

Total

1 17

2 18

3 28

4 30

5 15

6 12

7 20

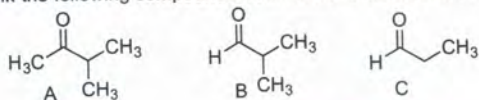
8 18

9 16

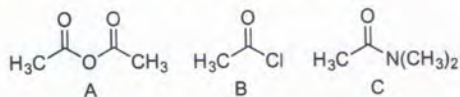
174

17
1. (20 points).

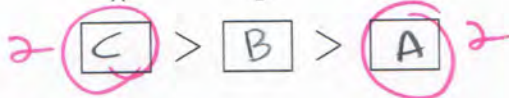
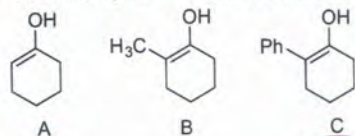
a. Rank the following compounds from fastest to slowest reaction with an enolate:



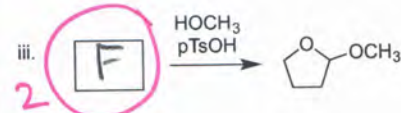
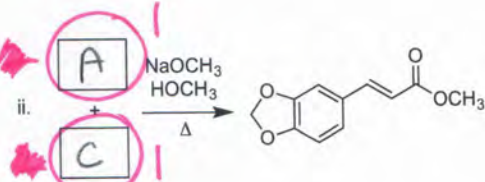
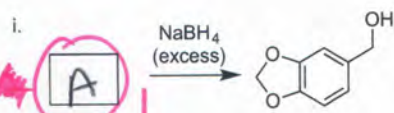
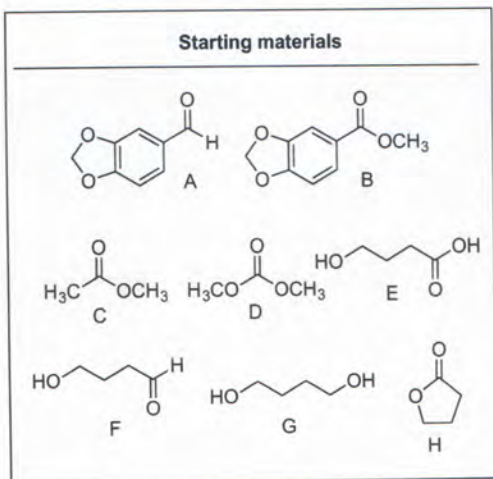
b. Rank fastest to slowest reaction with LiAlH₄.



c. Rank the following enols from most to least stable:



d. Fill in the starting materials to complete the syntheses

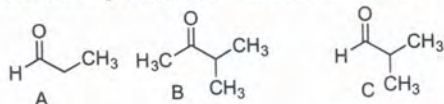
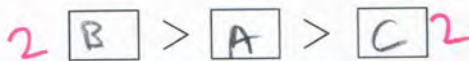
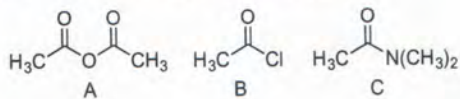


17

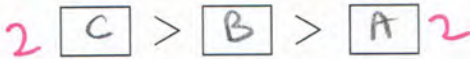
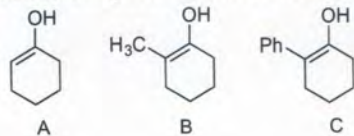
Initials: B

2 (20 points).

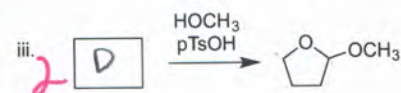
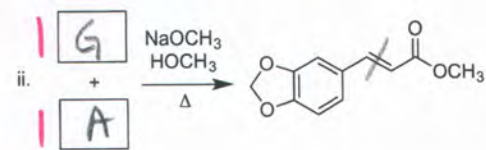
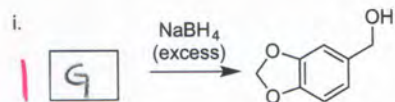
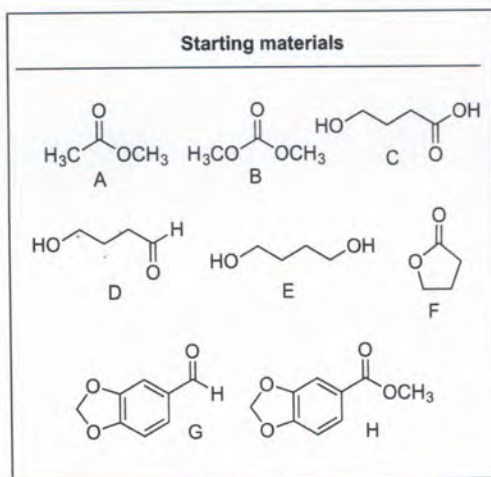
a. Rank the following compounds from fastest to slowest reaction with an enolate:

b. Rank fastest to slowest reaction with LiAlH_4 .

c. Rank the following enols from most to least stable:



d. Fill in the starting materials to complete the syntheses



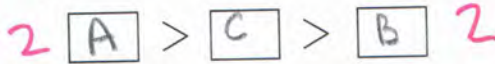
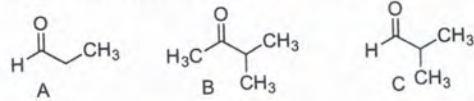
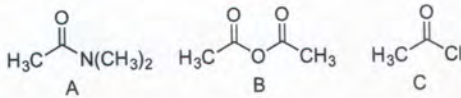
17

Final Exam, Chem 51C, Jarvo, Spring 14

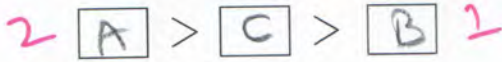
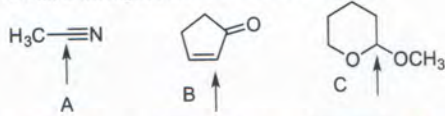
Initials: C

1 (20 points).

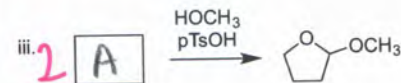
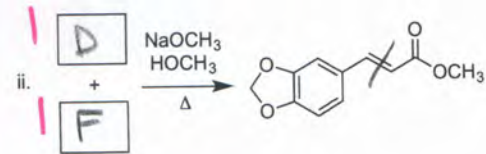
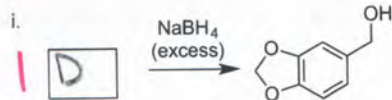
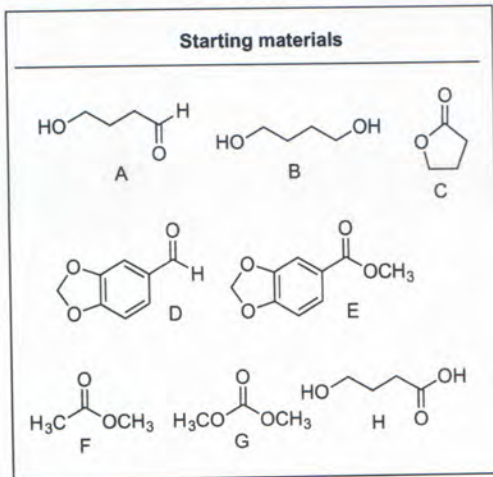
a. Rank the following compounds from fastest to slowest reaction with an enolate:

b. Rank fastest to slowest reaction with LiAlH_4 .

b. Rank from highest to lowest oxidation state:



d. Fill in the starting materials to complete the syntheses

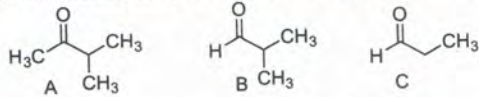


17

Initials: D

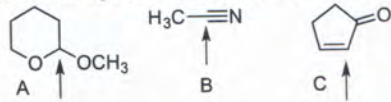
2 (20 points).

a. Rank the following compounds from fastest to slowest reaction with an enolate:



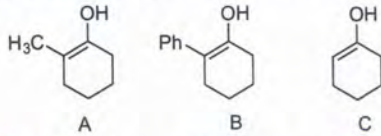
2 C > B > A 2

b. Rank from highest to lowest oxidation state:



2 B > A > C 2

c. Rank the following enols from most to least stable:



