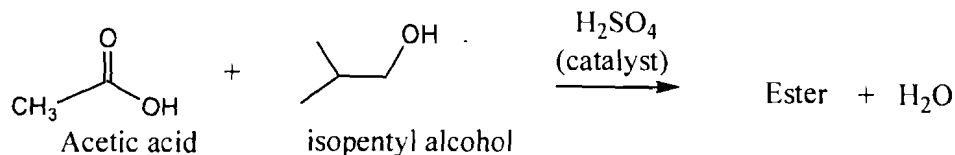


Chem 252 Exam #2 (80 pts)

Name Fonzle

1 For the Esterification reaction shown below answer questions a-e:

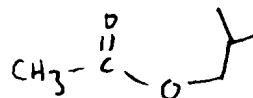
Reaction equation:



Reagent table:

Name	MW	mp	bp	Density	amt used/	moles used/	notes
Acetic acid	60	-5C	130C	1.1 g/mL	.35 mL	0.0064	
Isopentyl alcohol	88		156 C	0.9 g/mL	1.5 mL	0.015	
Sulfuric acid	98		180C	1.9 g/mL	0.3 mL	0.04	Catalyst
Water	18		100C	1.0 g/mL			
Ester	130	-20C	136C	0.9	g (expected)		product

a (4 pts) Draw the Ester that would be formed in this reaction.



b.(4pts) In this reaction, how are you shifting the equilibrium to favor the products? (use the information provided in the reagent table to answer this).

excess isopentyl alcohol (0.015 moles)

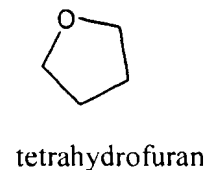
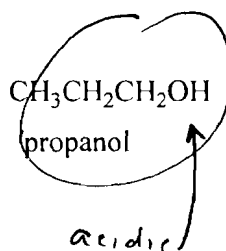
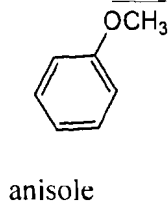
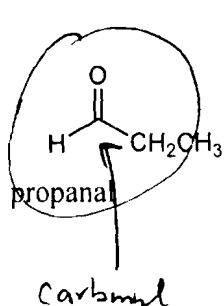
c. (3 pts) In This reaction how many moles of Sulfuric acid is consumed? None - is catalyst

d.(4 pts) In this reaction how many moles of water are produced? ~~0.0064~~ 0.0064 moles

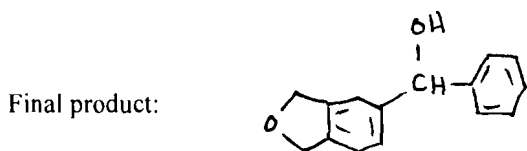
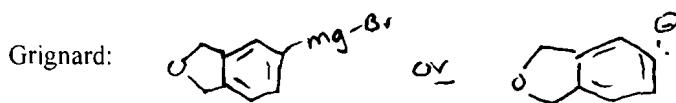
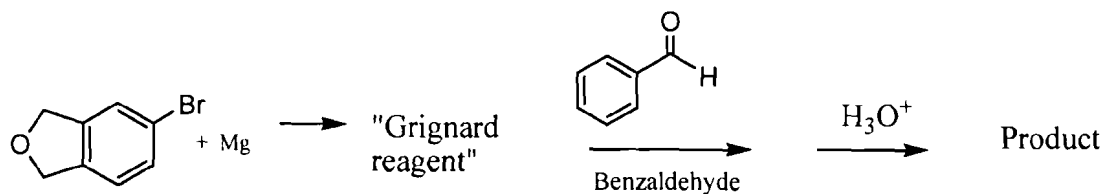
e.(6 pts) What purification methods would you want to do to isolate 'pure' banana oil? Circle all that would be reasonable to apply:

a) Recrystallization, b) Acid/base extraction, c) Distillation, d) Chromatography, e) High hopes

2. (6 pts) Circle the compounds below NOT be used as a solvent in a Grignard reaction?

