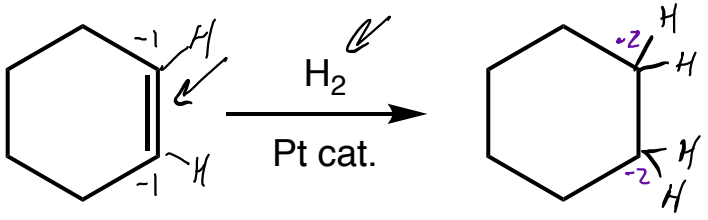
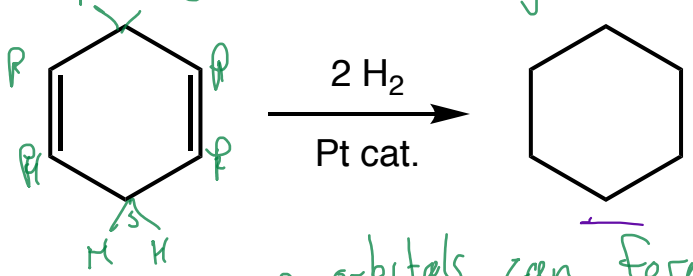
Test 3 Postponed until May 3



	$\Delta H_{reaction}$ (kcal/mol)	per bond (kcal/mol)
cyclohexene	–28.6	–28.6

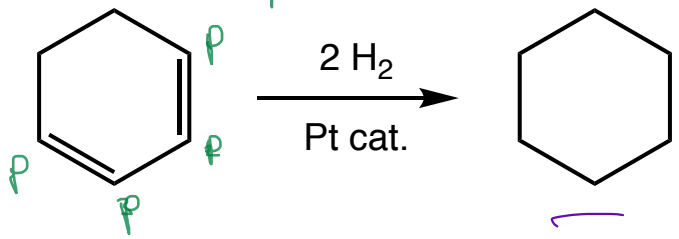
no extended π system no resonance



1,4 cyclohexadiene	–57.4	–28.7

p orbitals can form an extended π system

resonance stabilized

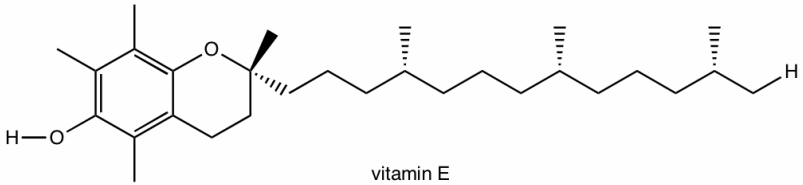


1,3-cyclohexadiene	–55.4	–27.7

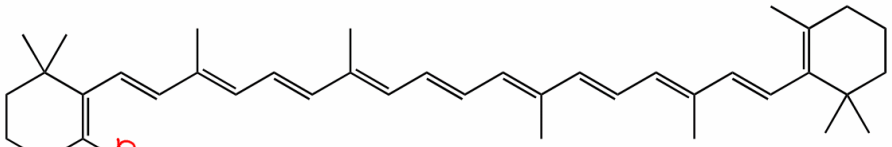
less energy is released ↙ the 2 π bonds must be lower in E

the end pt is the same so any difference in the energy released by the reaction can be attributed to the energy of the reactants.

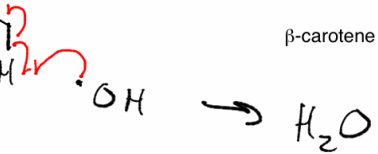
If the rxn releases more E, the reactants must have been higher in energy



