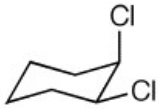
Organic Chemistry II CHM 3150
Dr. Laurie S. Starkey, Cal Poly Pomona
Final Exam Review (Ch. 1-22) – Practice Problems

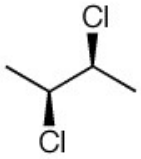
For clicker question voting, go to:
https://pollev.com/lauriestarke263

Is the following molecule chiral? Does it have an enantiomer?

1

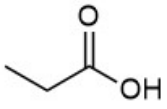


Is the following molecule optically active? Does it have an enantiomer?

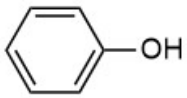


1b

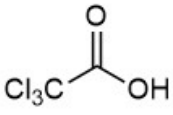
Arrange the following compounds from least acidic to most acidic.



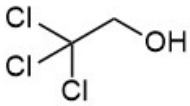
I



II



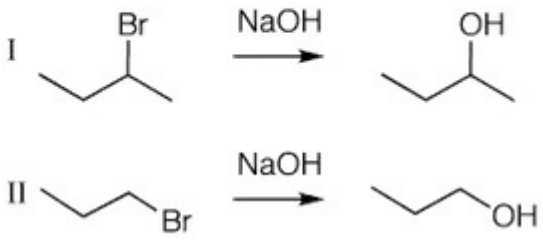
III



IV

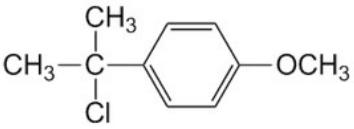
Which of the following is the FASTER reaction? Explain briefly.

2

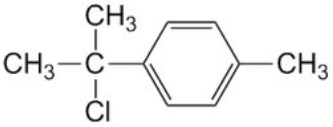


Of the following compounds, which has the fastest S_N1 reaction rate with H_2O in acetone?

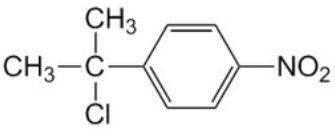
A)



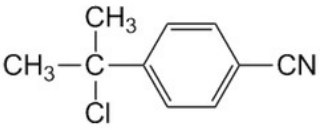
B)



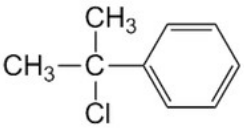
C)



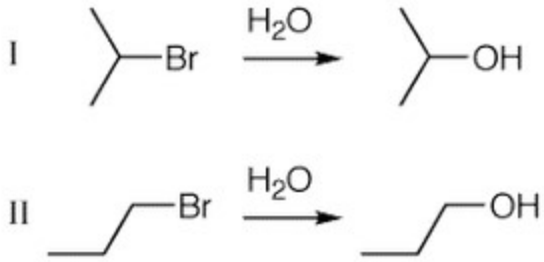
D)



E)

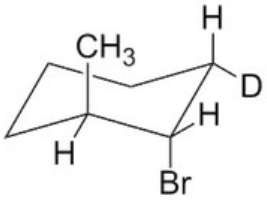


3



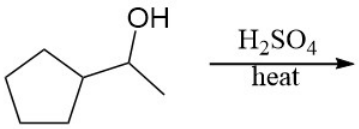
*2(GRE)

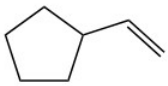
4

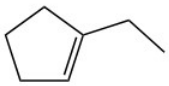


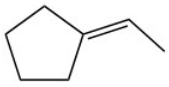
What is the major product of an E2 reaction of the compound shown above?

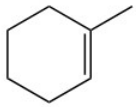
Which of the following is the LEAST likely to be isolated as a product in the reaction shown?



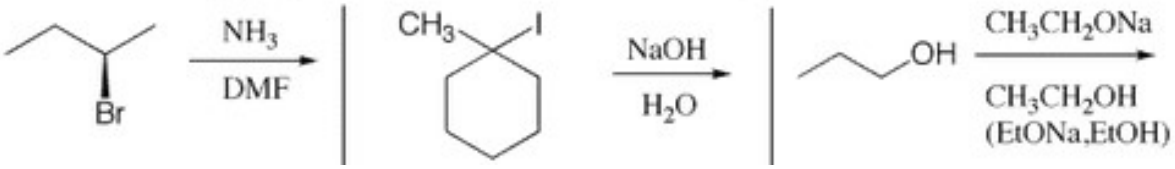
A) 

C) 

B) 

D) 

