

(a)

vii.

i. Is there (or is there the potential for) an sp^3 carbon-leaving group?

yes

yes, potential

no

ii. If so, what is the structural category for the carbon atom?

1°

2°

3°

heteroatom-substituted

allylic

benzylic

propargylic

iii. If there is a Lewis base, what is its classification?

anion, conj. acid $pK_a < 15$
uncharged sp^3
N, S, or Panion, conj. acid pK_a
15-30conj. acid $pK_a > 30$, hindered
base conj. acid $pK_a > 10$

poor electron donor (not in the other categories)

iv. Is a bimolecular reaction predicted? If so, which one?

 S_N2

E2

no bimolecular

v. If no bimolecular, then is there:

good carbocation possible

polar solvent

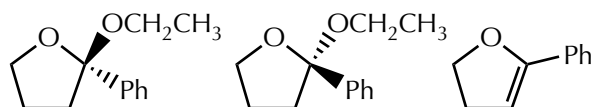
vi. Is $S_N1/E1$ predicted?

yes

no

(b)

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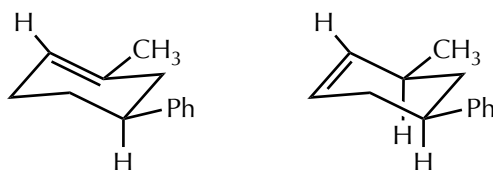
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(c)

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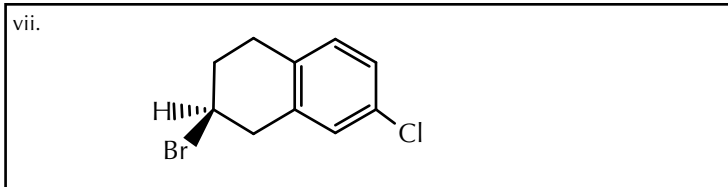
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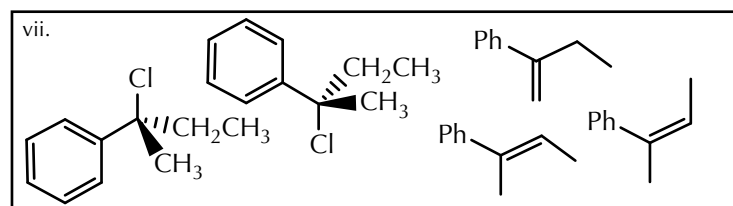
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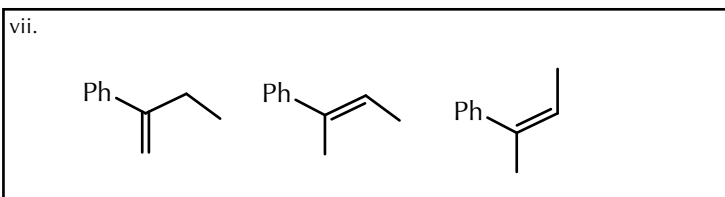
polar solvent

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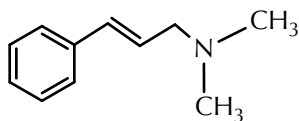
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(a)

vii.



*initially formed
ammonium ion
via S_N2 is deprotonated
by the excess base*

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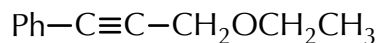
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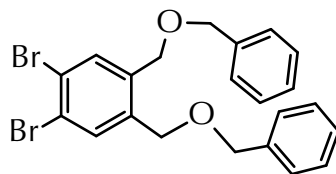
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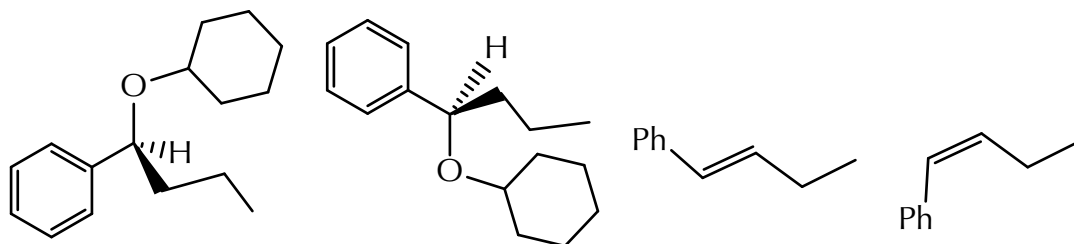
polar solvent

vi. Is $S_N1/E1$ predicted?

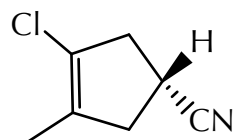
yes

no

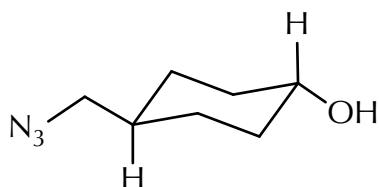
(a)

 $S_N1/E1$ 

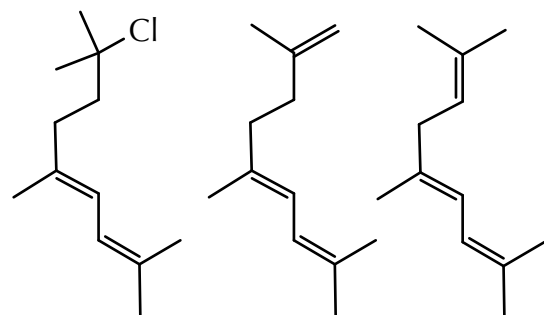
(b)

 S_N2 

(c)

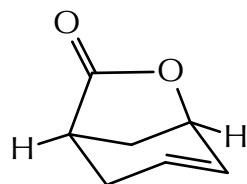
 S_N2 

(d)

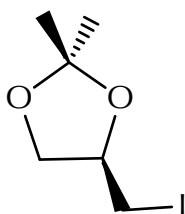
 $S_N1/E1$ 

(e)

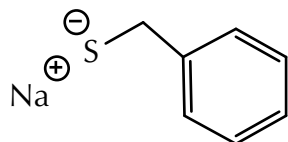
E2



(f)

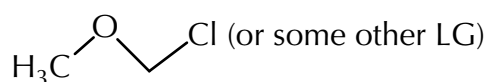
 S_N2 

(a)



S_N2 1° benzylic with no β -H
S anion is CA $pK_a < 15$

(b)



S_N1 1° heteroatom with no β -H
good C+, no good Nu, polar solvent

(c) 1) MsCl/pyridine (or other sulfonate ester LG)
2) excess NH_3

S_N2 2° LG with an
uncharged, sp^3 N atom

(d) $(CH_3)_3COK$

E2 to only get elimination; use a bulky base to avoid S_N2 and
do not use ionizing conditions to avoid $S_N1/E1$

(e) 1) TsCl/pyridine (or other sulfonate ester LG)
2) NaI
3) NaBr

two S_N2 reactions (double
inversion) to get retention
result (OK for 2° C-LG when
a CA $pK_a < 15$)

(f) CH_3OH /(heat)

S_N1 to get the racemic product
2° benzylic (excellent C+) and no β -H
 CH_3OH polar solvent and poor Nu