vitamin E



β-carotene



ETC

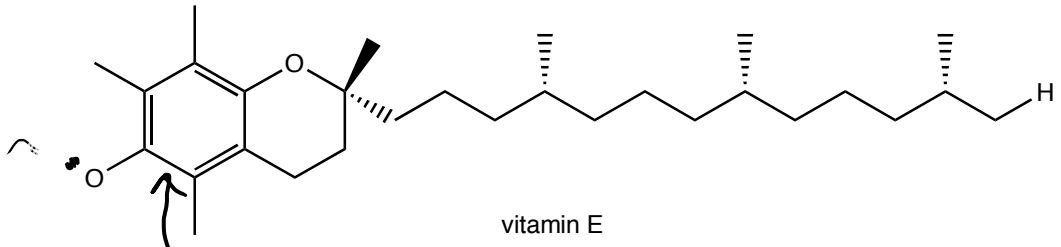
Reactive oxygen species scavengers (radical = odd # e^-'s)

odd + even

H-Ö: reactive molecules when the react with non radicals

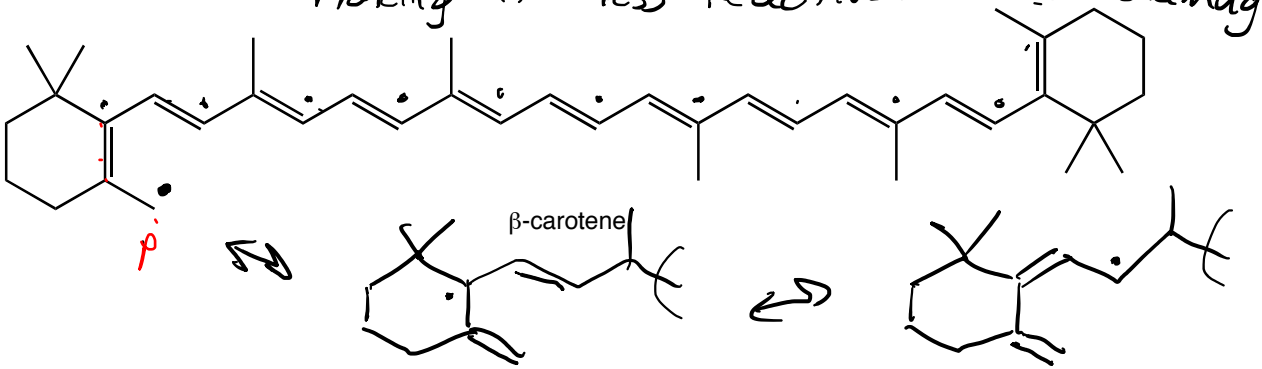
a radical always forms

odd # e^-'s



vitamin E

π bonds in ring can form extended π system with radical e⁻ and stabilize it making it less reactive ... less damaging.



ETC

Reactive oxygen species scavengers (radical = odd # e⁻'s)

odd + even

$H-\ddot{O}\cdot$ reactive molecules when the react with non radicals

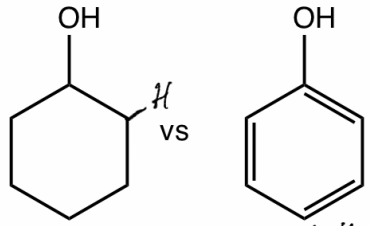
a radical always forms

odd # e⁻'s

Resonance Can Affect Reactivity

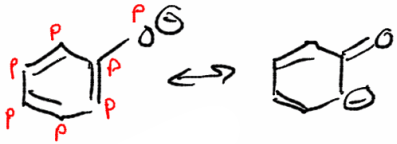
What's the reaction?
How does resonance stabilization affect the outcome

Section 8.9 & 8.10



which is the better acid?

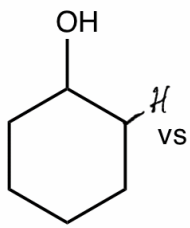
no resonance



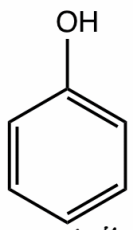
- stabilize anion... one of the products. makes the reaction form more products

Resonance Can Affect Reactivity

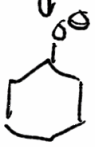
What's the reaction?
How does resonance stabilization affect the outcome?



