Name: _____Key_____

CHEMISTRY 3331, Fall 1999
Professor Walba
Second Hour Exam
October 21, 1999

scores:

1) 20

2) 20

3) 20

4) 20

5) 20

_____
100

This is a closed-book "open model" exam. You may use models, but no notes or books. Please put all your answers on the test. Use the backs of the pages for scratch.

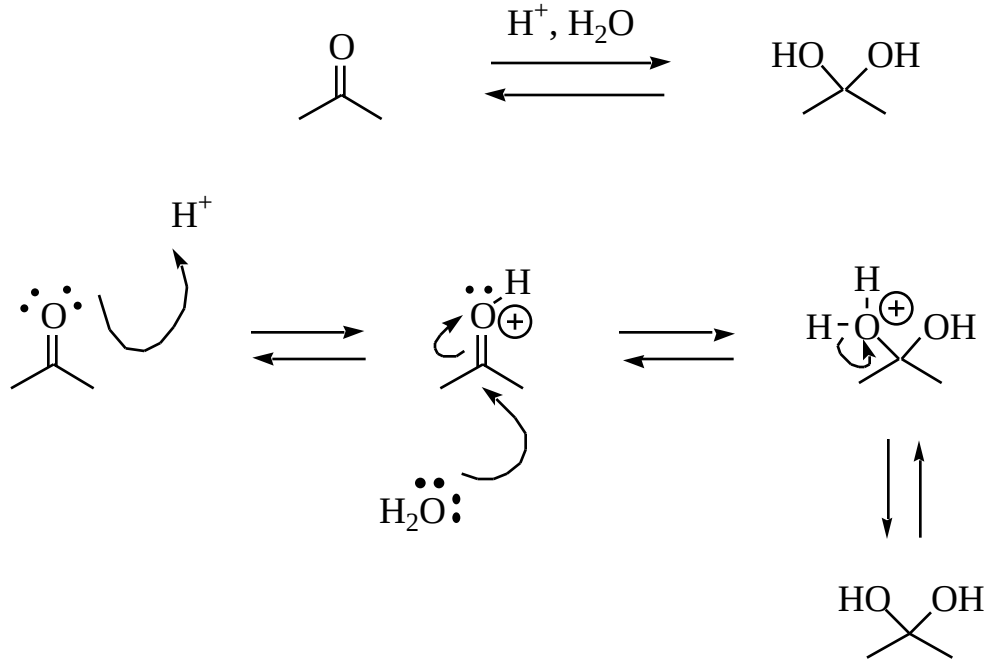
PLEASE read the questions carefully!

Partial Periodic Table

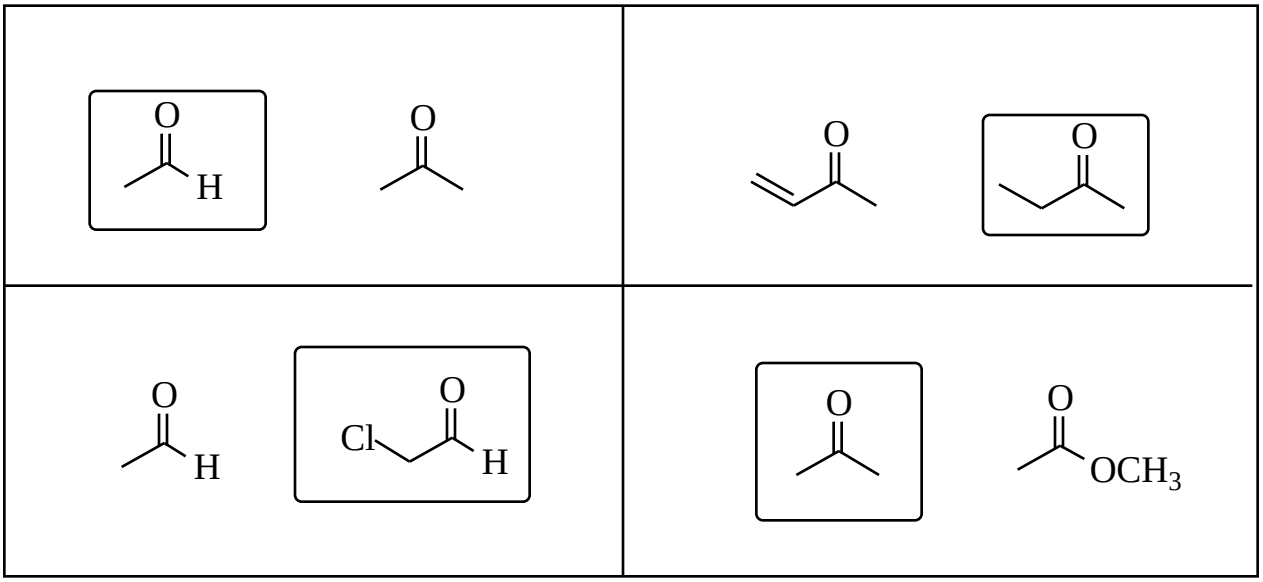
1A							8A
1 H	2A	3A	4A	5A	6A	7A	2 He
3 Li	4 Be	5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg	13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
						35 Br	
						53 I	