2 C > A > B 2

d. Fill in the starting materials to complete the syntheses

Starting materials

COC(=O)c1ccc2c(c1)OCO2
A

O=Cc1ccc2c(c1)OCO2
B

OCCCO=O
C

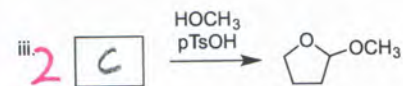
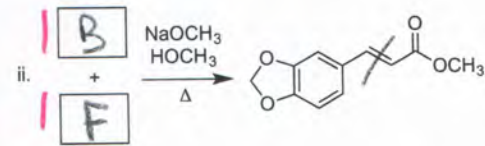
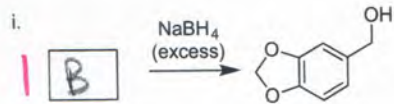
OCCCOCCO
D

O=C1OCCO1
E

CC(=O)OC
F

CCOC(=O)OC
G

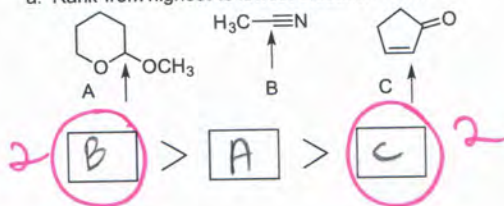
OCCCO=O
H



18
2 (20 points)

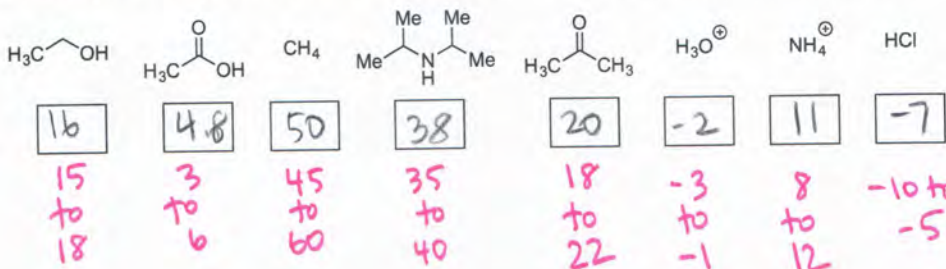
Initials: A

a. Rank from highest to lowest oxidation state:



b. Provide pKa's for any 6 of the following compounds (if you do them all, we will count your best 6).

1 pt each
max
6

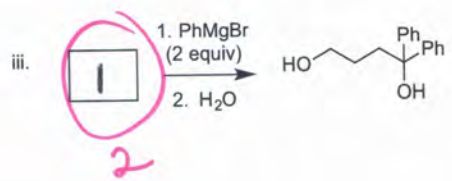
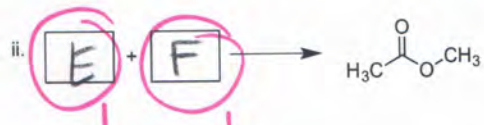
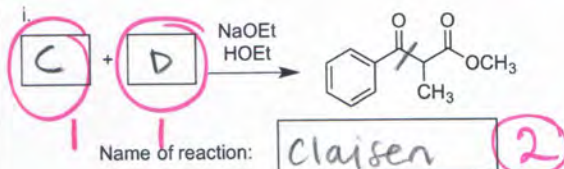


ok range

c. Fill in the starting materials to complete the syntheses

Starting materials

<chem>CC(=O)c1ccccc1</chem> A	<chem>O=Cc1ccccc1</chem> B	<chem>CC(=O)OC1=CC=CC=C1</chem> C
<chem>CC(=O)OC</chem> D	<chem>CO</chem> E	<chem>CC(=O)OC(=O)C</chem> F
<chem>OCCCO=O</chem> G	<chem>COCCCO=O</chem> H	<chem>O=C1OCCC1</chem> I



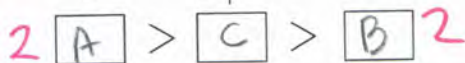
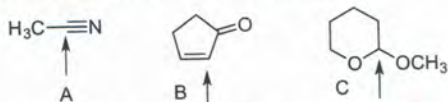
18

18

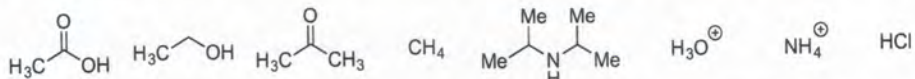
Initials: B

1 (20 points)

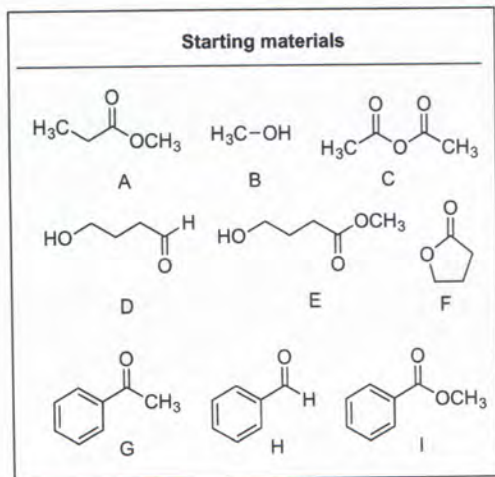
a. Rank from highest to lowest oxidation state:



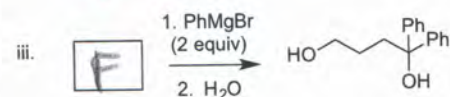
b. Provide pKa's for any 6 of the following compounds (if you do them all, we will count your best 6).



c. Fill in the starting materials to complete the syntheses

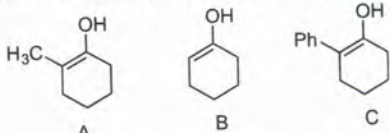
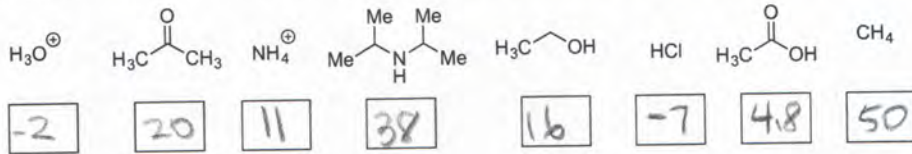


Name of reaction:

claisen

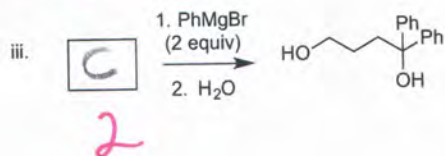
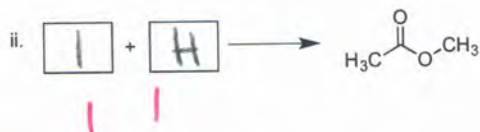
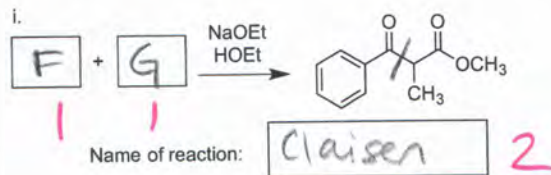
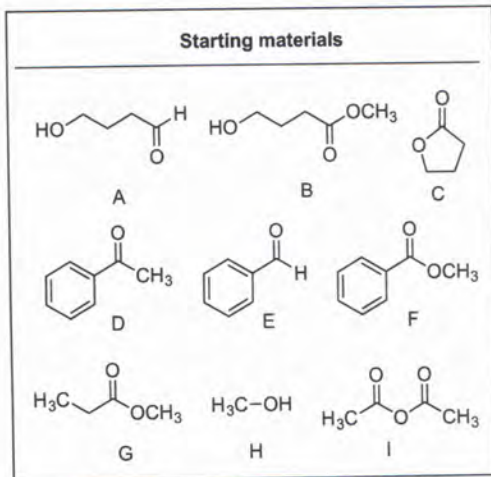
18

2 (20 points)

Initials: Ca. Rank the following enols from **most to least** stable:b. Provide pKa's for **any 6** of the following compounds (if you do them all, we will count your best 6).

