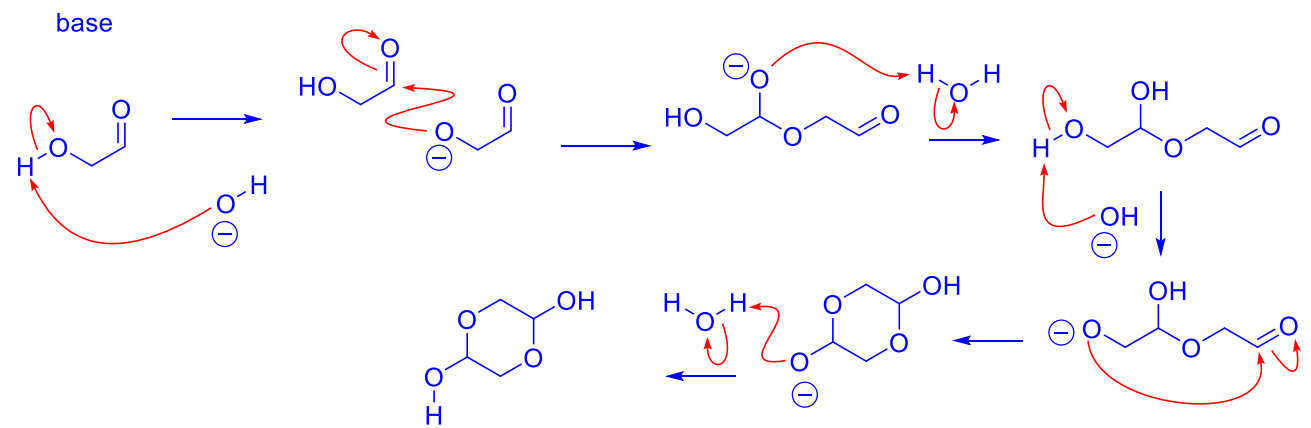
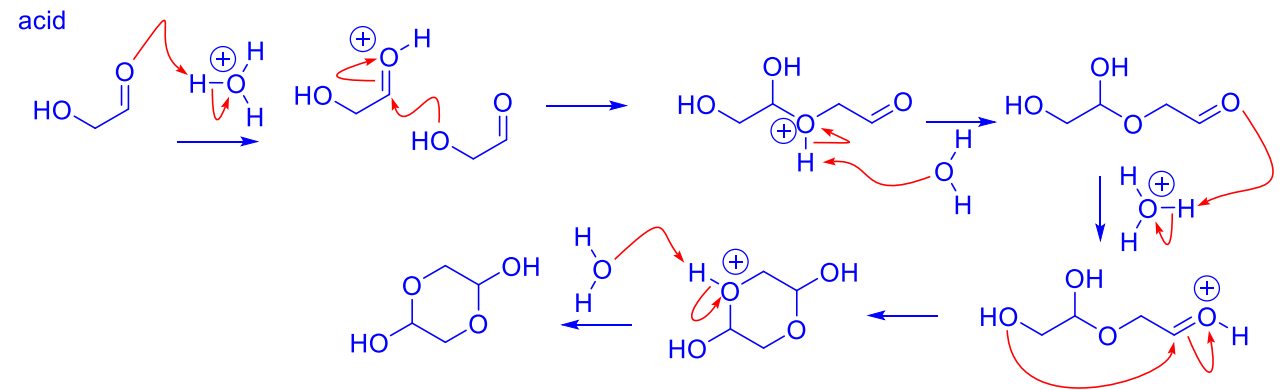
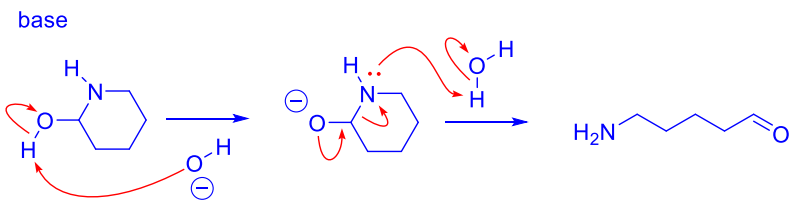
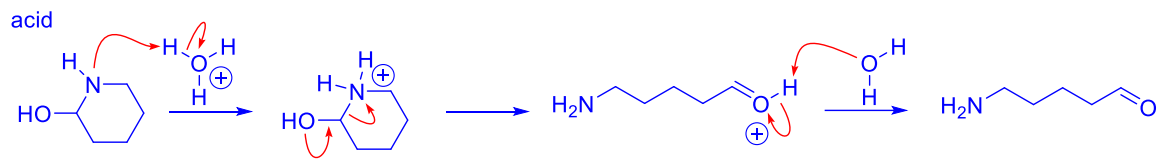


base

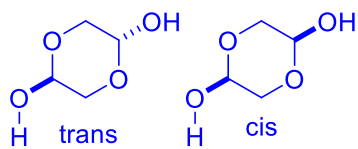


Note: OH^- is a much weaker base than NHR and therefore cannot remove an H from the nitrogen until the nitrogen becomes positively charged

