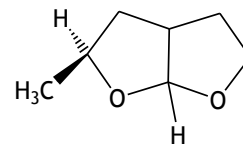
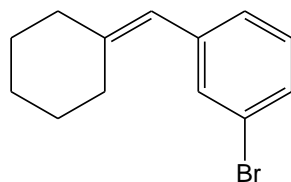


Chemistry 318N

Spring 2012

Dr. Willson



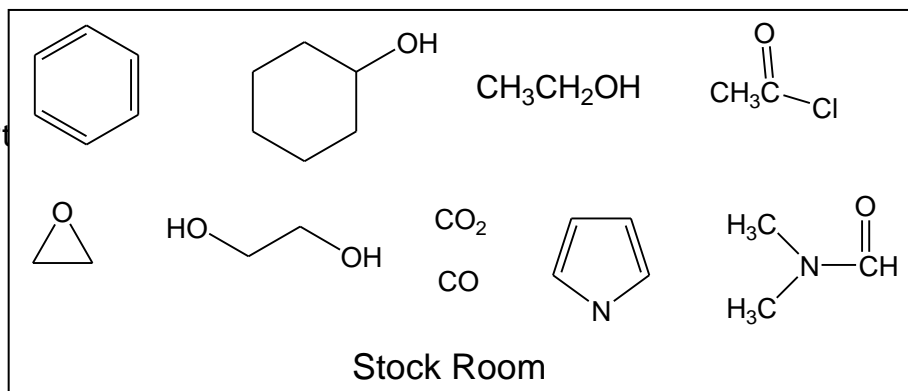
Second Midterm Exam

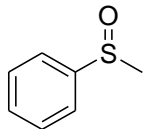
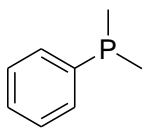
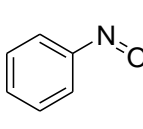
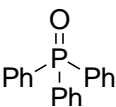
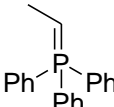
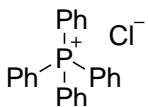
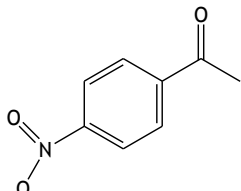
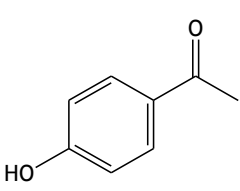
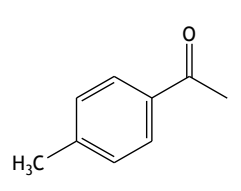
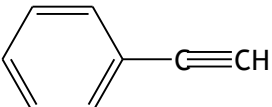
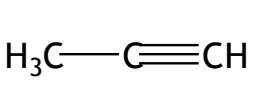
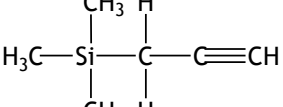
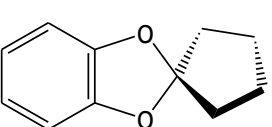
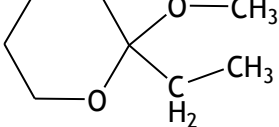
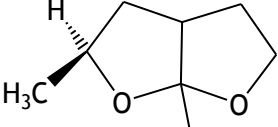
This evening you will take two tests, one in chemistry and one in integrity. I want you to get A's on both of these tests but if you are to fail one, let it be the one on organic chemistry. GW

Name (Print as it appears on the Class Roster) _____

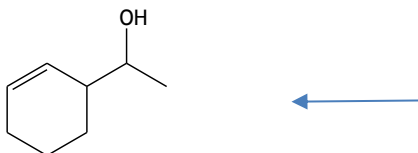
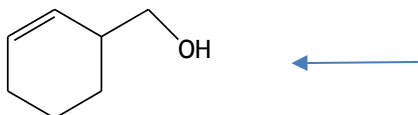
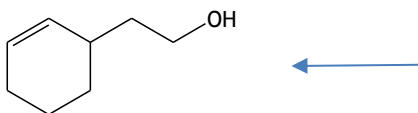
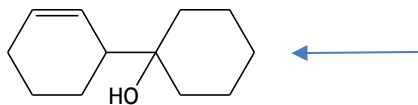
Signature _____

1. (10 Pt)

