CHEM 51C LEC A (40620)

Midterm 1 (Spring Qtr 2018) - LETTER SIZE

ver. D

8527 (4018)

Assigned Seat#:_____

Instructions to Instructor:

Do not alter this coversheet in ANY way. Substantial delays and additional fees may apply.

Instructions to Student:

1. Clearly print your Last Name, First Name and the Date
2. Clearly print your Student ID number in the boxes provided. Use large, dark numbers. These numbers are captured automatically during the scanning process.
3. Bubble in each number of your Student ID completely. The bubbles are used only if your written ID number is not captured.
4. Write your Name and Student ID number in the upper right corner of all following pages of your exam.

Last Name, First Name: Key Date: ____/____/____

STUDENT ID: *For Access UCI student, leave first column blank then enter your 7-digit Student ID number.*

	_____	_____	_____	_____	_____	_____	_____	_____	
1	0	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	2
3	0	0	0	0	0	0	0	0	3
4	0	0	0	0	0	0	0	0	4
5	0	0	0	0	0	0	0	0	5
6	0	0	0	0	0	0	0	0	6
7	0	0	0	0	0	0	0	0	7
8	0	0	0	0	0	0	0	0	8
9	0	0	0	0	0	0	0	0	9
0	0	0	0	0	0	0	0	0	0

---------- (This space for Instructor/TA use only) ----------

Question	1	2	3	4	5	Total
Score	18	15	20	14	8	75

_____

Do not open your exam until instructed to do so.
Answer the questions you understand best first.
Your answers must be neat and legible.

Midterm 1, Chem 51C, Jarvo, Fall 16

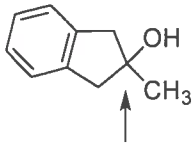
Initials: Key A

1. (22 points)

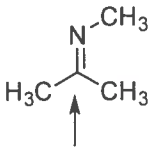
a. Rank highest to lowest oxidation state

M1 F16 #1d

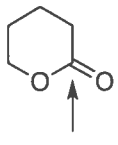
PS2 #1b



M



A



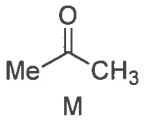
Z

1 Z > A > M 1

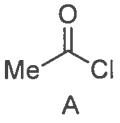
4

b. Rank fastest to slowest reaction with H_3CMgBr

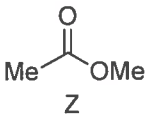
PS1 #1b,c
PS4 #1a



M



A

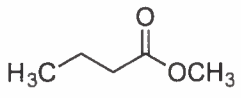
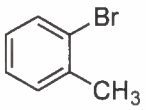
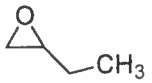
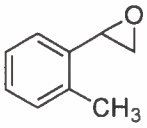


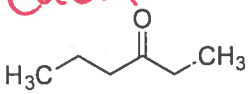
Z

1 A > M > Z 1

c. Fill in the correct compounds from the table to complete the retrosyntheses. You can use the same compound more than once.

1 point each

Compounds			
D	PCC	C	Mg^0
E	CO_2	F	NaCN
L		G	$LiCu(CH_2CH_3)_2$
H		K	
		M	

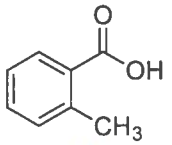


M1 F16 #3B

ok

K + G

then D



M1 F16 #5A

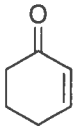
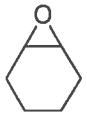
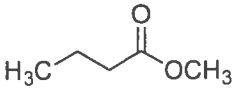
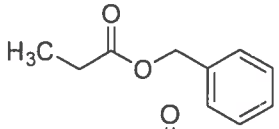
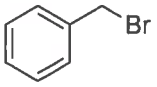
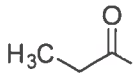
ok

H + C

then E

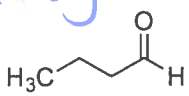
b

d. Fill in the correct compounds from the table to complete the retrosyntheses. You can use the same compound more than once.

