Organic II
Assignment # 4
Spring 2021

Name:_____

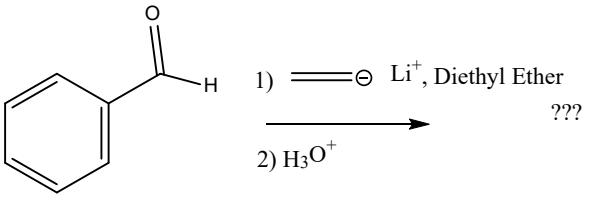
1) a) Using retrosynthetic analysis to develop a synthesis of 2-phenyl-2-butanol from benzene and 2-butyne as the source of all carbons.

b) Write a series of equations for the synthesis showing all necessary reagents.

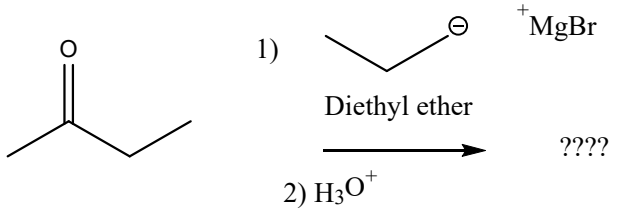
2) Write equations showing how you could prepare 2-methylpropyl magnesium bromide from 2-methylpropene and any necessary organic or inorganic reagents.

3) Write the structure of the organic product of each of the following reactions. Show stereochemistry. You may write +E for enantiomer or +D for diasteromer.

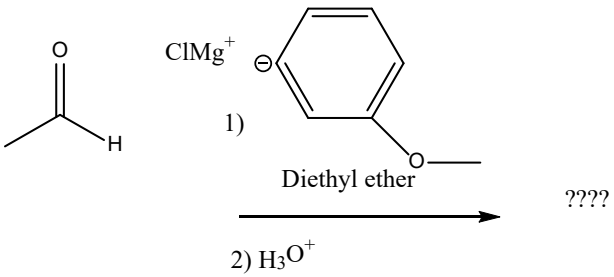
a)



b)



c)



4) a) Draw vitamin B12

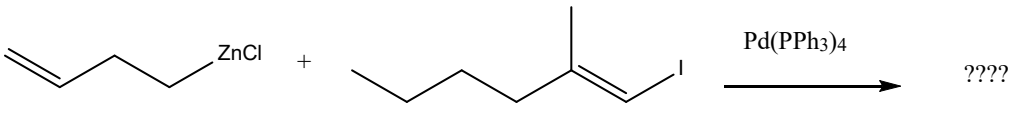
b) How is coenzyme B12 different than vitamin B12?

5) a) Draw an organometallic compound with iron that fits the 18 electron rule. Explain your compound (meaning explain how many electrons each ligand or metal is contributing).

b) Draw an organometallic compound with iron that is coordinatively unsaturated. Explain your compound.

6) Give the structure including stereochemistry of the product of each of the following reactions.

a)



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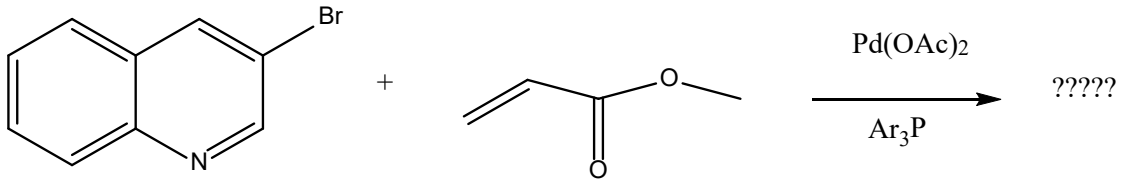