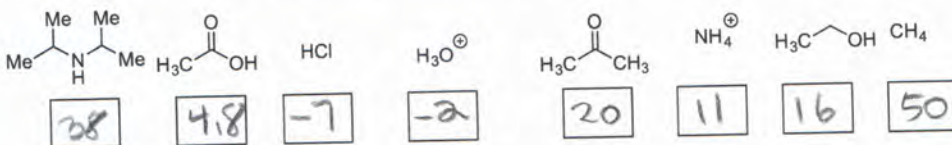
6

c. Fill in the starting materials to complete the syntheses

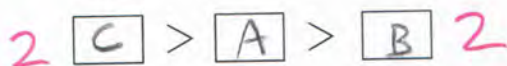
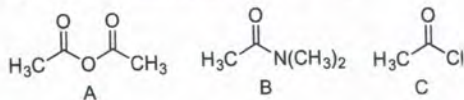


18
1 (20 points)

a. Provide pKa's for **any 6** of the following compounds (if you do them all, we will count your best 6).



b. Rank fastest to slowest reaction with LiAlH₄.



c. Fill in the starting materials to complete the syntheses

Starting materials

c1ccccc1C(=O)C
A

c1ccccc1C(=O)OC
B

c1ccc(cc1)C=O
C

CC(=O)OC
D

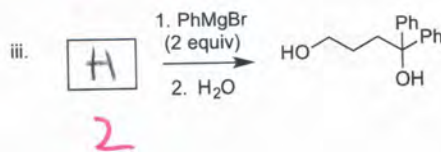
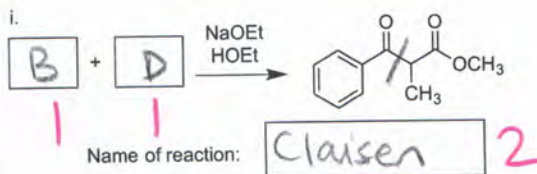
CO
E

CC(=O)OC(=O)C
F

OCCCO=O
G

O=C1OCCO1
H

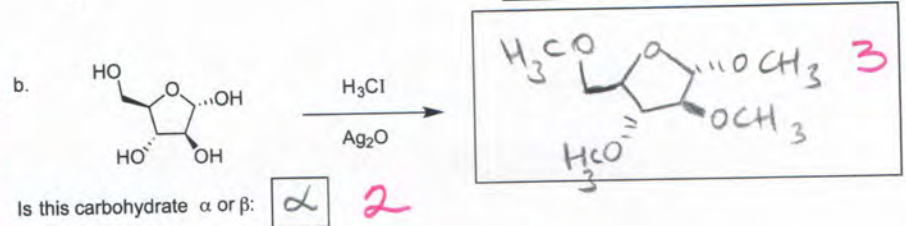
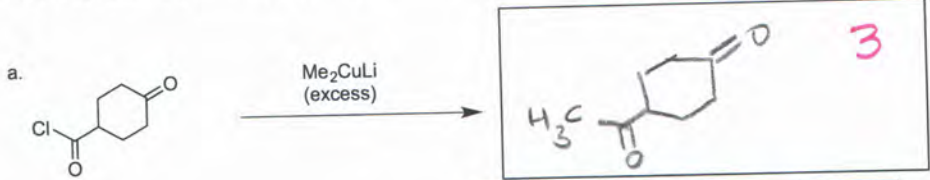
OCCCO(=O)OC
I



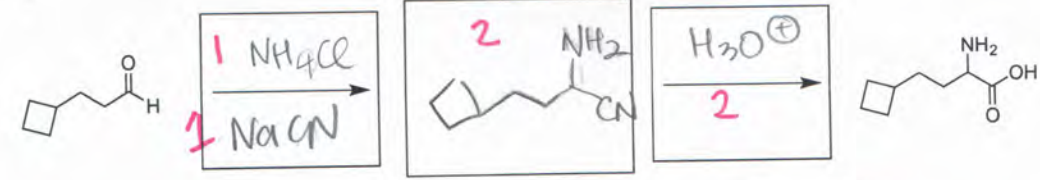
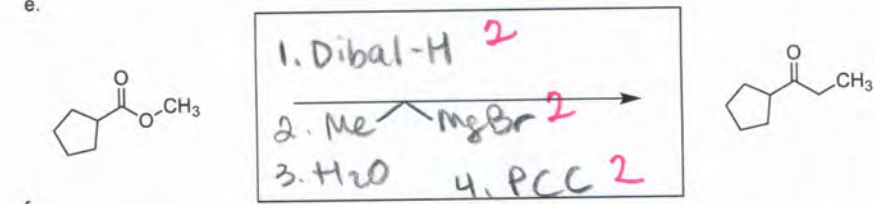
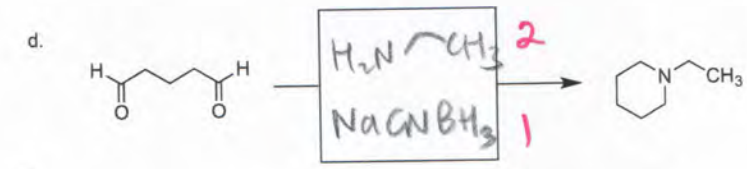
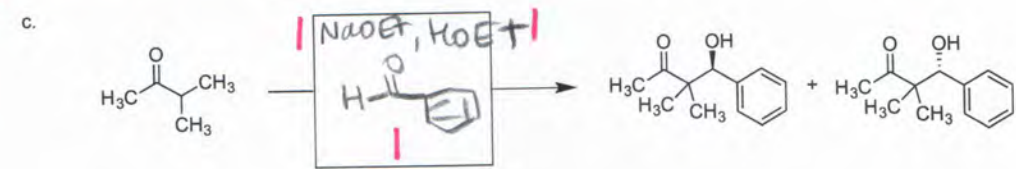
28

3. Fill in the boxes with the appropriate starting material, reagent or major product (25 points). Show stereochemistry where appropriate (you must DRAW the enantiomers/diastereomers)

Initials: A



Version
 A: α
 B: β
 C: β
 D: α



OR NH_3
 OR HCN

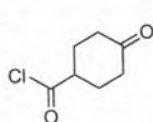
What is the name of this synthesis? Strecker 2
 amino acid synthesis

28

4. Fill in the boxes with the appropriate starting material, reagent or major product (25 points). Show stereochemistry where appropriate (you must DRAW the enantiomers/diastereomers)

Initials: **B**

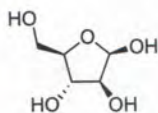
a.



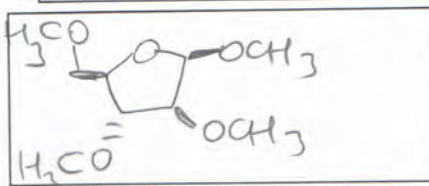
Me_2CuLi
(excess)



b.



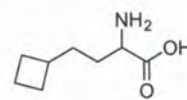
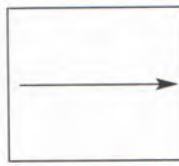
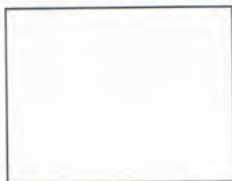
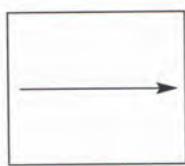
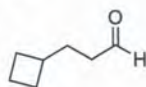
H_3Cl
 Ag_2O



Is this carbohydrate α or β :

β

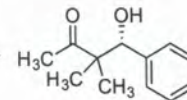
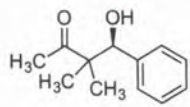
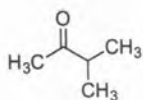
c.



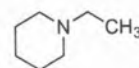
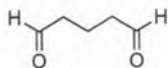
What is the name of this synthesis?



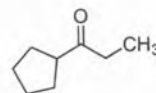
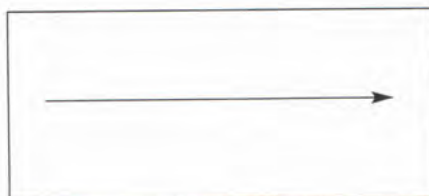
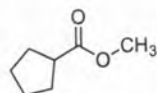
d.



e.



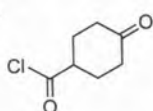
f.



3. Fill in the boxes with the appropriate starting material, reagent or major product (25 points).
 Show stereochemistry where appropriate (you must DRAW the enantiomers/diastereomers)

Initials: C

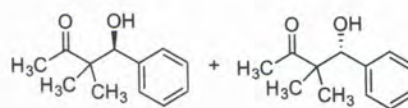
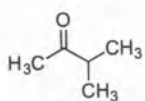
a.



