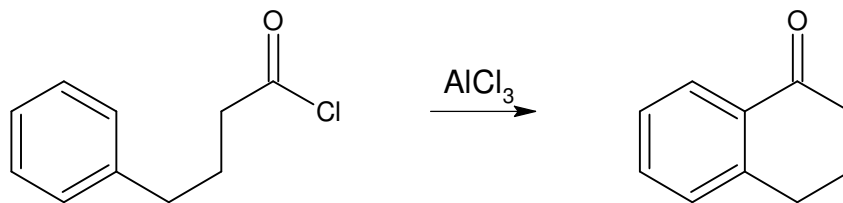


CHT 212

Exam I

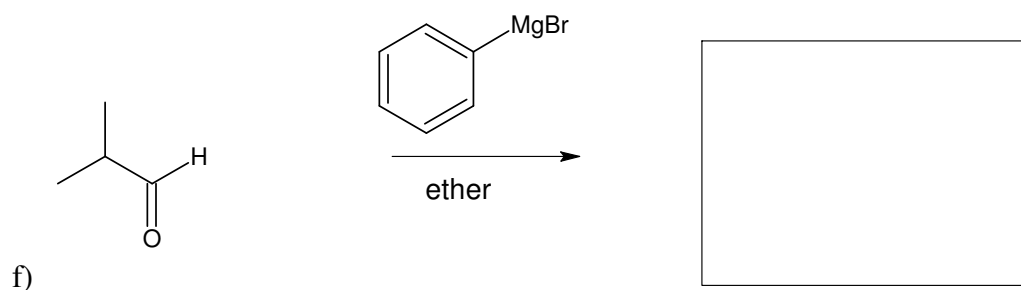
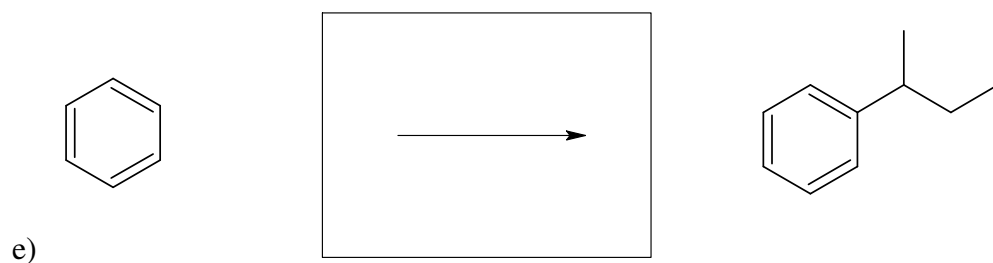
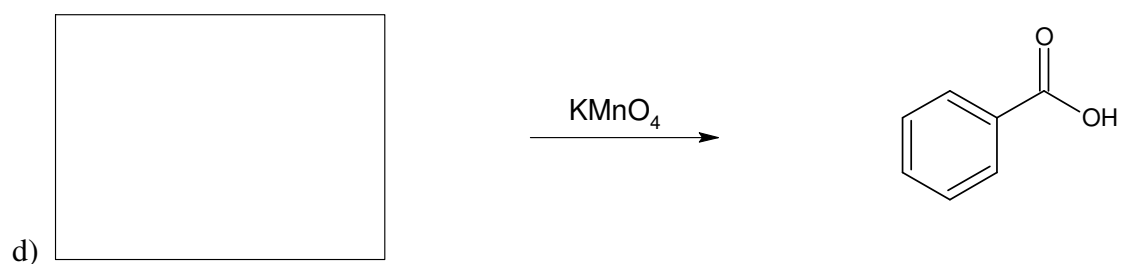
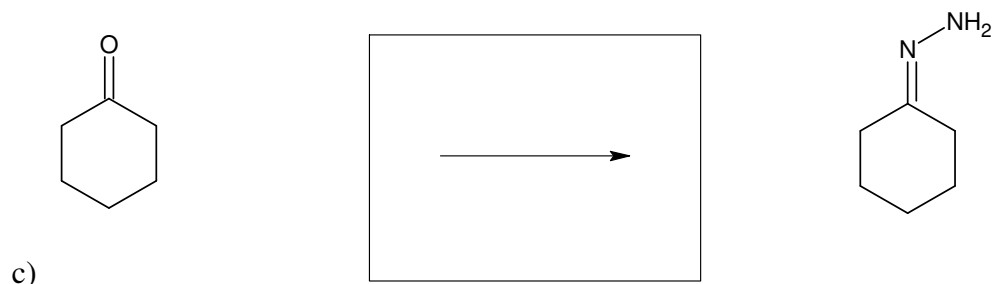
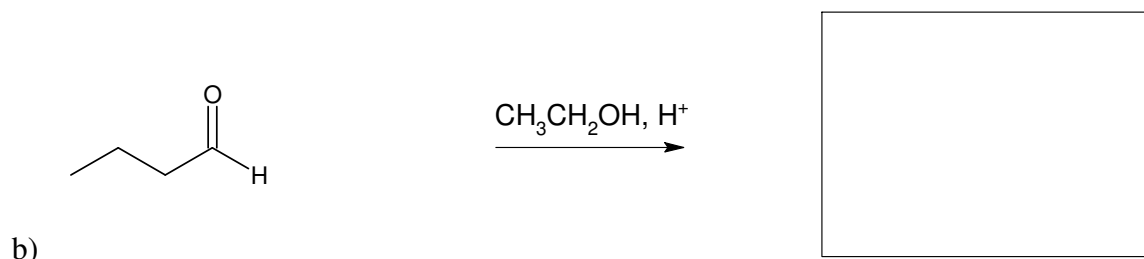
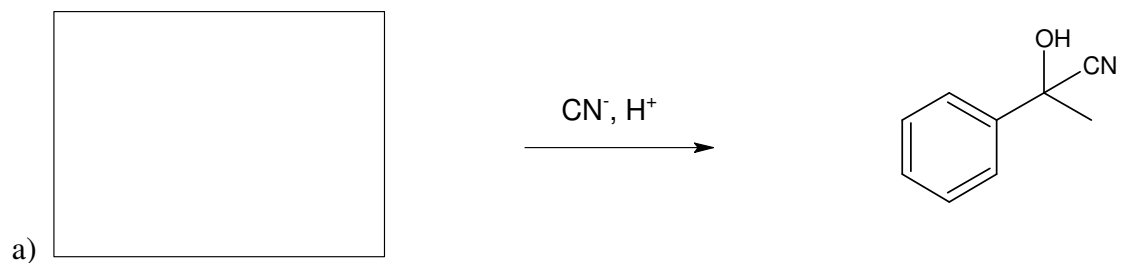
1. Annulations are a class of intramolecular reactions that form cyclic compounds. The following reaction is an example of an annulation:



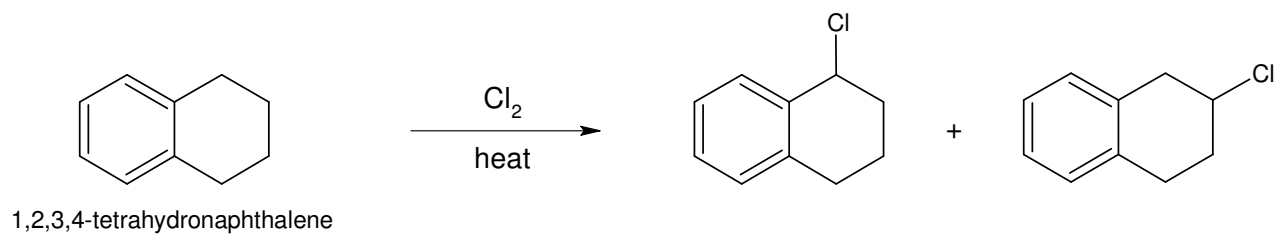
a) Propose a mechanism for this reaction.

b) What kind of reaction is this?

2. Fill in the missing reactant, reagents, or products.



3. The compound 1,2,3,4-tetrahydronaphthalene, shown below, reacts with chlorine in the presence of heat to form a mixture of two products. Predict the major product in this reaction and explain why it is formed in greater quantities than the minor product.



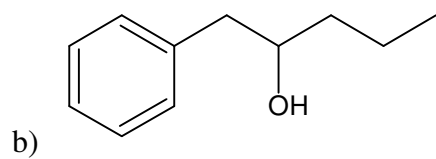
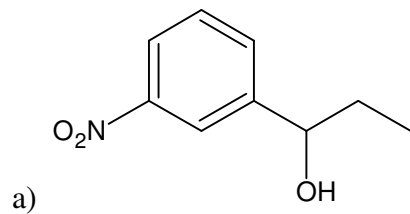
4. *cis*-1,2-cyclopentanediol reacts with acetone in the presence of dry HCl to yield a product with formula $C_8H_{14}O_2$, which is resistant to boiling alkali but which is readily converted into the starting materials by aqueous acids.

a) What is the most likely structure of the product?

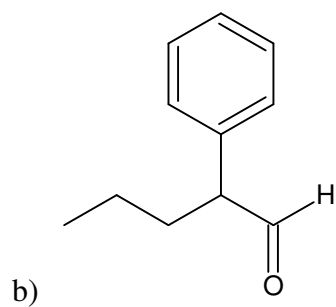
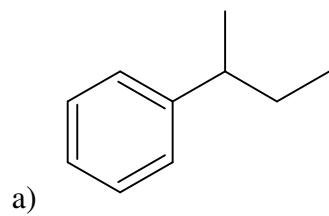
b) What functional group is present in the product?

c) *trans*-1,2-cyclopentanediol does not react with acetone under similar conditions. How do you account for this fact?

5. Propose syntheses for the following compounds using benzene, toluene, alcohols of four or fewer carbons, and any inorganic reagents necessary. It may be helpful to recall that you can convert an alcohol to an alkyl bromide with PBr_3 .



6. Provide unambiguous systematic names for the following compounds.



7. Draw a structure corresponding to each name.

a) 3-bromo-2-pentanone

b) phenyl isopropyl ketone