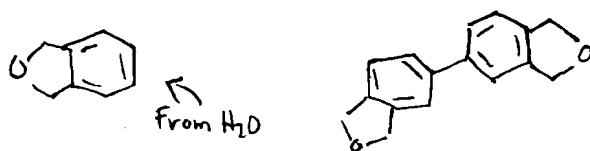


3 a) (10 pts) For the Grignard reaction shown below, draw the structure of the Grignard reagent and the final product.



b) (4 pts) Which step of a Grignard reaction is faster: 1) formation of the Grignard reagent or 2) reaction of the Grignard reagent with water.

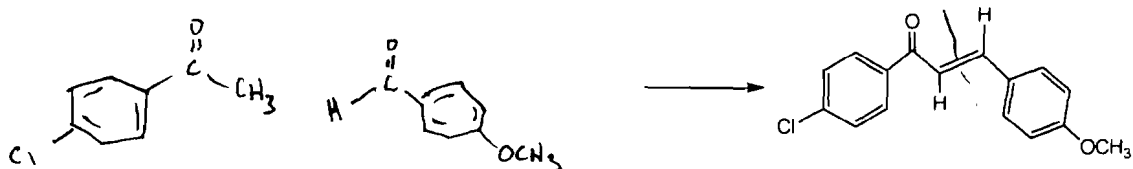
c) (6 pts) Draw the structures of the 2 main impurities of this reaction—do NOT include any magnesium salts. (Assume that some water got into your reaction mixture).



d) (4 pts) Which purification technique listed below would be the best way to purify and separate the product from the 2 impurities in part c). Assume that the mixture is 50% product and 25% each impurity and that they are all solids.

Circle one: *need 80% purity to start* *No acid to separate out* *liquids only*
 1) Recrystallization, 2) Acid/base extraction, 3) Distillation, 4) Chromatography, 5) Wishful thinking.

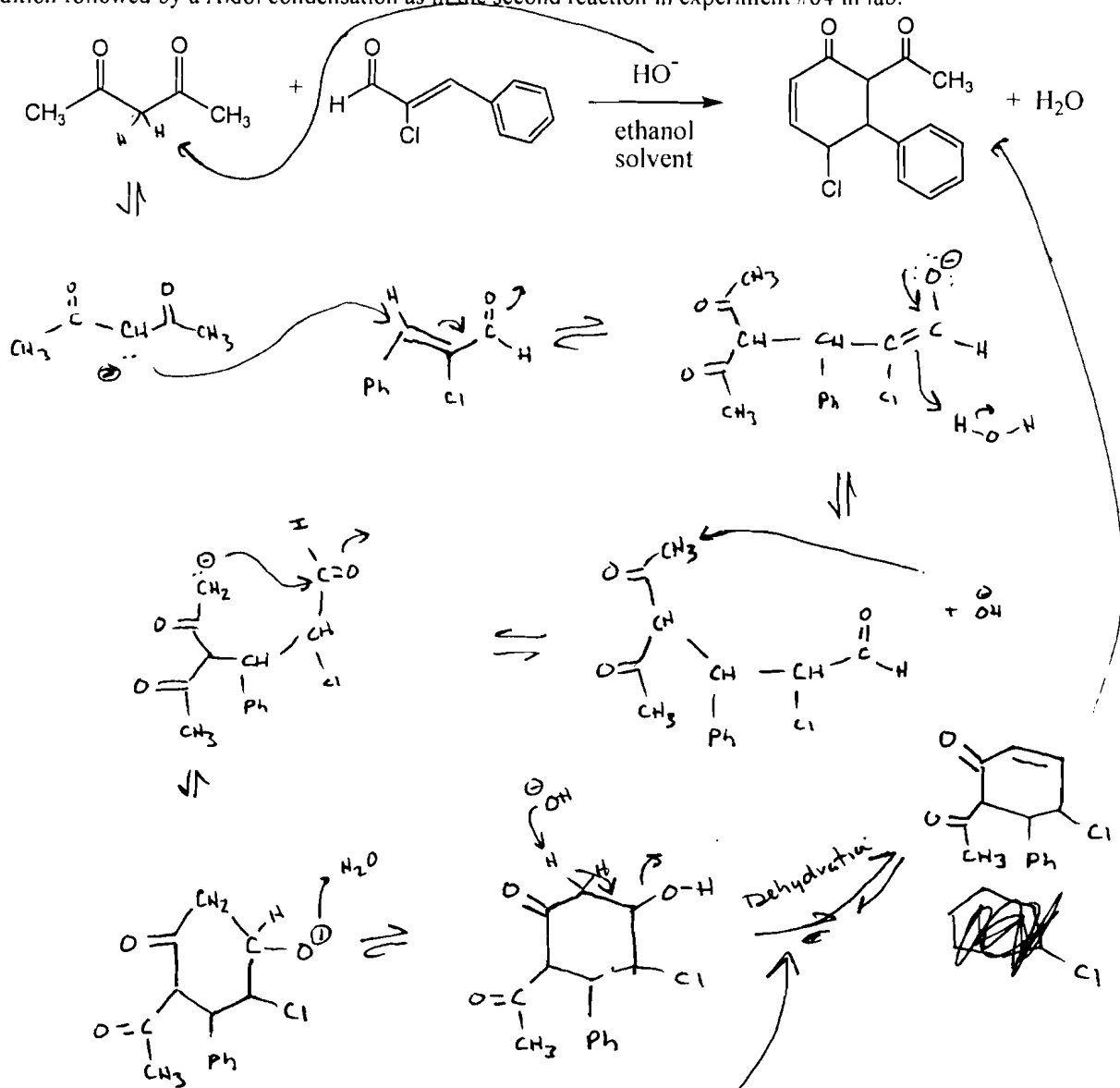
4 a. (8 pts) Draw the Ketone and aldehyde that reacted by an Aldol condensation to produced the chalcone shown below :