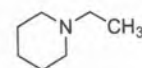
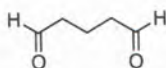
Me_2CuLi
(excess)



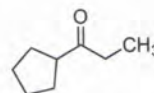
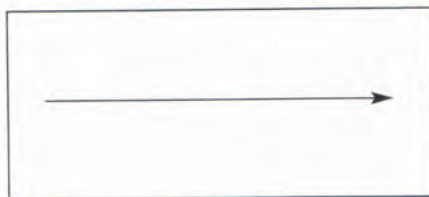
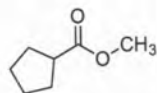
b.



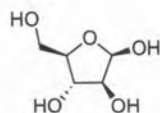
c.



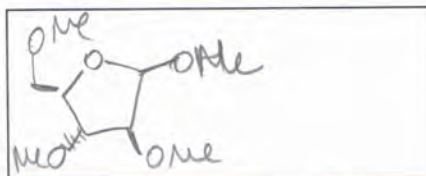
d.



e.



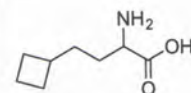
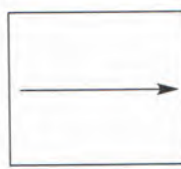
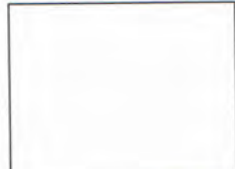
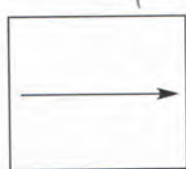
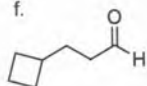
H_3Cl
 Ag_2O



Is this carbohydrate α or β :

β

f.

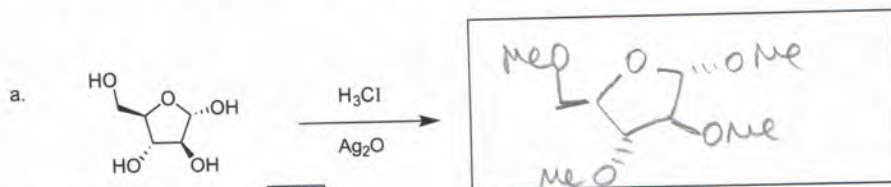


What is the name of this synthesis?

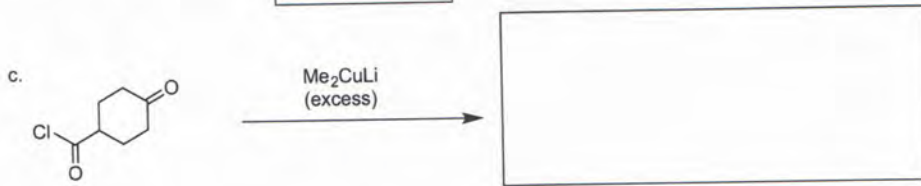
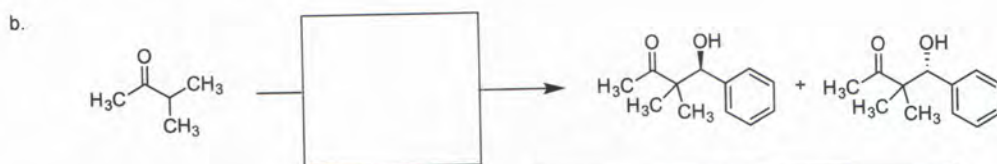


4. Fill in the boxes with the appropriate starting material, reagent or major product (25 points). Show stereochemistry where appropriate (you must DRAW the enantiomers/diastereomers)

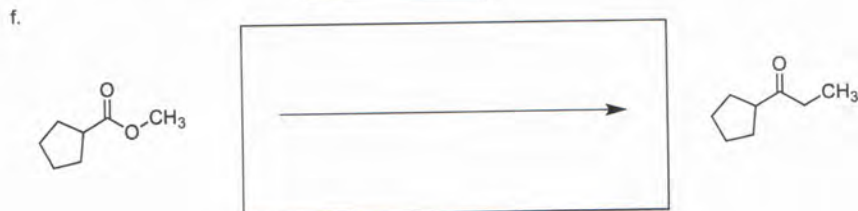
Initials: D



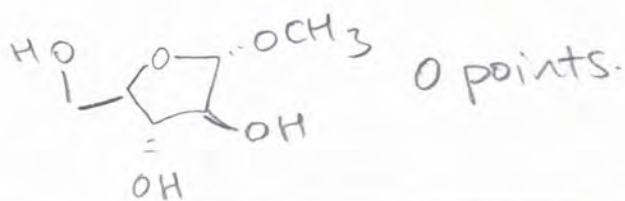
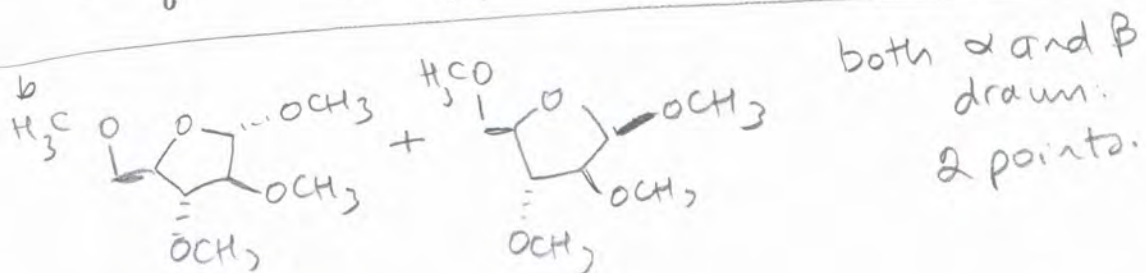
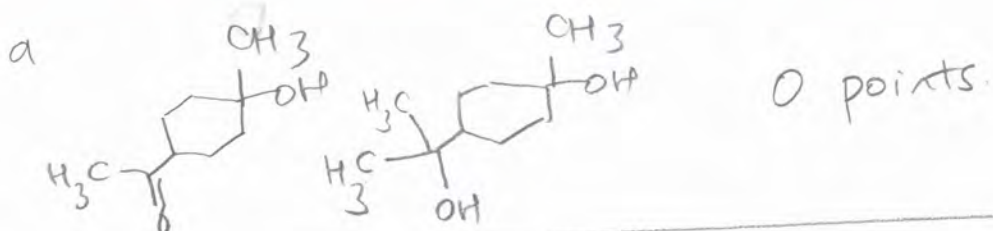
Is this carbohydrate α or β : α



What is the name of this synthesis?



Partial credit: page is sugar.



c. LDA instead of NaOEt + HOEt = 0 points
(can still get 1 point for $\text{Ph-P}(\text{H})$)

d. NaBH_4 0 points

e. Also ok:

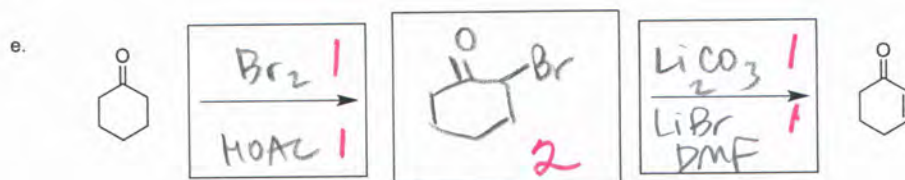
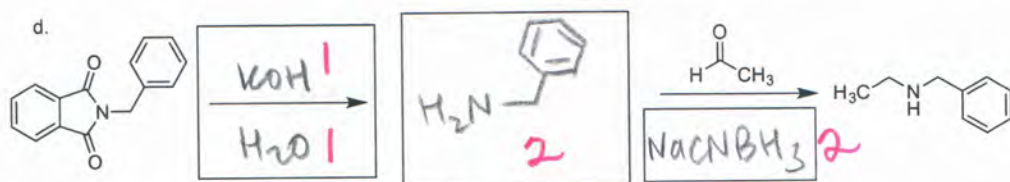
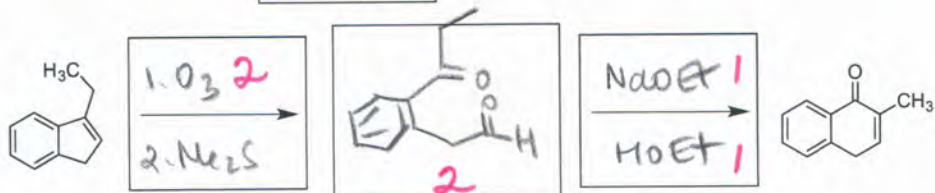
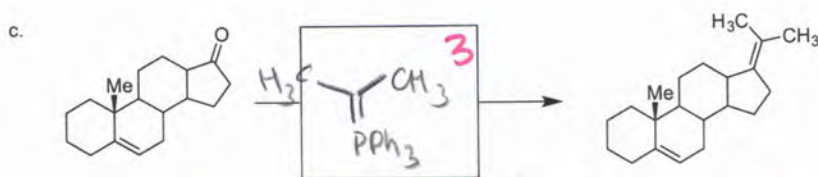
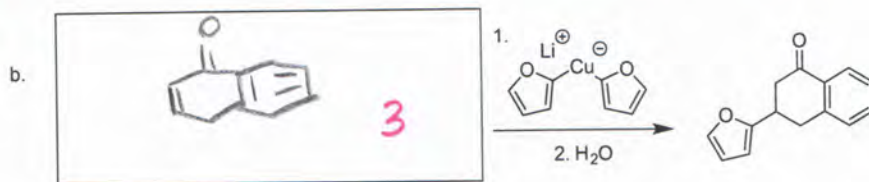
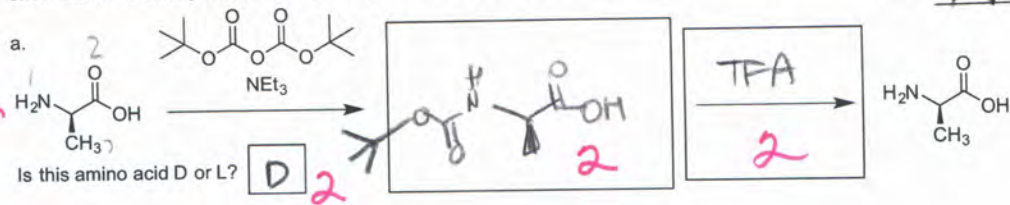
1. H_3O^+
2. SOCl_2
- 3.

f. Also ok: NH_3
 HCN

4. Fill in the boxes with the appropriate starting material, reagent or major product (30 points). Show stereochemistry where appropriate (you must DRAW the enantiomers/diastereomers)

Initials: A

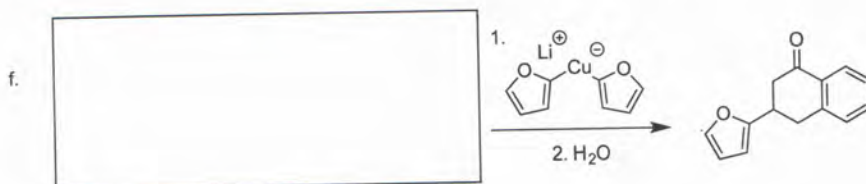
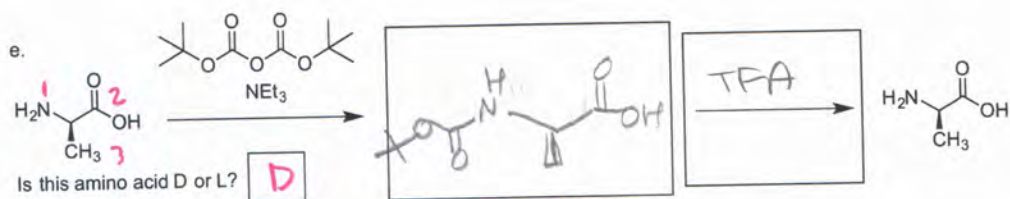
Version
A: D
B: D
C: L
D: L



30

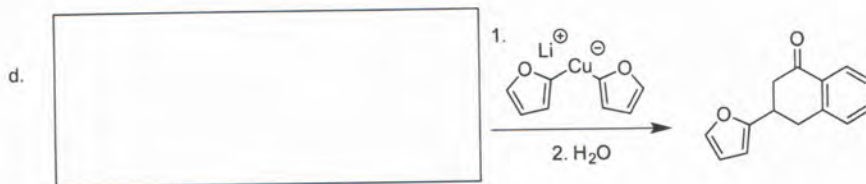
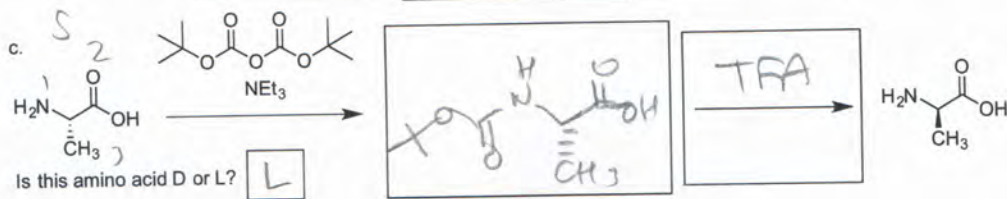
3. Fill in the boxes with the appropriate starting material, reagent or major product (30 points).
Show stereochemistry where appropriate (you must DRAW the enantiomers/diastereomers)

Initials: B



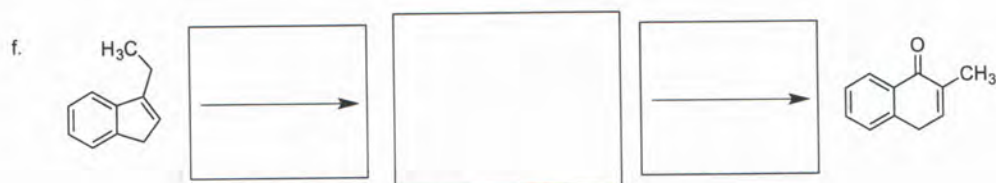
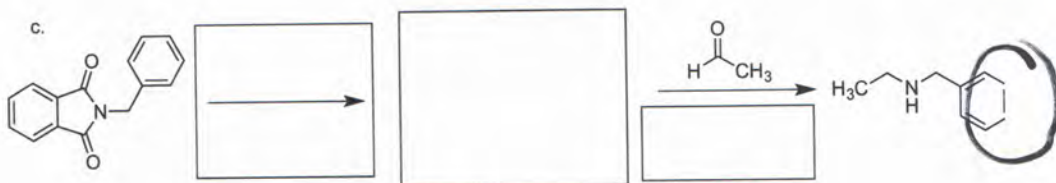
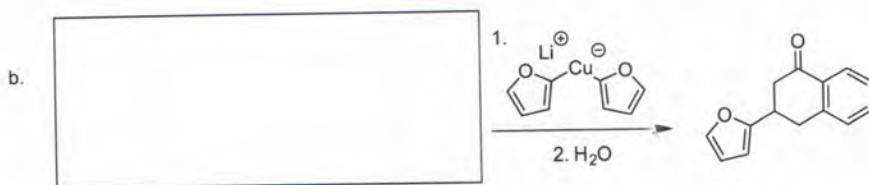
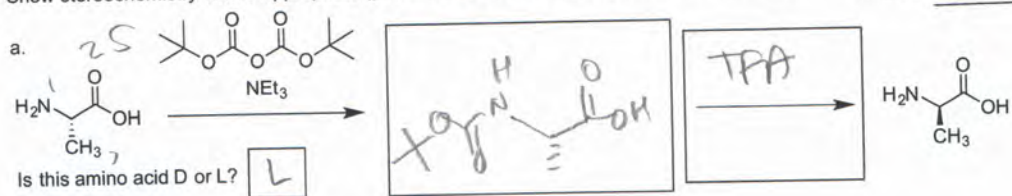
4. Fill in the boxes with the appropriate starting material, reagent or major product (30 points).
 Show stereochemistry where appropriate (you must DRAW the enantiomers/diastereomers)

Initials: C



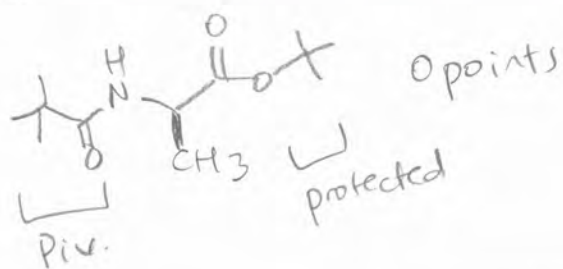
3. Fill in the boxes with the appropriate starting material, reagent or major product (30 points). Show stereochemistry where appropriate (you must DRAW the enantiomers/diastereomers)