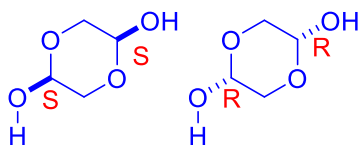
the product is formed as a racemic mixture of enantiomers. no stereochemistry is shown because it is assumed that this racemic mixture is obtained

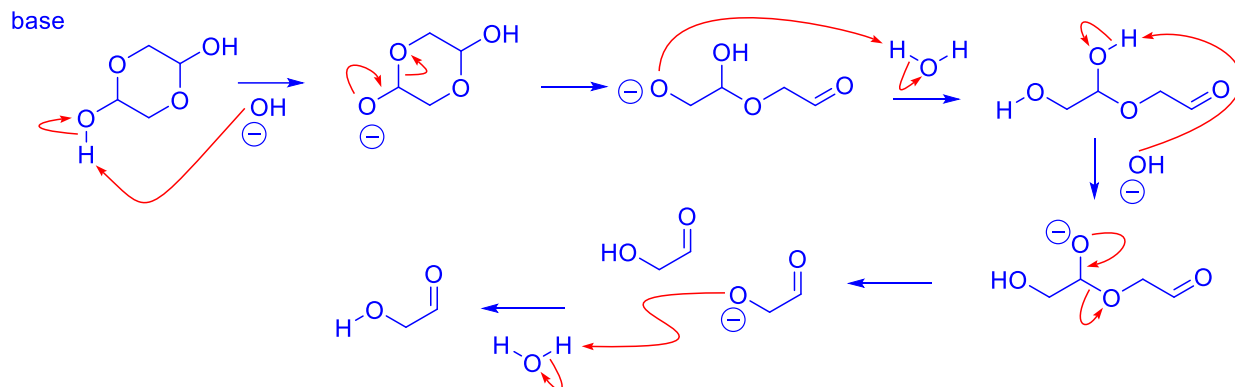
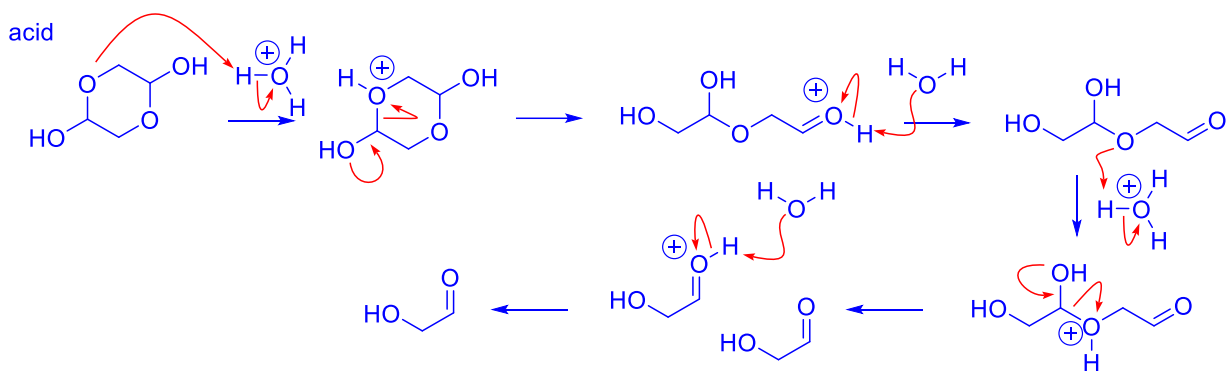


two diastereomers are formed

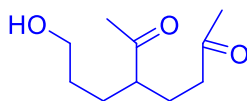
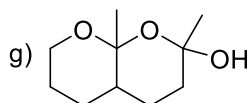
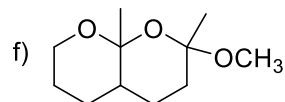
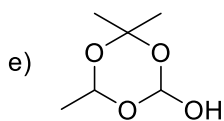
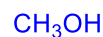
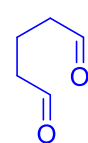
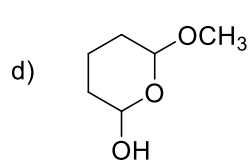
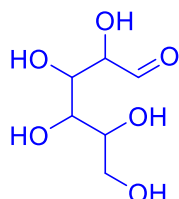
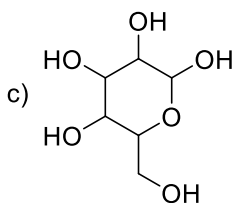
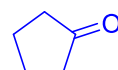
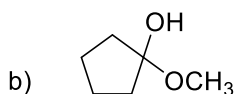
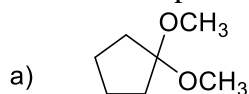


cis is formed as pair of enantiomers
trans is meso

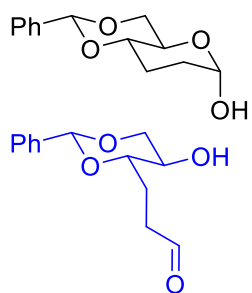




14) What products will be formed if each of the following is treated with NaOH in water? If no reaction is expected write NR.



15) What product will be formed if the following is treated with NaOH?



16) What product will be formed if the following is treated with excess PhMgBr in Et₂O (assuming a normal workup)?

