Organic 212 Test # 2 Rework Spring 2021

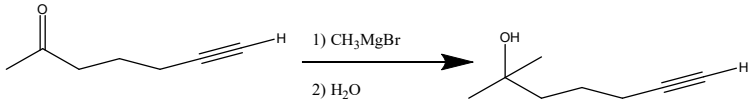
Name:_____

Directions: Only work the problems you missed on the exam.

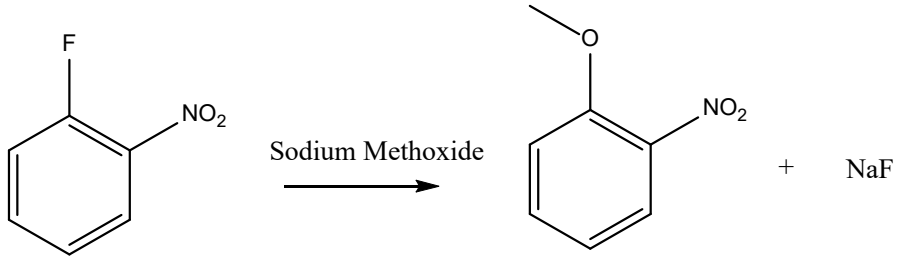
Section B – Problems, short answers, drawings, mechanisms

1) You have a molecule (B) with the molecular formula $C_6H_{12}O_6$ that does not contain a double bond. Reaction of compound B with periodic acid forms six moles of formic acid. Give a plausible structure for compound B.

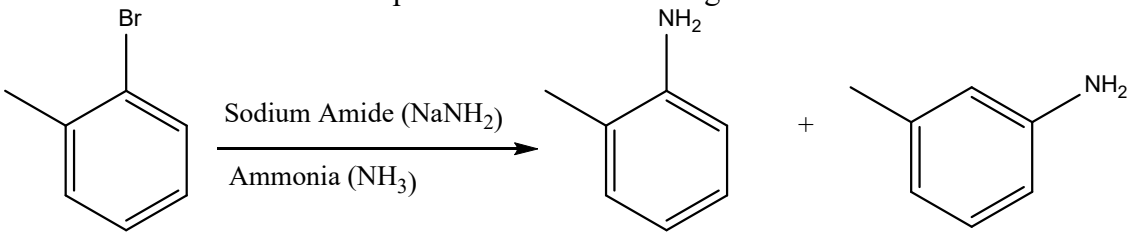
2) Would you expect the reaction below to happen in a high yield with only one mole of methyl Grignard? Explain.



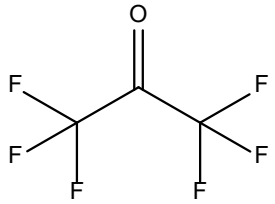
3) Give ALL of the possible resonance structures for the intermediate for the following reaction. Circle the one that makes the greatest contribution to the resonance hybrid.



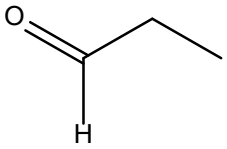
4) Give a reasonable mechanism (means draw the arrows showing electron movement) that allows for the formation of BOTH products of the following reaction.



5) Perfluoroacetone (A) is more reactive than propanal (B.) towards nucleophilic addition. Why?



A

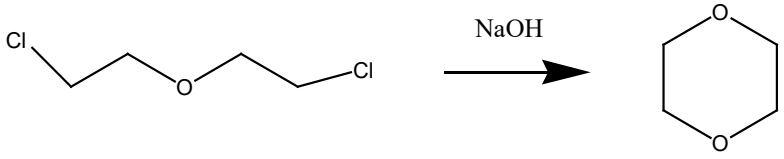


B

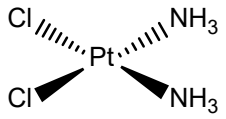
6) Give four different ways to make 2-phenylethanol. You must start with four different starting materials. For example, you CANNOT use phenyl magnesium bromide, phenyl magnesium chloride, phenyl magnesium iodide for your Grignard.

7) On heating, 1,2,5-pentanetriol in the presence of an acid catalyst, TWO cyclic ethers of molecular formula $C_5H_{10}O_2$ are obtained. Suggest reasonable structures for this product.

8) Work the following mechanism. Show every step.



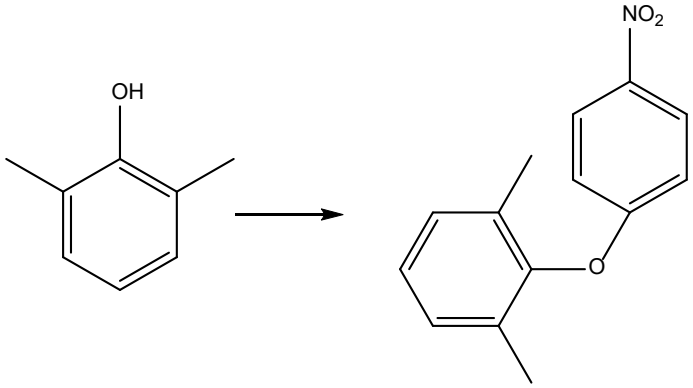
9) From Wikipedia "Cis-platin is a chemotherapy medication used to treat a number of cancers. For example, testicular cancer, ovarian cancer, lung cancer, and others." How many electrons does cis-platin (shown below) contain? An amine donates the same number of electrons as phosphorus. Explain your answer.