Initials: D

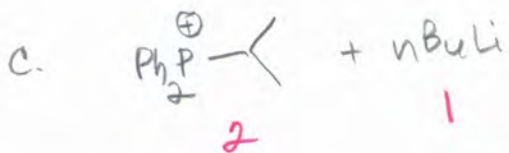


Partial credit for page with amino acid

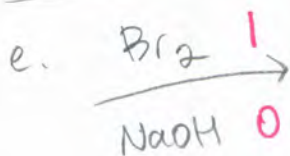
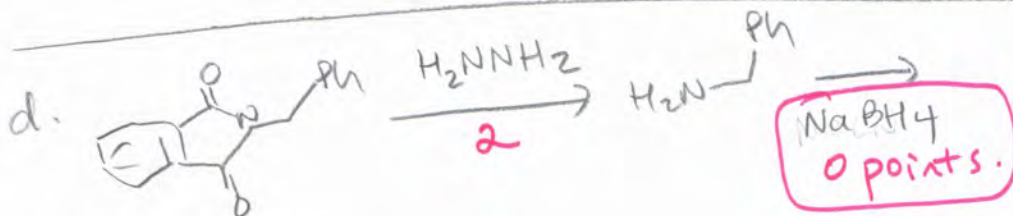
a. Note: enantiomer. Switch blue version



deprotection
HCl or HBr
ok



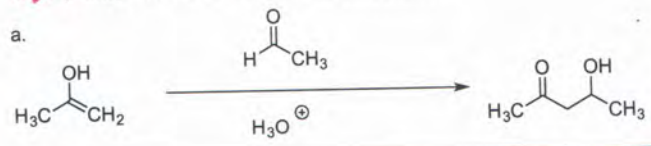
intramolecular aldol: LDA 0 points.



15

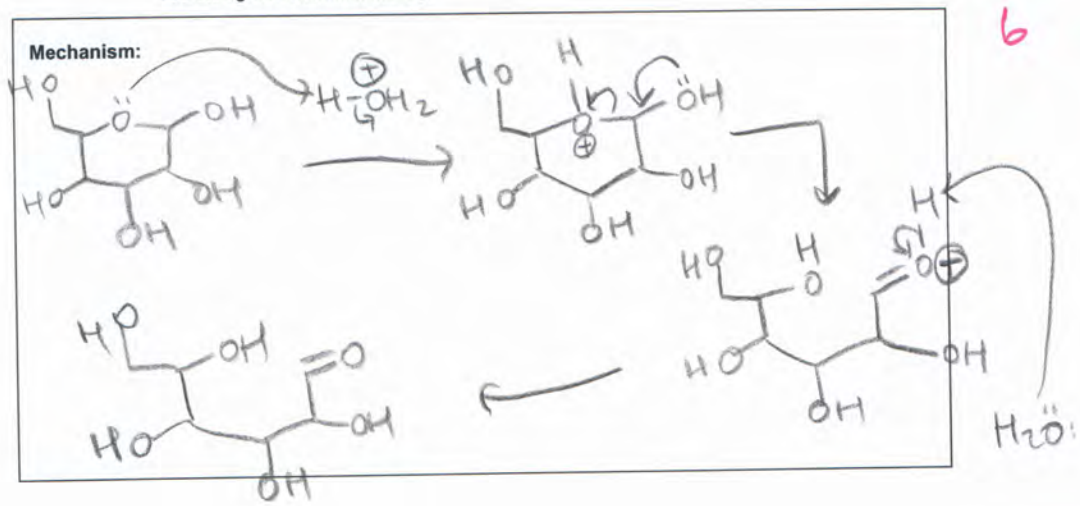
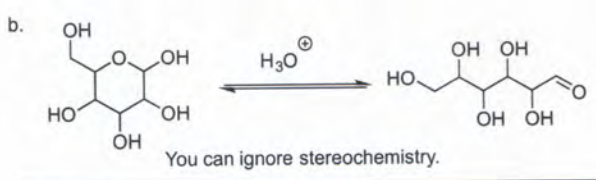
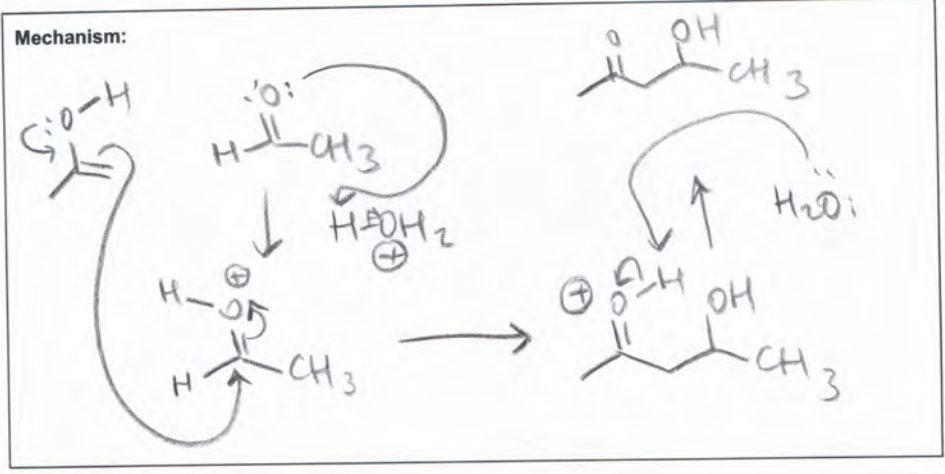
5. (13 points) Provide an arrow-pushing mechanism.

Initials: A



What is the name of this reaction?

aldol 2

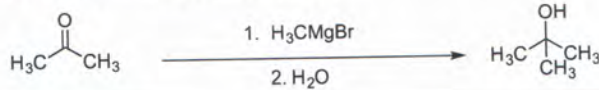


15

12
6. (18 points)

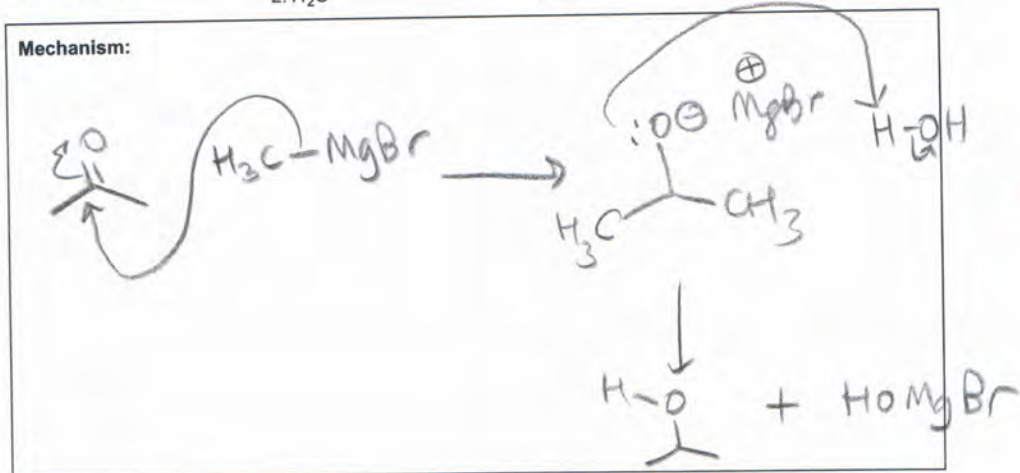
Initials: **A**

a. Provide an arrow-pushing mechanism.



What named type of reagent is H_3CMgBr ?

Grignard 2



b. Match the names of the functional groups with labeled examples from the natural products and medicines.

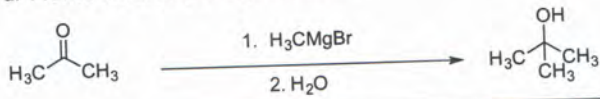
lactam	D	
ether	C	
hemiacetal	K	
cyanohydrin	G	
aniline	P	
β -hydroxy ketone	A	

1 point each
total = 6

Initials: B

5. (13 points)

a. Provide an arrow-pushing mechanism.