Compounds			
C	$LiAlH_4$	K	
D	Dibal-H		
E	$BrMgCH_2CH_3$	L	
F	$LiCu(CH_2CH_3)_2$	M	
G	Mg^0		
H	*n*-BuLi		
J	PPh_3	N	
P		O	

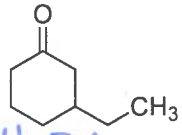
Products

PS4 #2g

i. 

ok

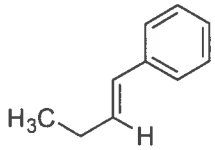
M + D

ii. 

PS3 #5A

ok

K + F

iii. 

PS3 1di

ok

P + J

then H

then O

8

18 20

MIF16 #3b.
PS4 #6

2. 15 points

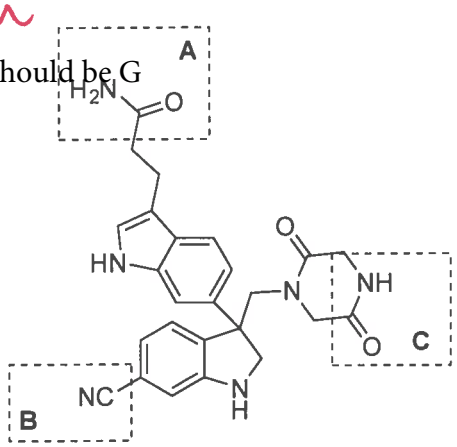
Initials: A

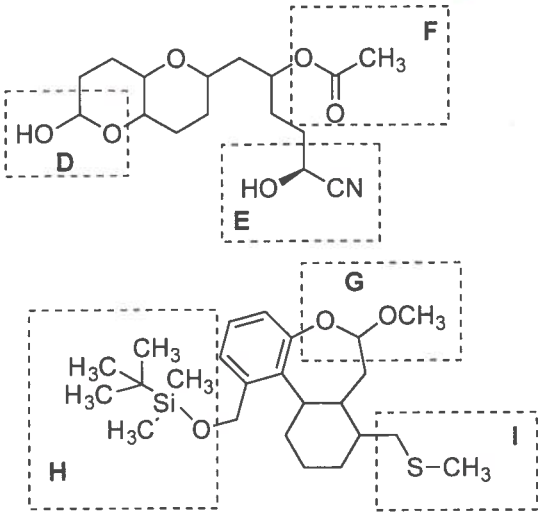
a. Match the names of the functional groups with labeled examples (5 points).

1 point each

- acetal: B (acetal should be G)
- 1° amide: A
- ester: F
- cyanohydrin: E
- silyl ether: H

5





MIF14 #1b

b. Provide pKa's for **any 5** of the following compounds (if you do them all, we will count your best 5).

1 pt each
5 max

MIF16 #1c

20	5	16	-7	50	-10	36
18-22	4-6	14-18	-10 to -5	45-55	-11 to -7	32-38

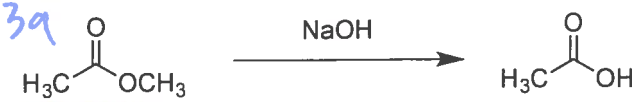
-3

ok range

5

c. Provide an arrow-pushing mechanism (~~7~~ points).