Name: _____Key_____

1) (20 pts) a) Propose an arrow-pushing mechanism for the following equilibration of acetone with the acetone hydrate.



b) For each pair of carbonyl compounds, circle the compound with the LARGEST amount of hydrate at equilibrium in water.



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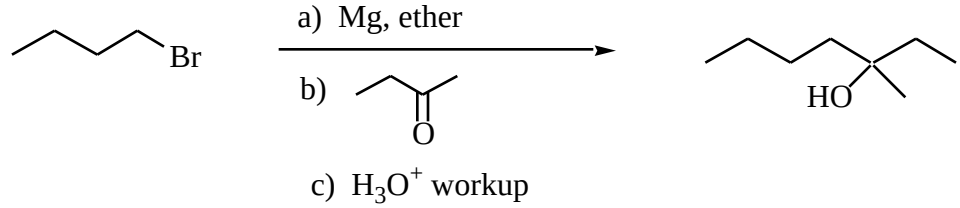
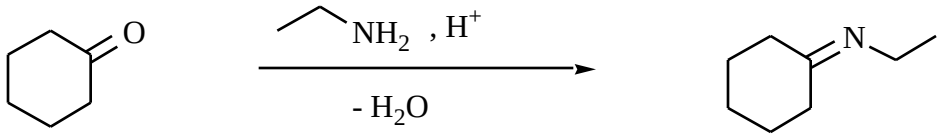
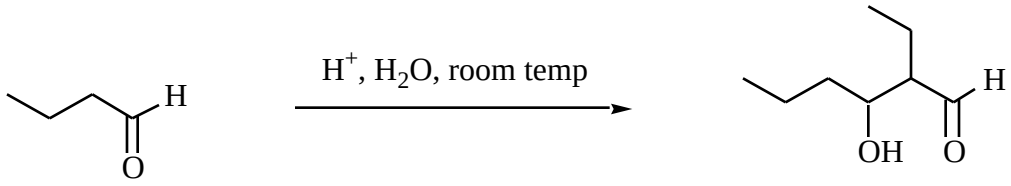
2) (20 pts) Give the single major organic product (unless specifically asked for more products) for each of the following reactions. If a racemate is formed, consider this to be one product and show only one of the enantiomers.

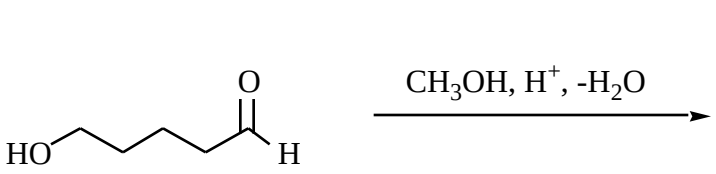
a) 

b) 

c) 

Ignore stereochemistry for this one!

$C_8H_{16}O_2$

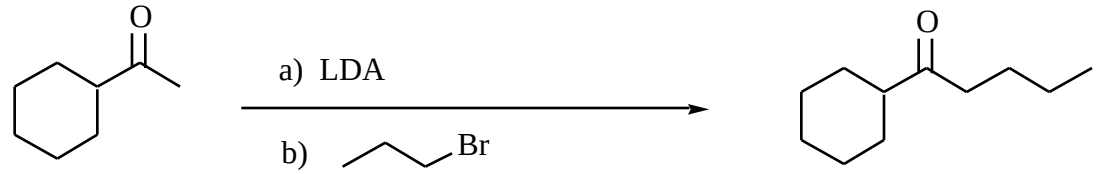
d) 

$C_6H_{12}O_2$

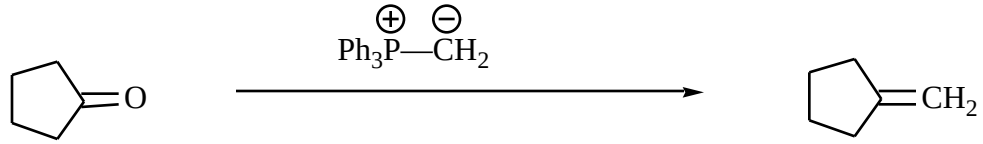
Name: _____Key_____

3) (20 pts) Propose reagents for accomplishing the following transformations. NOTE: more than one step may be required! Try to make your synthesis efficient (i.e. the desired product should be the major product). You must use the starting material given, and you may use any other organic or inorganic reagents you want, such as ylides and Grignard reagents.

