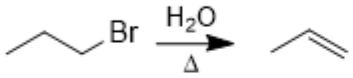
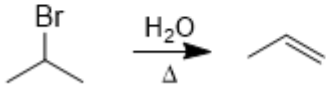
1 Which of the following is the FASTER reaction? Explain briefly.

I 

II 

A) I is faster because this is more stable: 

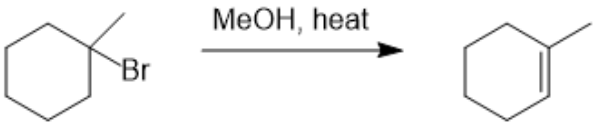
B) II is faster because this is more stable: 

C) I is faster because this is less stable: 

D) I is faster because LG has less sterics

E) neither reaction is faster because the products are the same

E1 Mechanism



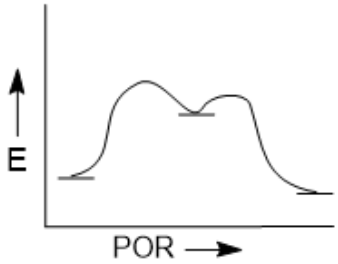
elimination (E2 or E1?) + *substitution (Sn2 or Sn1?)*

E1 Kinetics Rate = *k*[RBr]

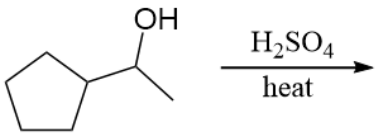
- follows **Zaitsev / Hofmann** rule: forms most substituted, most stable alkene
- a more stable carbocation will be formed faster (lower E_a) and gives **slower / faster** $E1/S_N1$

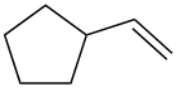
Rate (by RX type)

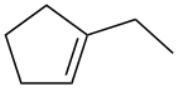
allyl / benzyl / 3º > 2º >> 1º methyl

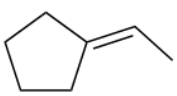


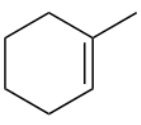
Which of the following is the LEAST likely to be isolated as a product in the reaction shown?

2 

A) 

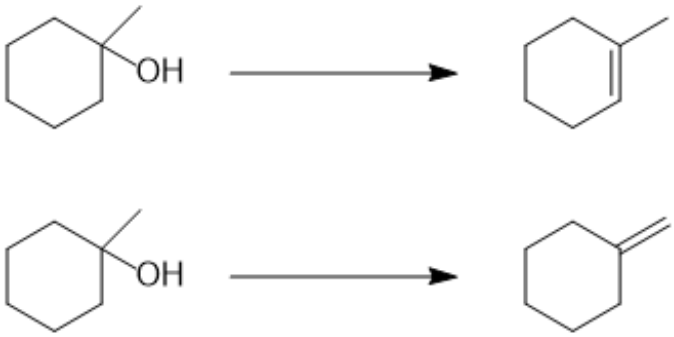
C) 

B) 

D) 

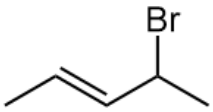
Provide reagents to achieve the given transformation. More than one step may be required.

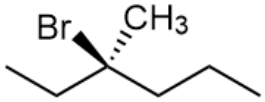
3

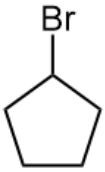


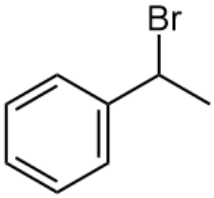
4

Which would undergo the **SLOWEST** E1 mechanism?

A) 

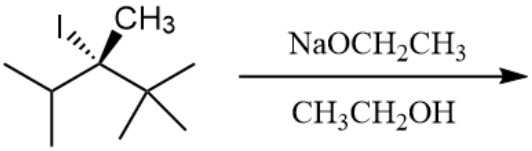
B) 

C) 

D) 

5

Predict the major product.



Substitution vs. Elimination (7.9)

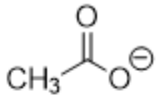
Summarize what you know about each of the following mechanisms. (circle all that apply)

	S_N2	S_N1	E2	E1
bi/unimolecular?	bi / uni	bi / uni	bi / uni	bi / uni
one-step mech.?	yes / no	yes / no	yes / no	yes / no
need good LG?	yes / no	yes / no	yes / no	yes / no
need strong Nu:?	yes / no	yes / no	yes / no	yes / no
need strong base?	yes / no	yes / no	yes / no	yes / no
sterics important?	yes / no	yes / no	yes / no	yes / no
preferred LG type?	1º 2º 3º allylic	1º 2º 3º allylic	1º 2º 3º allylic	1º 2º 3º allylic
stereochemistry?				
other notes				

Categorize the following species as a strong or weak nucleophile, AND as a strong or weak base.