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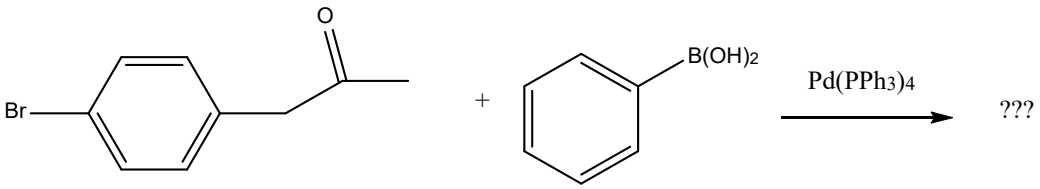
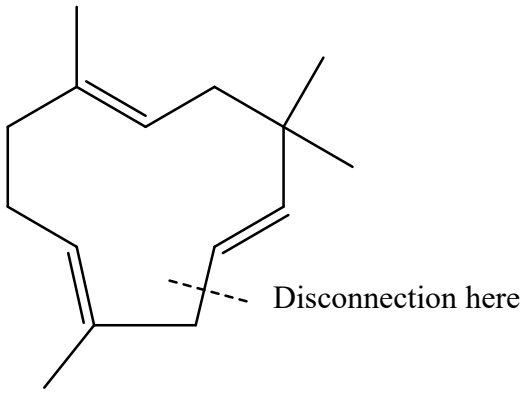
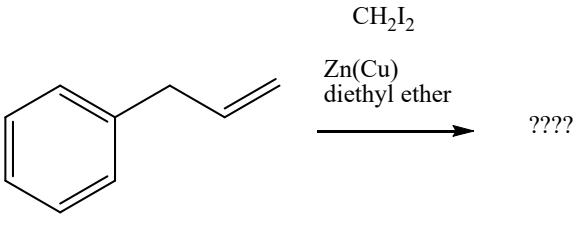


7) Humulene is a naturally occurring hydrocarbon present in the seed cone of hops and has been synthesized several times. In one of these, the retrosynthetic strategy was based on the disconnection that is shown. Deduce the structure, including stereochemistry, of an allylic bromide capable of yielding humulene by an intramolecular Suzuki-Miyaura coupling in the last step. Represent the boron-containing unit as $B(OH)_2$.



8) Predict the principal organic product of each of the following reactions. Show stereochemistry. You may use + E for enantiomer or +D for diasteromer.

a)



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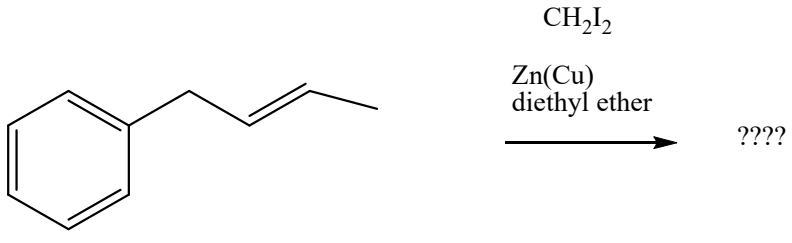

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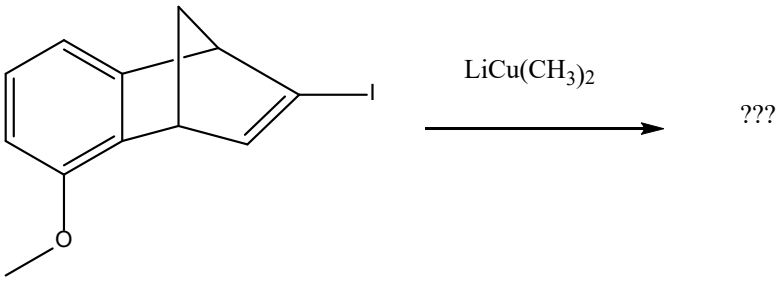