b. (4 pts) What was the catalyst used in this reactions (was the same one as in the Aldol condensation that you did in lab).

Sodium hydroxide OH^-

5a (8 pts) Draw the arrow pushing mechanism for the reaction below. Hint: the reaction was a Michael addition followed by a Aldol condensation as in the second reaction in experiment #64 in lab.

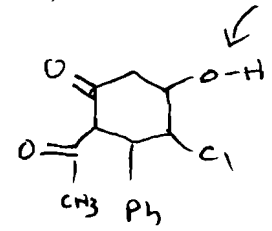


b. (3 pts) A student running this experiment, did not sufficiently heat the reaction (you normally reflux for 1 hour but this student only heat at 40C for 15 minutes in order to leave lab early). When the student took an IR of the final product a large broad absorption at 3300 cm^{-1} was observed Explain what happened..

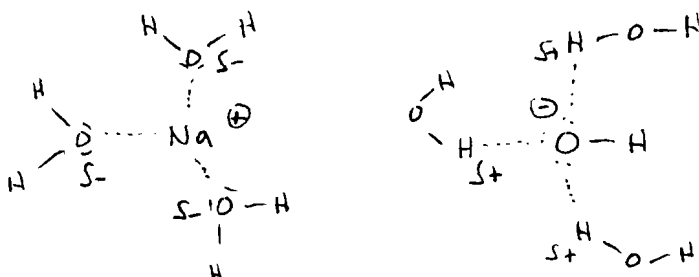
need heat for last step (dehydration)

IR at 3300 cm^{-1}

The product for this reaction is probably \rightarrow



10. (4 pts) Clearly depict what happens to sodium hydroxide (NaOH) when it dissolves in water (show an picture at the atomic level of how NaOH interacts with water)



11. (2 pts) What was your favorite lab experiment/lab moment from chem. 251/252 (what organic lab tales will you be telling your grandchildren?)

Extra credit (2 pts) Do one of the following:

Interpret the following Nasrudin story or write you own Nasrudin story:

Nasrudin returned to the village from the imperial capital, and the citizens gathered around him to hear what he had to say.

"I shall be brief," said Nasrudin, "and confine my remarks on this occasion simply to the statement that my greatest moment was when the King spoke to me,"

Overcome with wonder and staggered by the reflected glory, most of the people fell back, and went on their way to discuss this wonderful happening.

The least sophisticated peasant of all hung back, and asked: "By the way, just what did His Majesty say to you?"

"I was standing outside the palace when he came out, and he said to me, quite clearly, for anyone to hear: 'Get out of my way you fool!'"