NaOH NH_3 MeOH NaCN iPrOH NaOEt $NaNH_2$ $PhNH_2$

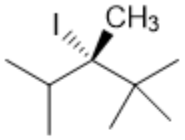
$I^{\ominus}$ tBuOK NaSH Ph_3P H_2O $CH_3O^{\ominus}$ $PhS^{\ominus}$ CH_3CH_2OH



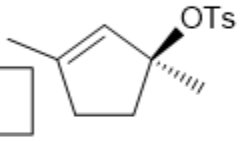
strong Nu:	strong base
weak Nu:	weak base

Competing Substitution and Elimination Mechanisms

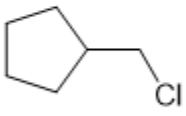
For each reaction, determine the mechanism and predict the major product(s). N.R. if no reaction.

1. 

$NaOCH_2CH_3$ / CH_3CH_2OH

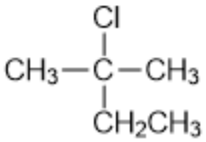
2. 

CH_3OH

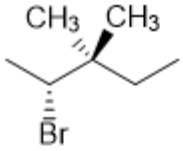
3. 

NaSH / CH_3CN

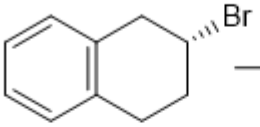
4. CH_3CH_2OH
NaCN / acetone

5. 

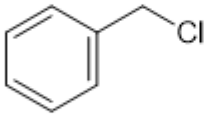
t-BuOK

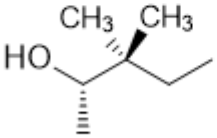
6. 

H_2O

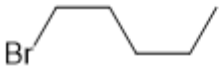
7. 

NaOH / H_2O

8. 

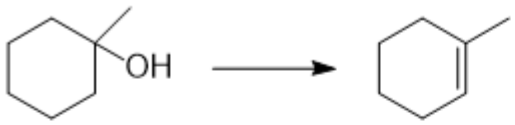
9. 

H_2SO_4 / Δ

10. 

MeONa / MeOH

3 Provide reagents needed to achieve each transformation.



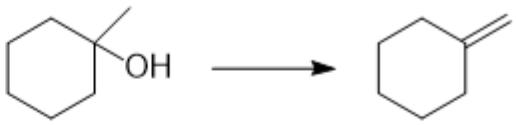
A) 1) TsCl, pyridine
2) H_2SO_4, heat

B) EtONa, EtOH

C) 1) HBr
2) t-BuOK

D) H_2SO_4, heat

E) HBr, heat



A) EtONa, EtOH

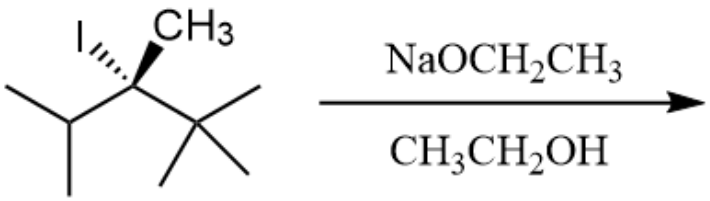
B) H_2SO_4, heat

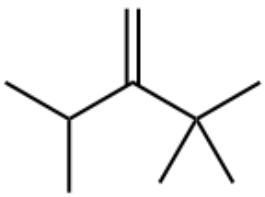
C) 1) TsCl, pyridine
2) t-BuOK

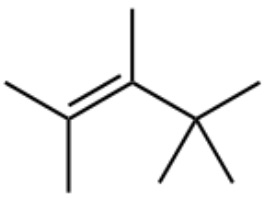
D) 1) TsCl, pyridine
2) NaOH, H_2O

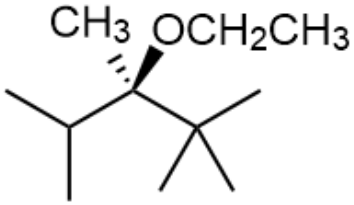
E) t-BuOK, t-BuOH

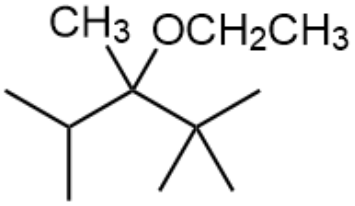
5 Predict the major product.



A) 

B) 

C) 

D) 

(racemic)

E) No Reaction