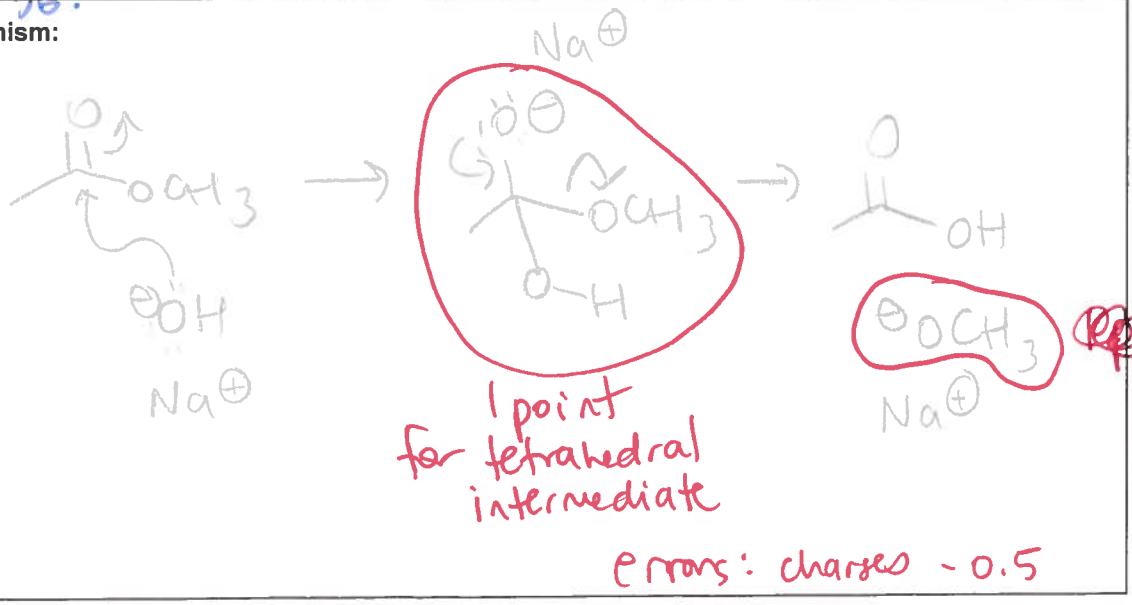
MIF16, 39



MIF14 # 36.

1 pt each arrow
start on electrons
end on atom
} -0.5

Mechanism:



1 point for tetrahedral intermediate

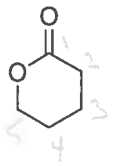
errors: charges -0.5

15

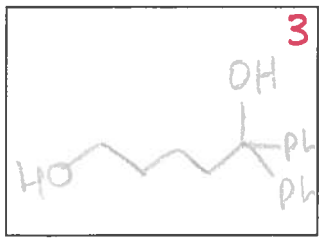
Unecessary proton transfers minus 1

3. (26 points) Fill in the boxes with the appropriate starting material, reagent or major product. Show stereochemistry where appropriate. Initials: A

a.



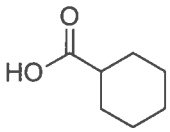
1. PhMgBr (excess)
2. H_2O



3

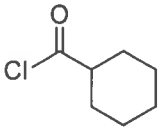
What is the name for this type of reagent? Grignard 1

b.



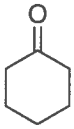
$SOCl_2$
pyridine 1

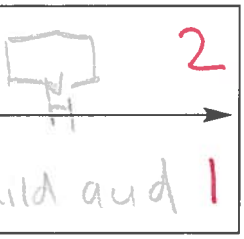
2



Is this reaction an oxidation, a reduction, or neither? neither 1

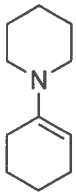
c.



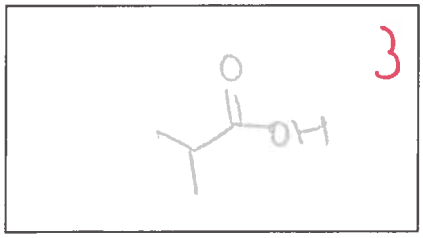


mild acid 1

2

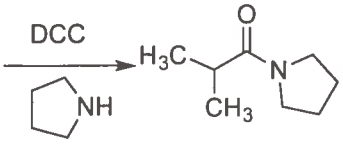


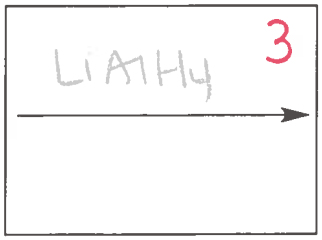
d.



3

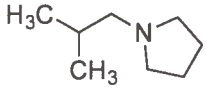
DCC



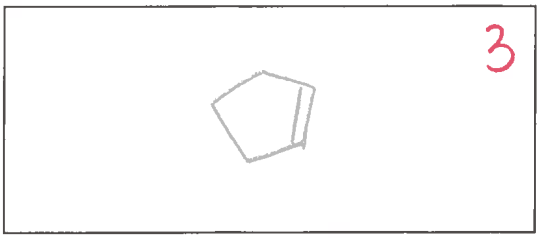


$LiAlH_4$

3



e.