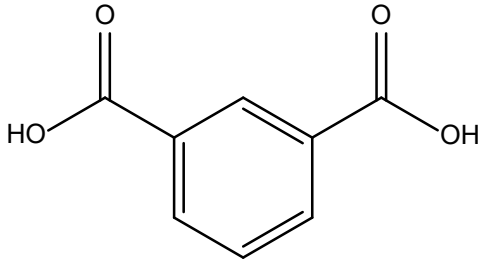
10) Give a structure that gives all the spectra on the following spectral sheet.

Part C – Reactions, synthesis, and free question.

11) Outline how you would synthesize the product ether from 2,6-dimethylphenol using any necessary organic or inorganic reagents. (4 pts.)



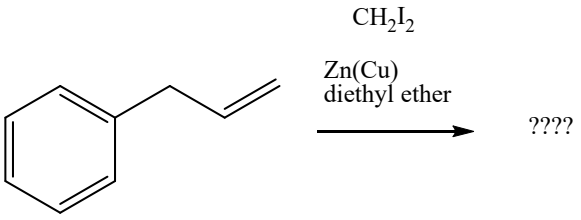
12) Outline a synthesis of isophthalic acid from benzoic acid using any necessary organic or inorganic reagents. (5 pts.)



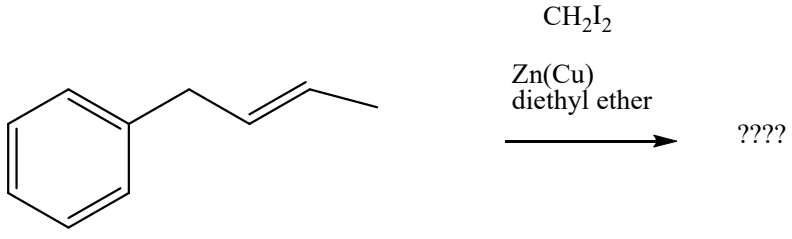
Isophthalic acid

13) Draw the missing reactant, reagent, or products for the following reactions. If ortho and para are formed, you may draw +o if you drew the para product. You may draw +p if you drew the ortho product. Show stereochemistry if important. You may use +e for enantiomer or +d for diasteromer. (3 pts. each)

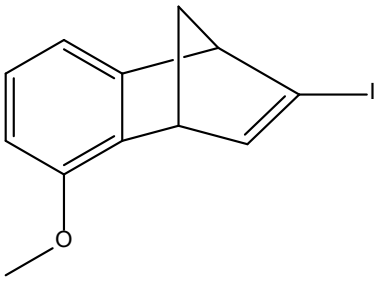
a)



b)

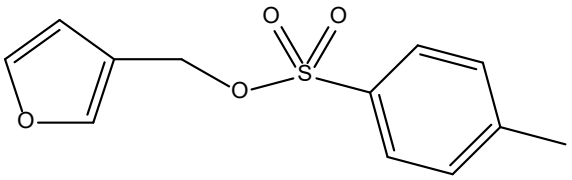


c)



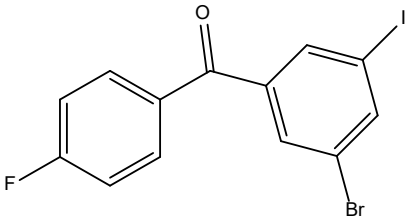
$LiCu(CH_3)_2$ → ???

d)

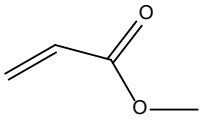


$LiCu(CH_2CH_2CH_2CH_3)_2$ → ????

e)

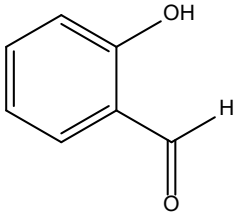


+

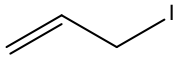


Palladium Acetate 5 mol % → ????

f)

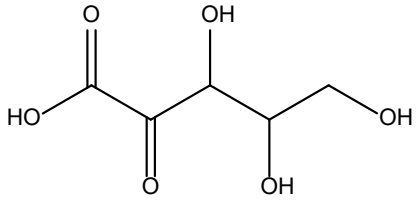


+



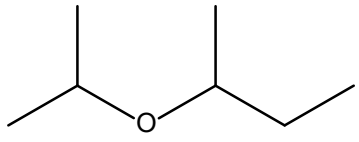
In, DMF → ??

g)



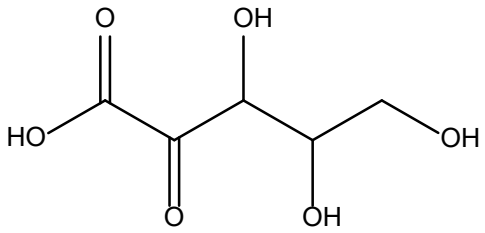
HIO_4 → ????

h)



excess HI → ???

i)

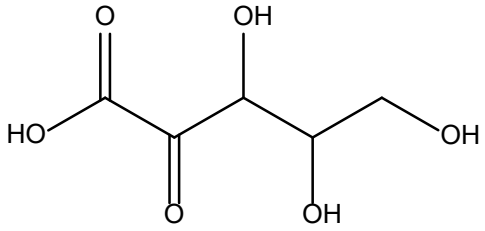


PCC

CH_2Cl_2

????

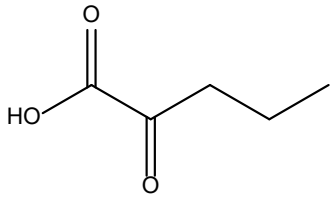
j)



$Na_2Cr_2O_7$
H_2SO_4
H_2O

????

k)

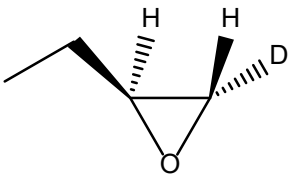


H^+

Ethanol

????

l)



$NaOCH_3$

????