5 Predict the major products for the following reactions.



Predict the major product(s) and describe the stereochemistry of the product(s) as:

(taken from Stereochemistry practice problems)

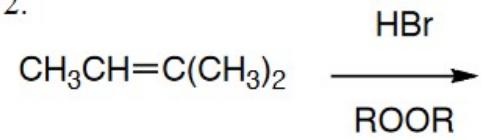
A) a single enantiomer

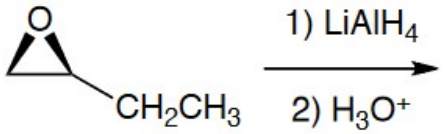
B) a racemate

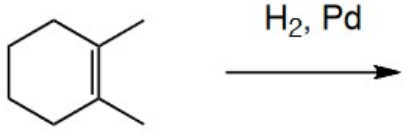
C) a meso compound

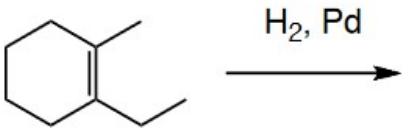
D) an achiral product, but not meso

E) a mixture of diastereomers

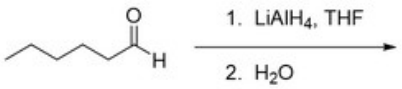
2. 

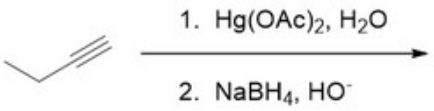
3. 

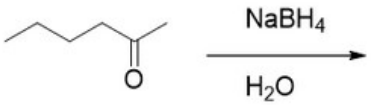
4. 

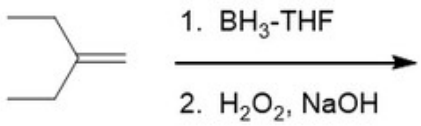
5. 

6 Which of the following reactions gives an alcohol product that is formed as a racemic mixture?



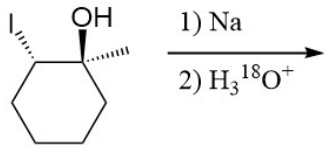






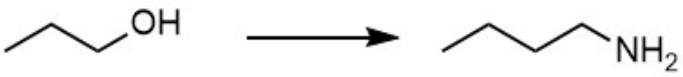
Predict the major product

7

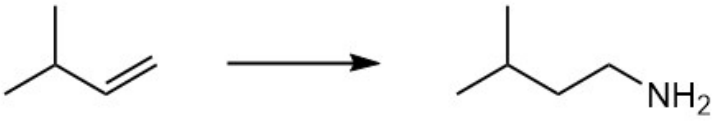


Which reagents would be best to achieve the following synthesis?

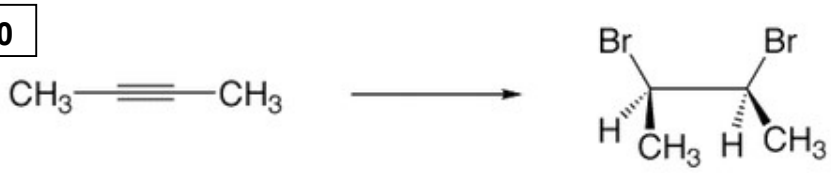
8



9

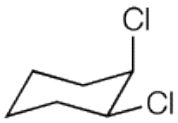


10



Is the following molecule chiral? Does it have an enantiomer?

1



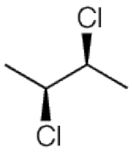
A) It is chiral and it does have an enantiomer.

B) It is NOT chiral but it does have an enantiomer.

C) It is chiral but it does NOT have an enantiomer.

D) It is NOT chiral and it does NOT have an enantiomer.

Is the following molecule optically active? Does it have an enantiomer?



A) It is optically active and it does have an enantiomer.

B) It is NOT optically active but it does have an enantiomer.

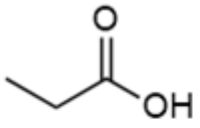
C) It is optically active but it does NOT have an enantiomer.

D) It is NOT optically active and it does NOT have an enantiomer.

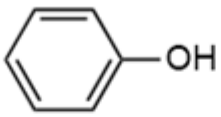
Configuration? A) 1R, 2R B) 1S, 2S
C) 1R, 2S D) 1S, 2R

Arrange the following compounds from least acidic to most acidic.