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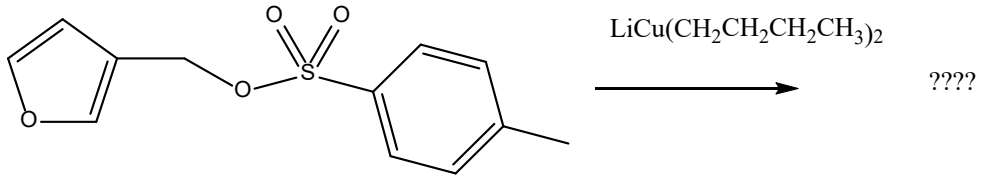
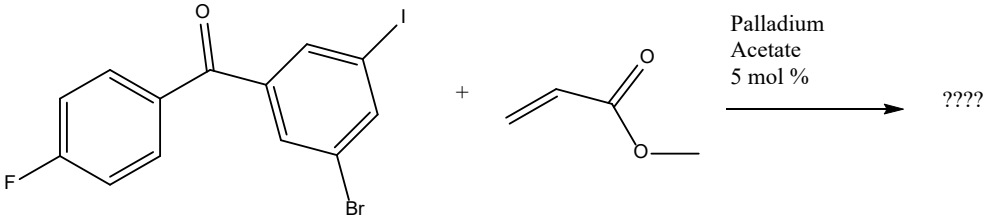


e)



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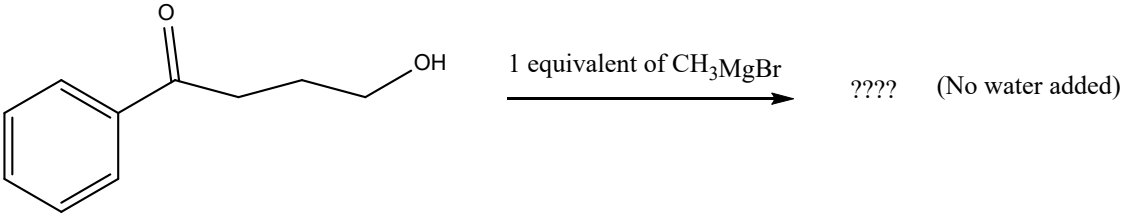
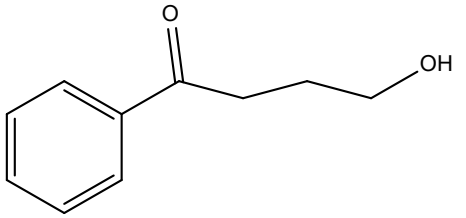
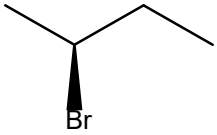


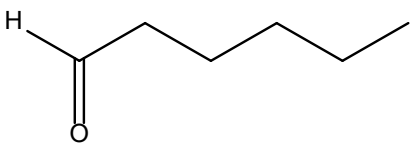
g) 

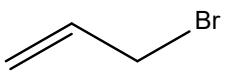
2 equivalent of CH_3MgBr ???? No water added!

9) Reaction of lithium diphenylcuprate with optically active 2-bromobutane yield 2-phenylbutane, with high net inversion of configuration. When the 2-bromobutane used has the absolute configuration shown, will the 2-phenylbutane formed have the R or S configuration?

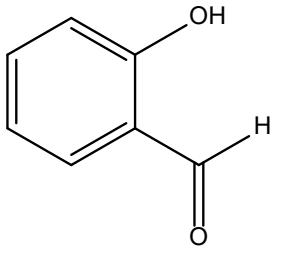


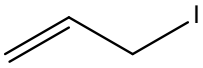
10) Indium is an element that can be used in water. Give the products (BAM!) of the following reactions. Show stereochemistry. Include +E for enantiomers, +D for diasteromers.

a) 

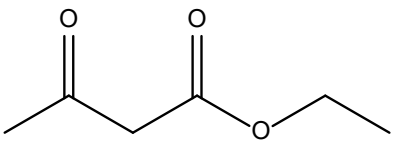
+ 

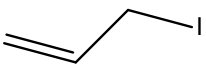
In, H_2O ??

b) 

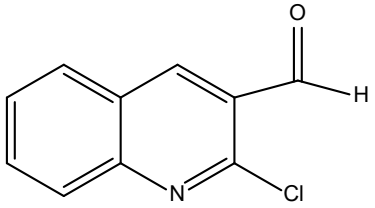
+ 

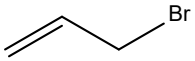
In, DMF ??

c) 

+ 

In, DMF ????

d) 

+ 

In, H_2O ????