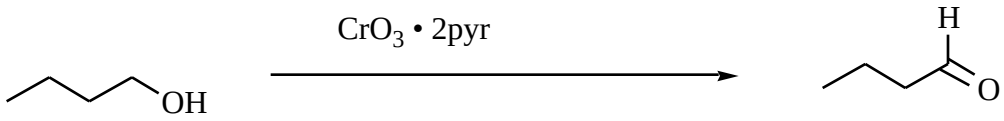
a)



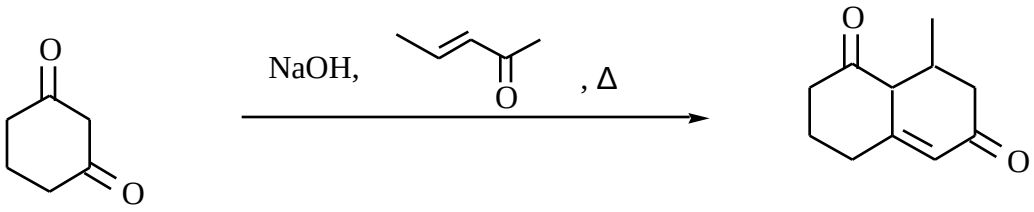
b)



c)



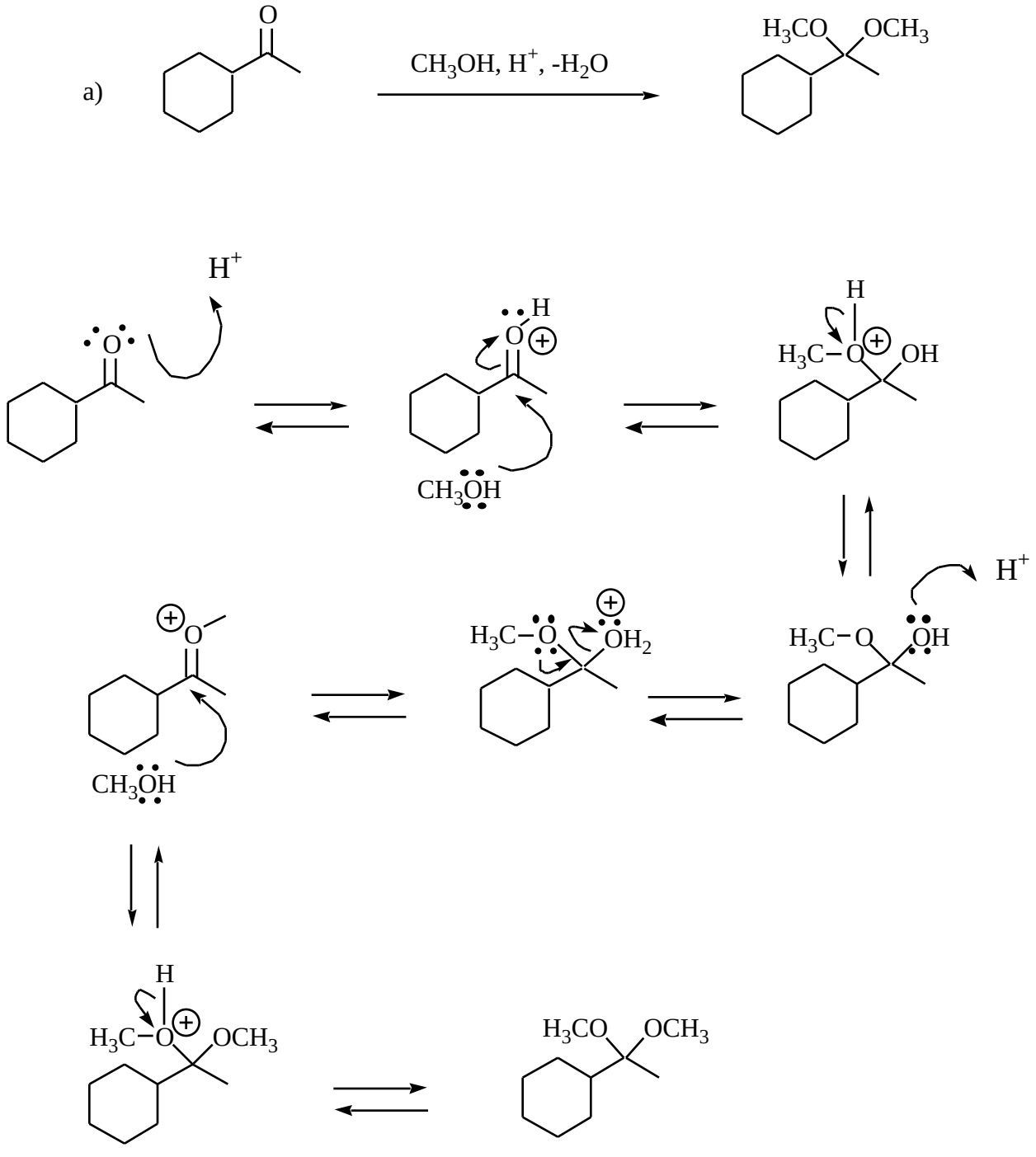
d)