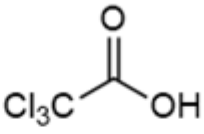
1b



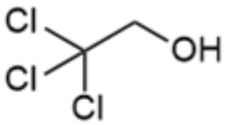
I



II



III



IV

A) IV < II < I < III

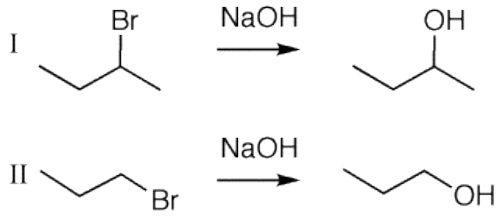
B) I < III < II < IV

C) IV < I < III < II

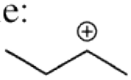
D) I < IV < III < II

E) II < IV < I < III

2 Which of the following is the FASTER reaction? Explain briefly.

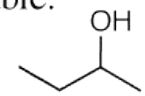


A) I is faster because this is more stable:



B) II is faster because this is more stable:

C) I is faster because this is more stable:

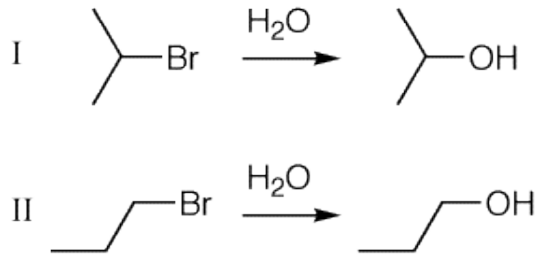


D) II is faster because *n*-PrBr has less sterics

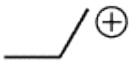
E) I is faster because *sec*-BuBr has less sterics

3

Which of the following is the FASTER reaction? Explain briefly.



A) I is faster because this is more stable: 

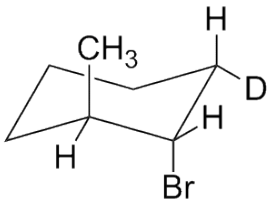
B) II is faster because this is less stable: 

C) I is faster because LG is allylic

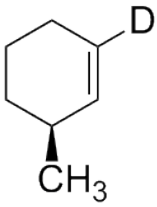
D) II is faster because LG has less sterics

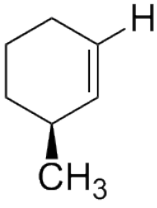
E) neither reaction should be faster

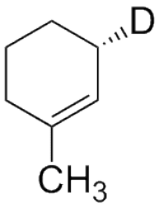
4

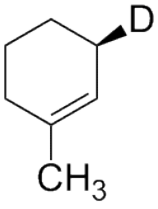


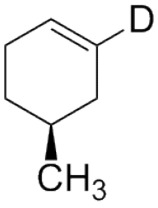
What is the major product of an E2 reaction of the compound shown above?

A) 

B) 

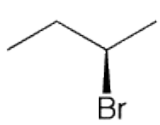
C) 

D) 

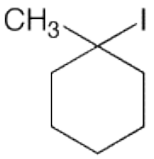
E) 

5

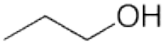
Predict the major products for the following reactions.



NH_3 / DMF



NaOH / H_2O

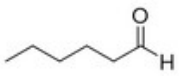


CH_3CH_2ONa / CH_3CH_2OH (EtONa,EtOH)

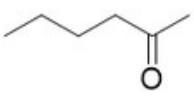
A)	N.R.	E2	N.R.
B)	E2	S_N2	S_N2
C)	S_N2	E2	N.R.
D)	S_N2	E2	S_N2
E)	S_N2	S_N2	S_N2

Which of the following reactions gives an alcohol product that is formed as a racemic mixture?

6

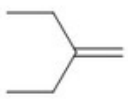


1. $LiAlH_4$, THF
2. H_2O



$NaBH_4$ / H_2O

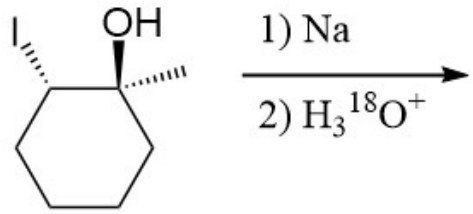
1. $Hg(OAc)_2$, H_2O
2. $NaBH_4$, HO^-



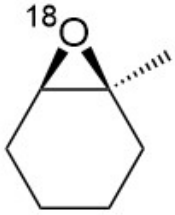
1. BH_3-THF
2. H_2O_2, NaOH

7

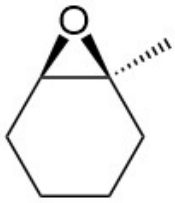
Predict the major product.