3

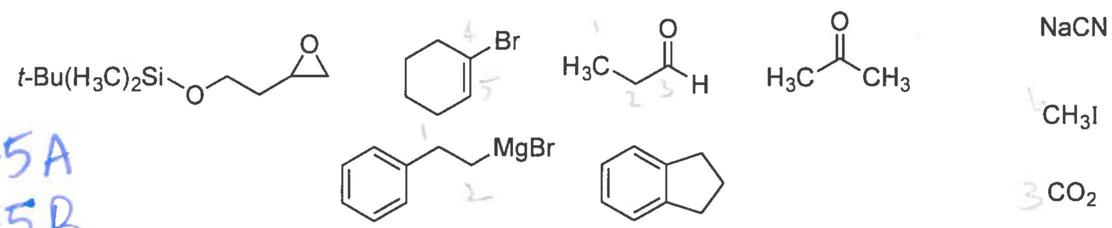
1. O_3
2. Me_2S
3. $LiAlH_4$
4. H_2O

11/20

4. Propose syntheses of the target below (14 points). Initials: B

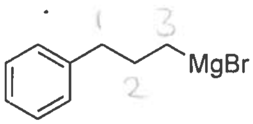
All carbons in the product must come from the starting materials provided, you can use any reagent you wish.
YOU CAN IGNORE STEREOCHEMISTRY.

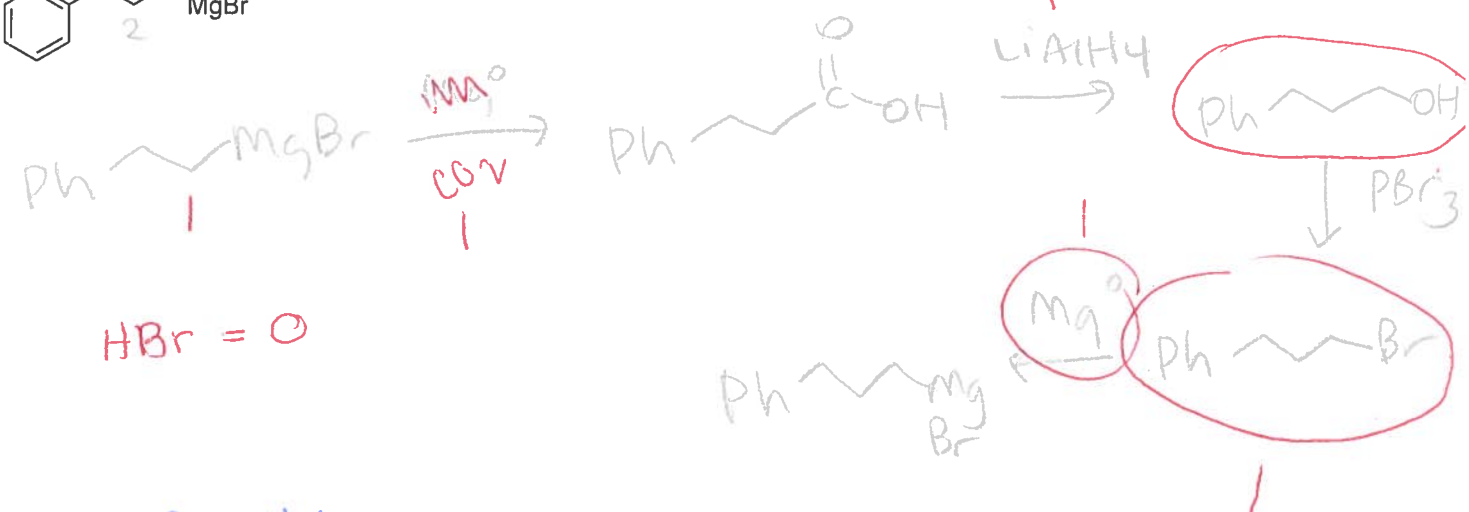
Starting Materials:



PS2 #5A
PS2 #5B

Target A.