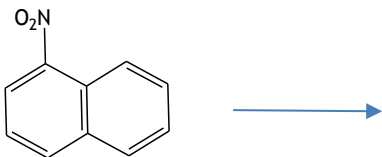
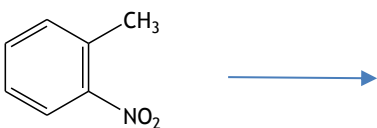
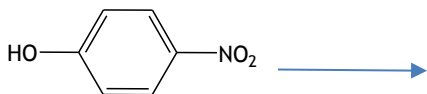
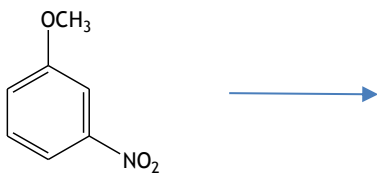


Reduces aldehydes, but not alkenes	Ni/H ₂	Ag(NH ₃) ₂ ⁺	LiAlH ₄
Oxidizes primary alcohols to aldehydes	K ₂ CrO ₄ /H ₂ SO ₄	PCC	NaBH ₄
Weak acids have	Small pKa values	Weak conjugate bases	Strong conjugate bases
Substitutes meta in reaction with electrophiles			
True statement	All ortho/para directors are activators	All activators direct ortho/para	All deactivators are meta directors
Phosphonium ylide			
Strongest Base	NaNH ₂	CH ₃ Li	CH ₃ C≡CNa
Reacts fastest with CH ₃ MgI			
Has the lowest field resonance in ¹ H-nmr			
Does not produce a ketone upon hydrolysis			

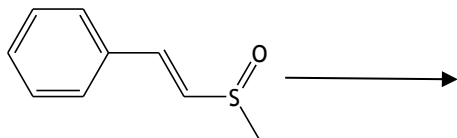
2. (4 Pts) Show how these four products can be synthesized from the same Grignard Reagent (Homework 16.4):



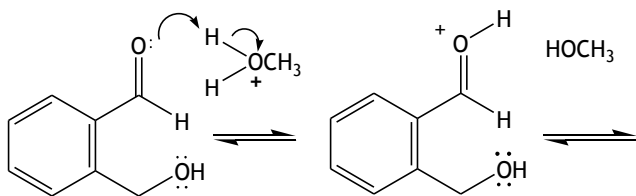
3. (4 Pts) Predict the major product or products from treatment of each compound with $\text{H}_2\text{SO}_4/\text{HNO}_3$ (Homework problem 22.15).



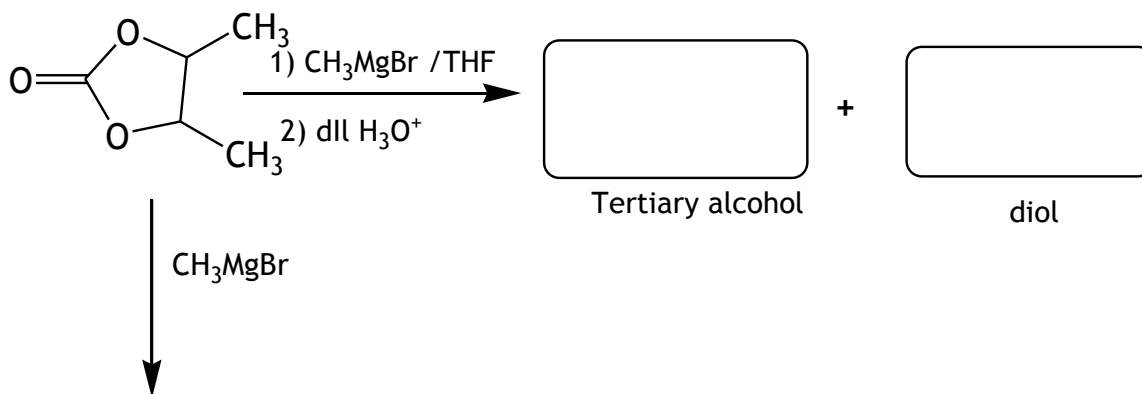
4. (12 Pts) Alkyl groups direct ortho and para and sulfoxide groups ($R_2S=O$) direct meta in In electrophilic aromatic substitution. The compound below has in interesting combination of these groups. Please predict whether the substitution on this compound will take place in the ortho and para or meta positions. Make your prediction on the basis of comparison of resonance structures. No credit will be given for a correct answer unless we see a resonance theory argument and the appropriate resonance structures to support your explanation and prediction. It is your ability to write proper resonance structures and your ability to make a rational argument that is being tested!