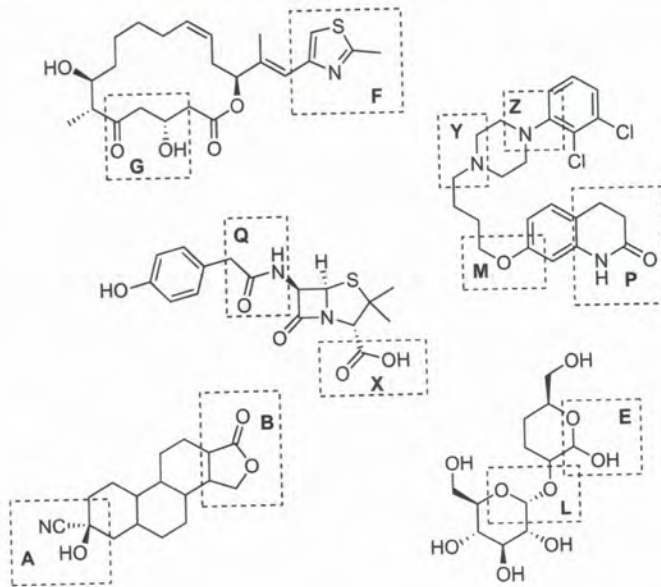


What named type of reagent is H_3CMgBr ?

Mechanism:

b. Match the names of the functional groups with labeled examples from the natural products and medicines.

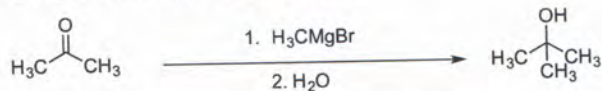
- cyanohydrin A
- aniline Z
- β -hydroxy ketone G
- lactam P
- ether M
- hemiacetal E



6. (13 points)

Initials: C

a. Provide an arrow-pushing mechanism.



What named type of reagent is H_3CMgBr ?

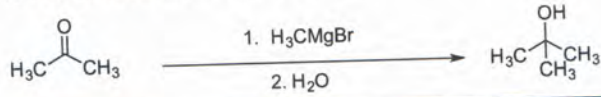
Mechanism:

b. Match the names of the functional groups with labeled examples from the natural products and medicines.

ether	<input type="text" value="D"/>	
hemiacetal	<input type="text" value="W"/>	
cyanohydrin	<input type="text" value="G"/>	
aniline	<input type="text" value="M"/>	
β -hydroxy ketone	<input type="text" value="B"/>	
lactam	<input type="text" value="C"/>	

5. (13 points)

a. Provide an arrow-pushing mechanism.

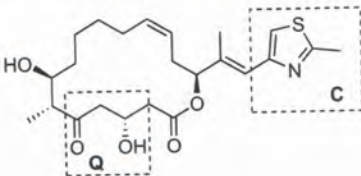
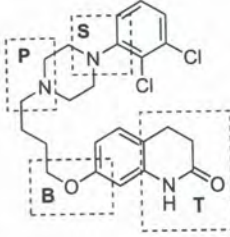
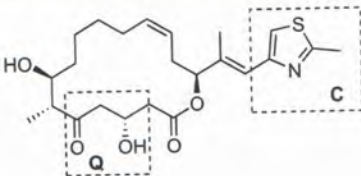
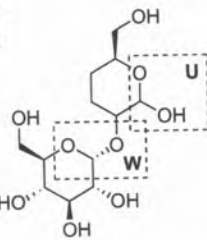
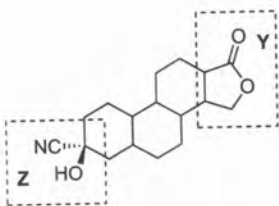
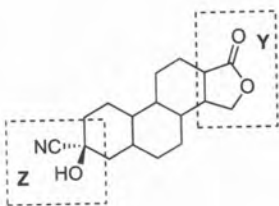
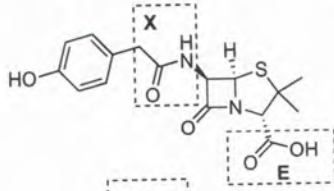
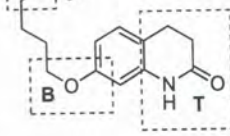
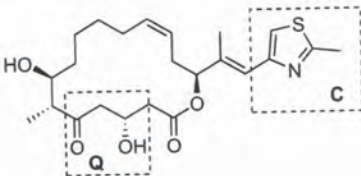
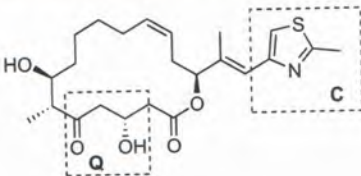
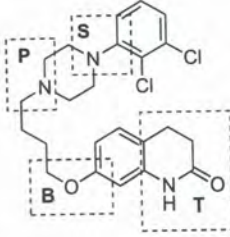
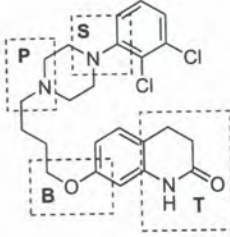


Initials: D

What named type of reagent is H_3CMgBr ?

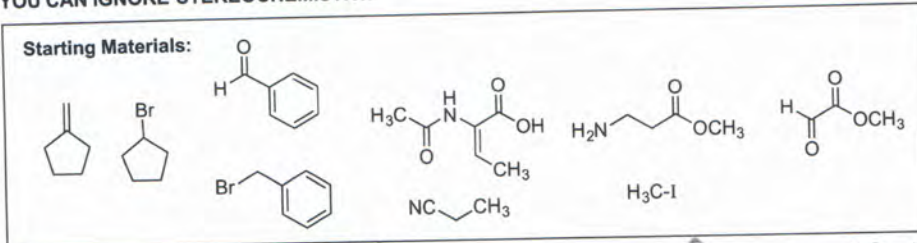
Mechanism:

b. Match the names of the functional groups with labeled examples from the natural products and medicines.

lactam	<input type="text" value="T"/>		
hemiacetal	<input type="text" value="U"/>		
cyanohydrin	<input type="text" value="Z"/>		
ether	<input type="text" value="B"/>		
β -hydroxy ketone	<input type="text" value="Q"/>		
aniline	<input type="text" value="S"/>		

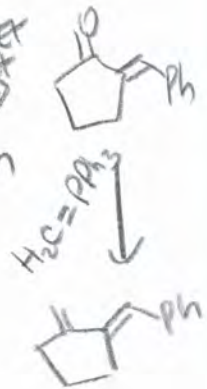
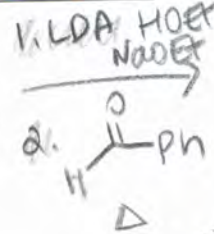
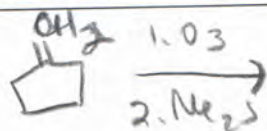
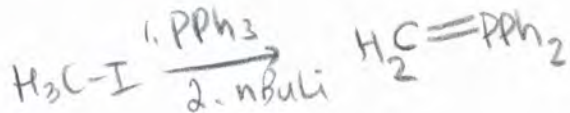
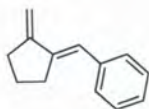
Initials: A

7. (14 points) Propose syntheses of the targets below.
 All carbons must come from the starting materials provided, you can use any reagent you wish.
 YOU CAN IGNORE STEREOCHEMISTRY.



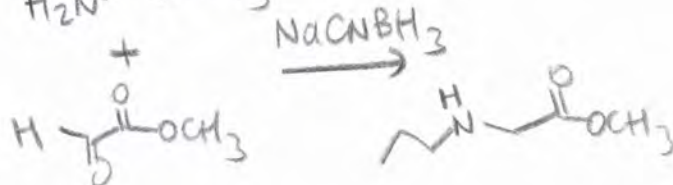
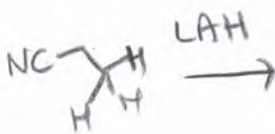
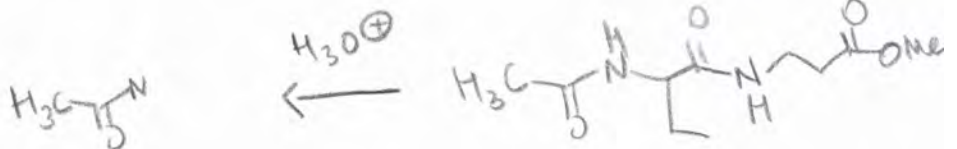
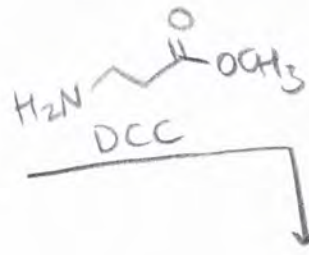
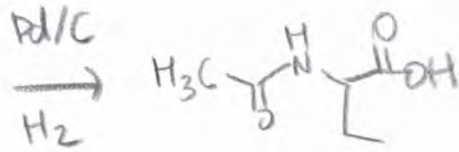
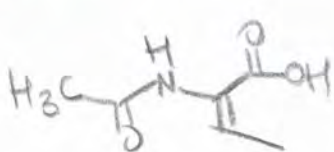
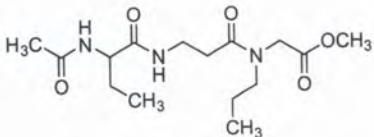
8

Target A.