Name: _____Key_____

4) (20 pts) Propose arrow pushing mechanisms for each of the following transformations. Be sure to show all intermediates in the pathway from starting material to product. Make all structures in your mechanism proper valence bond structures with correct formal charges and all lone pairs or unshared electrons shown.

a)



Name: _____Key_____

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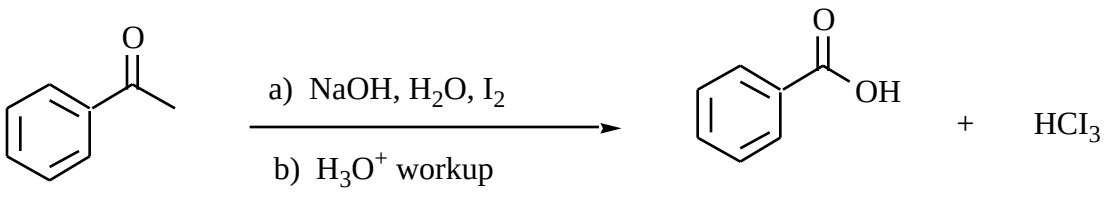
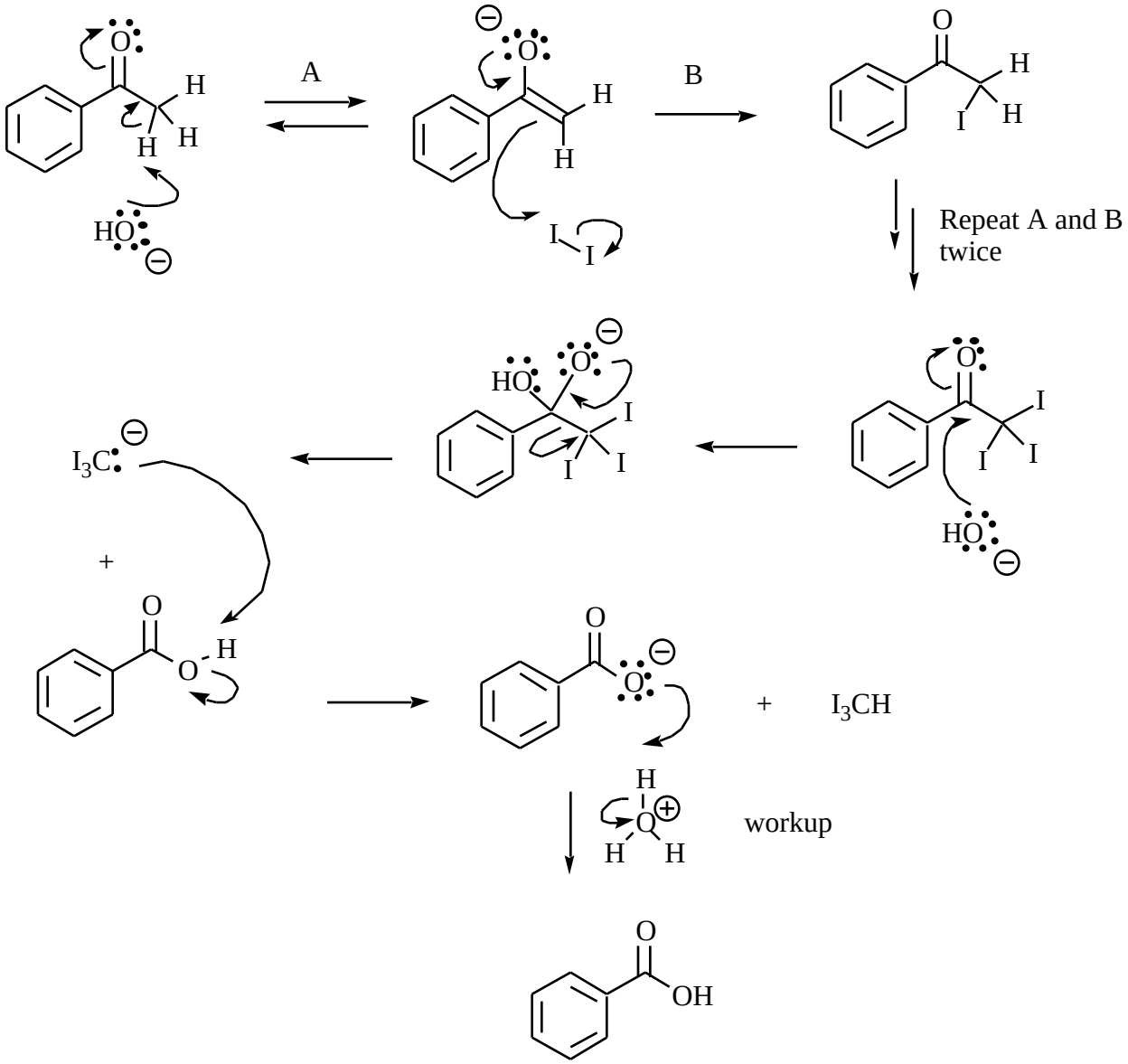
b)