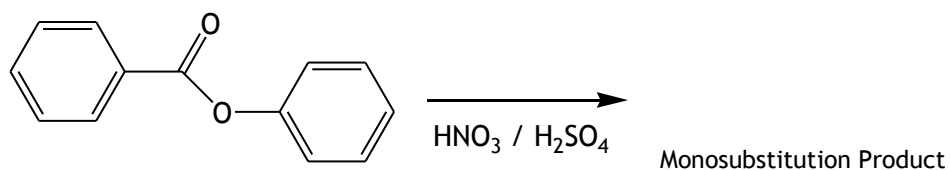
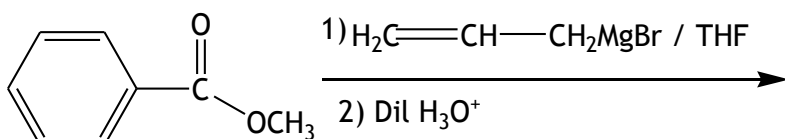
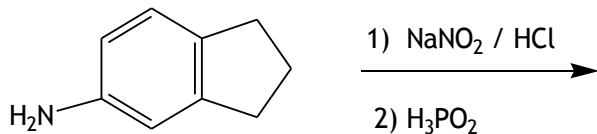
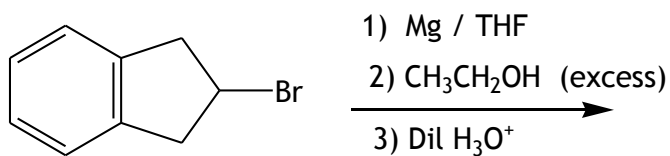
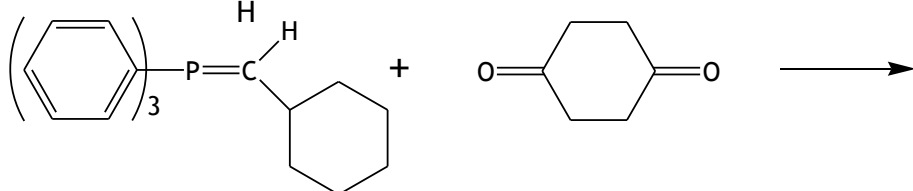
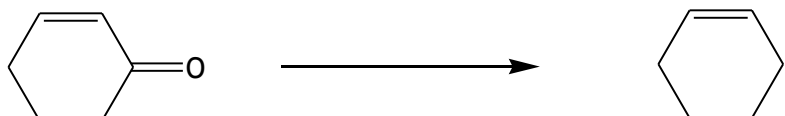
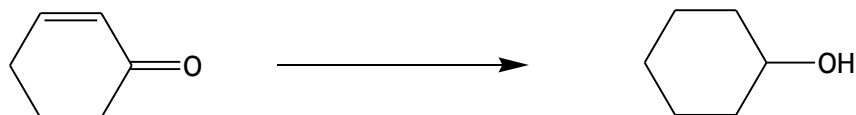
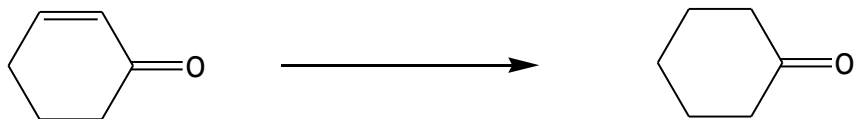
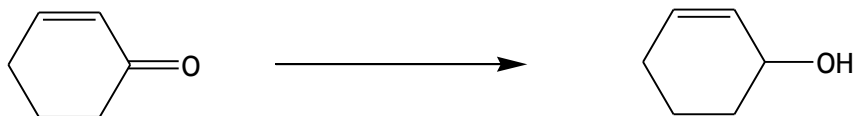
5. (20 Pts) When the compound below is treated with a catalytic amount of acid in methanol it forms a cyclic acetal in high yield. Use the curved arrow convention to show the step by step mechanism for this reaction. I did the first step for you so each person gets one point minimum. **Please** write clearly and be very neat. Grading 100 questions like this is a challenge!! If I cannot follow your work, it will be marked wrong. Please be sure to show the resonance structures for key intermediates.



6. (12 Pts) Michael carried out the reaction of methyl Grignard reagent in THF with the substance shown below. After treatment with dilute aqueous acid, two products were isolated in equimolar amounts and in good yield. One of the compounds was a primary diol and the other was a tertiary alcohol. Please tell me the structure of the two compounds. Use the curved arrow convention to show the mechanism by which these products were formed. Don't panic! Just employ what you know about how Grignard reagents react with ketones and esters and "let nature take its course!"



7. (10 Pts) Please complete the following equations by supplying missing starting materials, reagents or products as required.



8. (18 Pts) Please show a synthetic pathway to ***any two*** of the three structures below. An inventory of your “stock room” is provided on the cover sheet. All of the carbon in your product must come from the stock room. You may use any inorganic reagent, substance, or solvent you like, but ***all*** of the carbon in the final product must come from the stock room. There is an intentionally blank page following this one to give you additional room to work. Work backwards, write clearly and have fun. Do a good job!