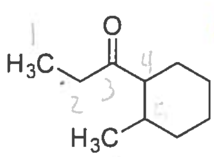


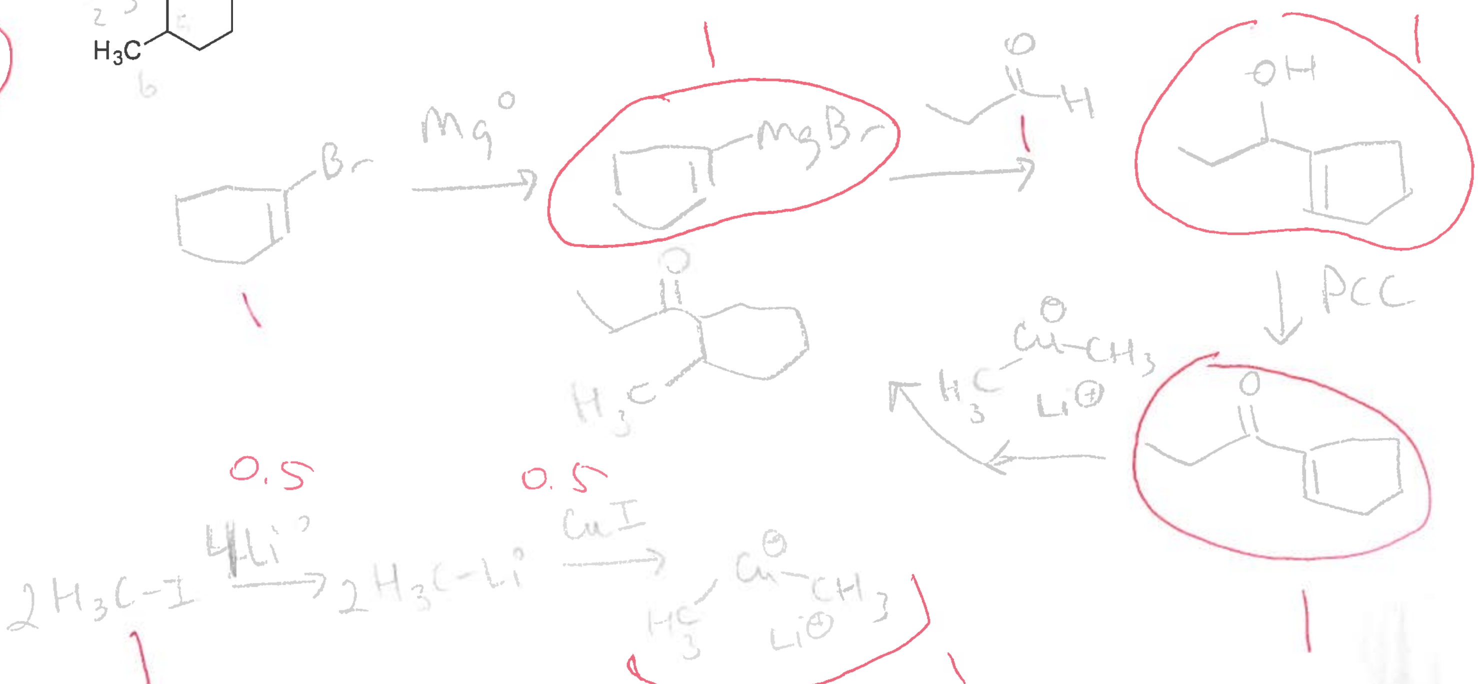
0 - NaBH4
0 - DIBAL-H

HBr = 0

Target B.

PS2 #5C
M1 F14 #5A





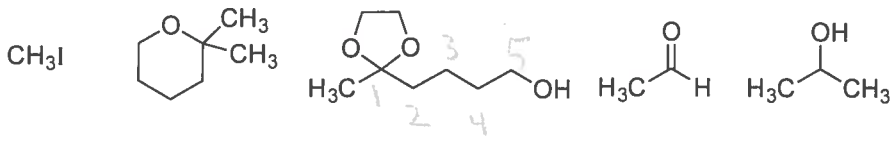
5. Propose a synthesis of the target below (8 points).

Initials: B

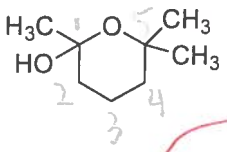
All carbons in the product must come from the starting materials provided, you can use any reagent you wish.
YOU CAN IGNORE STEREOCHEMISTRY.

M1F16 #5A
PS1 #5a
PS2 #2b
2c
~~PS2 #3a~~
PS2 #3c

Starting Materials:



Target.



Proper Grignard use: 1

redox correct 1 point each (2 x)