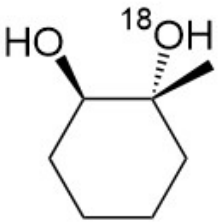
A)



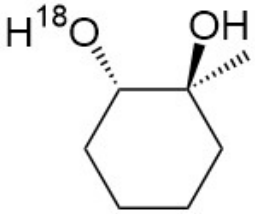
B)



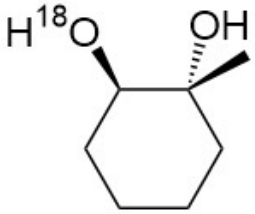
C)



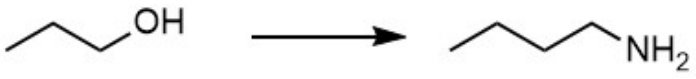
D)



E)



8 Select the BEST reagents for the transformation of the given starting material into the desired product.



A) 1) $Na_2Cr_2O_7$, H_2SO_4
2) $SOCl_2$
3) NH_3 (xs)
4) $LiAlH_4$ (+ aq. workup)

B) 1) TMSCl, pyridine
2) NaCN
3) $LiAlH_4$ (+ aq. workup)

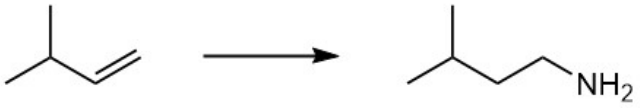
C) 1) TsCl, pyridine
2) NaCN
3) $LiAlH_4$ (+ aq. workup)

D) 1) TsCl, pyridine
2) NaN_3
3) $LiAlH_4$ (+ aq. workup)

E) 1) TMSCl, pyridine
2) NaN_3
3) $LiAlH_4$ (+ aq. workup)

9

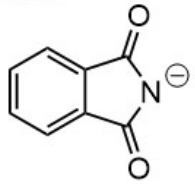
Provide the reagents necessary to transform the given starting material into the desired product.

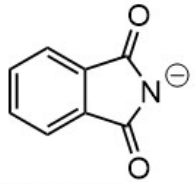


A) 1) HBr
2) NH_3

B) 1) HBr
2) NaN_3
3) $LiAlH_4$ (+ workup)

C) 1) NBS, heat
2) NaN_3
3) $LiAlH_4$ (+ workup)

D) 1) HBr
2) 
3) NH_2NH_2

E) 1) HBr, ROOR
2) 
3) NH_2NH_2

10

Which reagents would be best to achieve the following synthesis?

A) 1) Br_2
2) H_2, Lindlar's catalyst

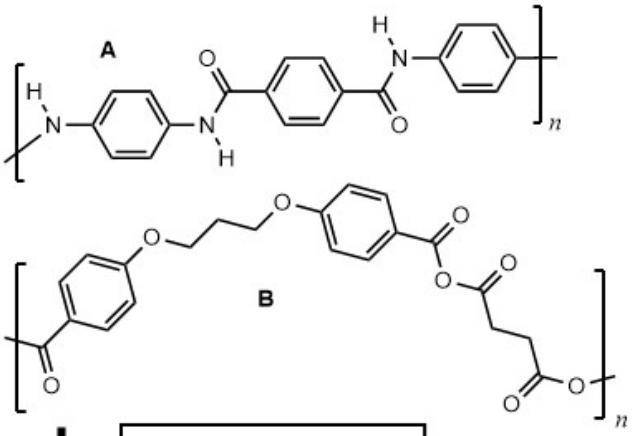
B) 1) Br_2
2) Na, NH_3

C) 1) H_2, Lindlar's catalyst
2) Br_2

D) 1) Na, NH_3
2) Br_2

E) HBr (excess)

One of these polymers is very strong and durable (bulletproof vests) and the other is easily hydrolyzed (biodegradable). Identify each polymer and explain the difference in properties. What monomers could be used to make each polymer?



Strong & Durable	Biodegradable
A) **A** because amide bonds are flexible	**B** because oxygen atoms make the polymer polar
B) **A** because amide C=O is electron-rich and can form H-bonds	**B** because anhydrides have good LG's
C) **B** because oxygen atoms make the polymer polar	**A** because amide C=O is electron-rich and can form H-bonds
D) **B** because anhydrides have good LG's	**A** because amide bonds are flexible

One of these polymers is very strong and durable (bulletproof vests) and the other is easily hydrolyzed (biodegradable). Identify each polymer and explain the difference in properties. What monomers could be used to make each polymer?