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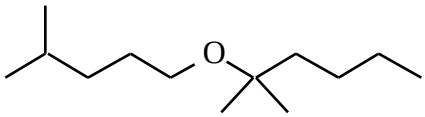
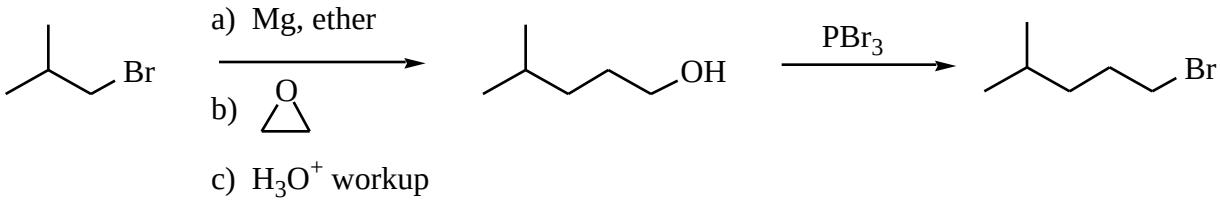
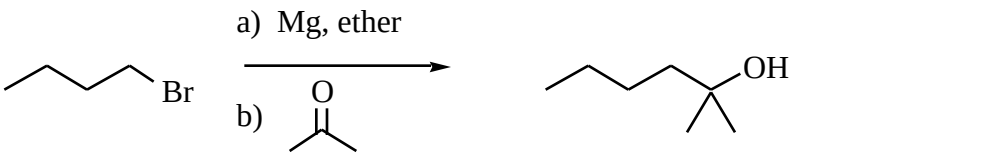
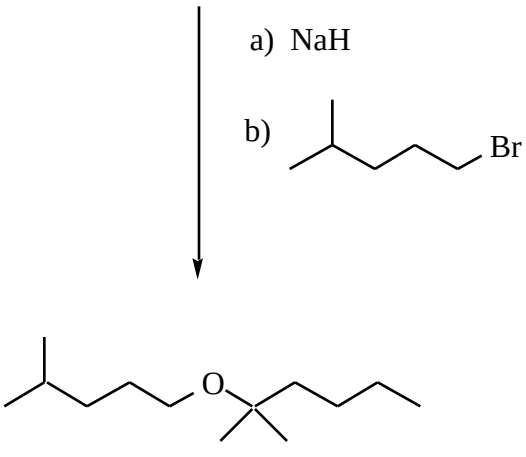
5) (20 pts) Propose a synthesis for each of the following targets from benzene, any organic starting materials with FOUR (**that's 4**) carbons or less, and any inorganic reagents you need (you may also use Ph_3P). Try to make your synthesis efficient (that is, the desired target in each step should be a major product). Please be sure that none of your initial starting materials has more than four carbons! For these questions, put down as much as you can - do NOT leave the page blank. There will be partial credit. CONTINUED ON NEXT PAGE!

a) 

Of course there are many correct answers to this question. Here's one. The last step is the Williamson ether synthesis.







Name: _____Key_____

5 –continued-

b)