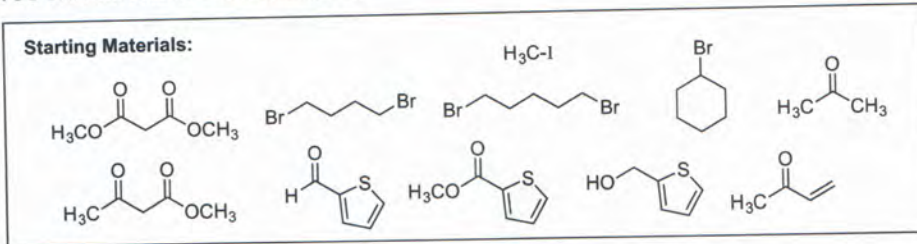
12

Target B.



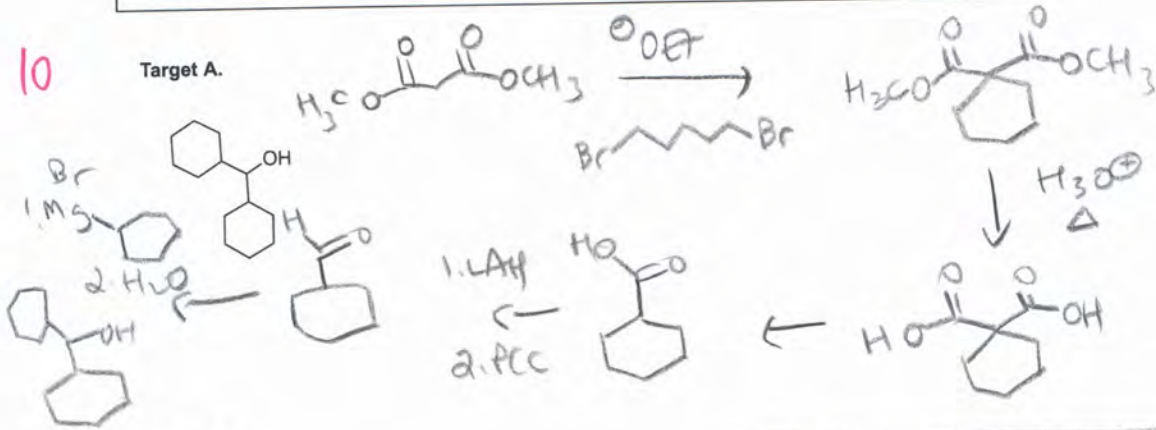
Initials: A

8. (12 points) Propose syntheses of the targets below.
All carbons must come from the starting materials provided, you can use any reagent you wish.
YOU CAN IGNORE STEREOCHEMISTRY.

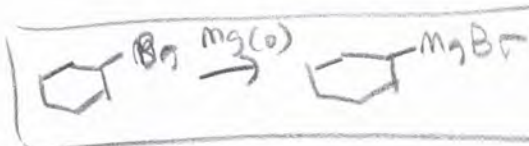
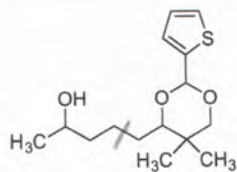


10

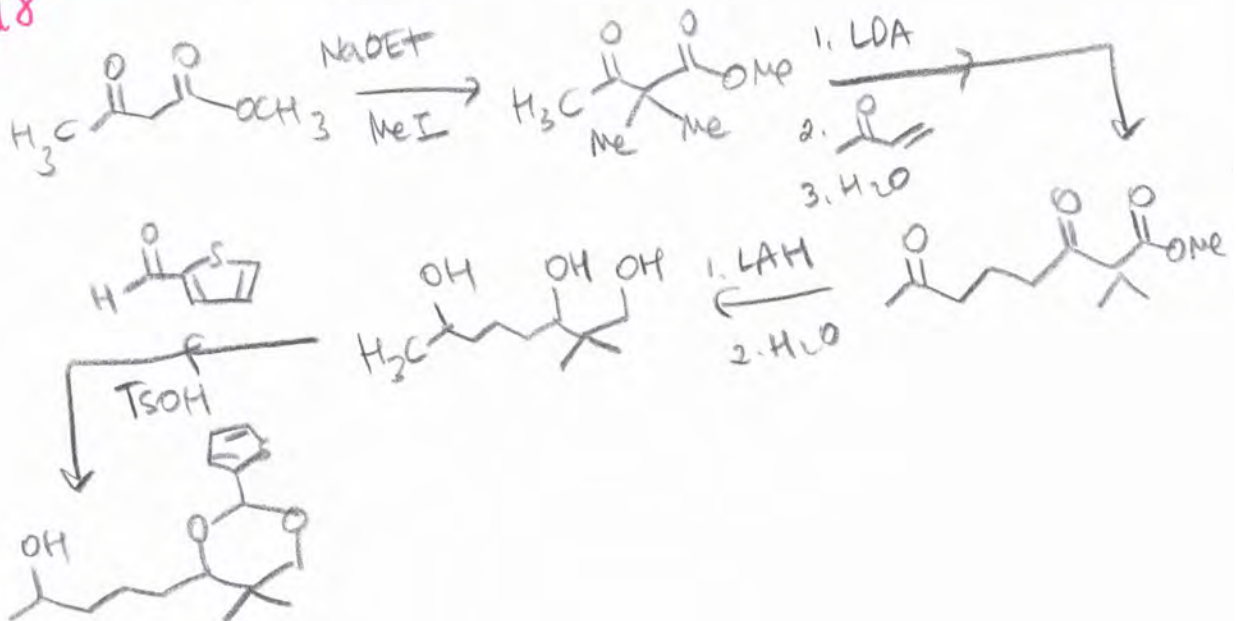
Target A.



Target B.

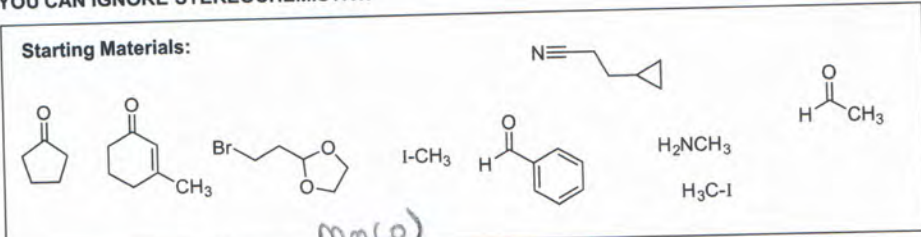


18

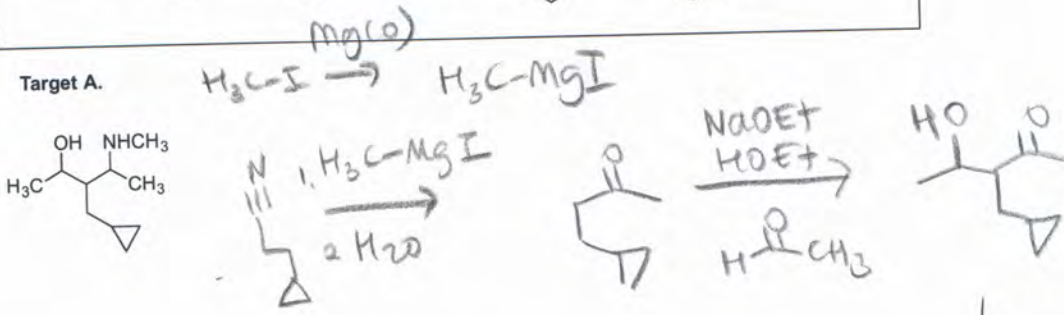


Initials: A

9. (14 points) Propose syntheses of the targets below.
 All carbons must come from the starting materials provided, you can use any reagent you wish.
 YOU CAN IGNORE STEREOCHEMISTRY.



6



10