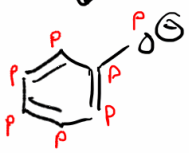
vs

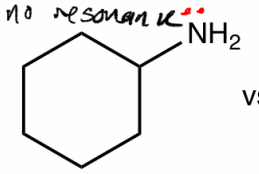


which is the better acid?

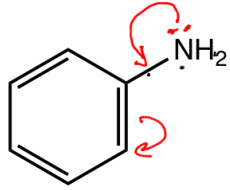


no resonance





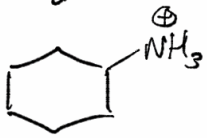
vs



NH_4^+ : NH_3 base

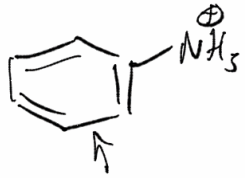
stronger base

H^+

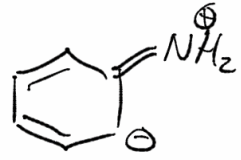


No resonance

H^+



Resonance in π system



Loss of resonance makes rxn less favorable

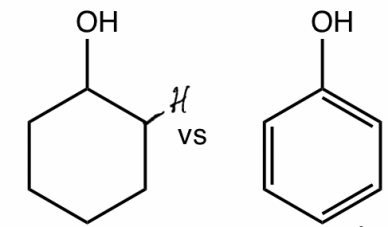
reactants were more resonance stabilized than products.

Resonance Can Affect Reactivity

Section 8.9 & 8.10

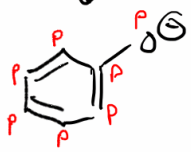
What's the reaction?

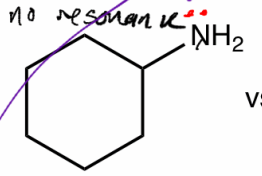
How does resonance stabilization affect the outcome

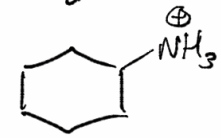


which is the better acid?

no resonance

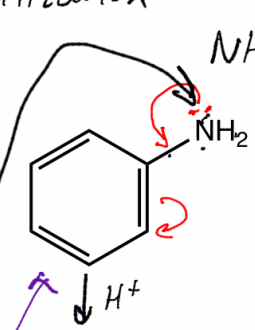




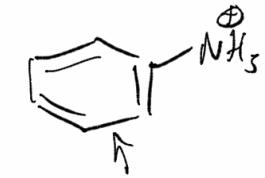


No resonance

vs



stronger base



Resonance in π system

Are these e⁻'s really here?

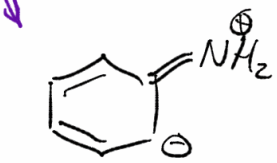
yes, no resonance

more concentrated e⁻'s better base

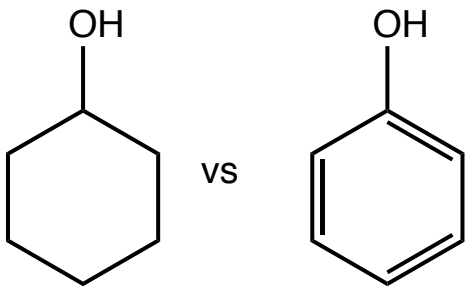
are these e⁻'s really here?

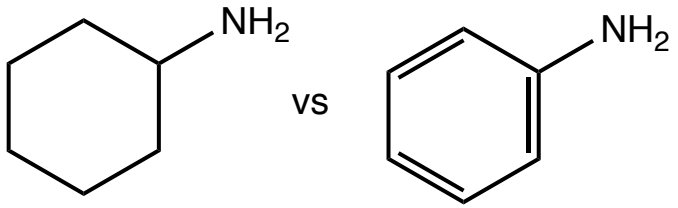
No, they are distributed into an extended π system

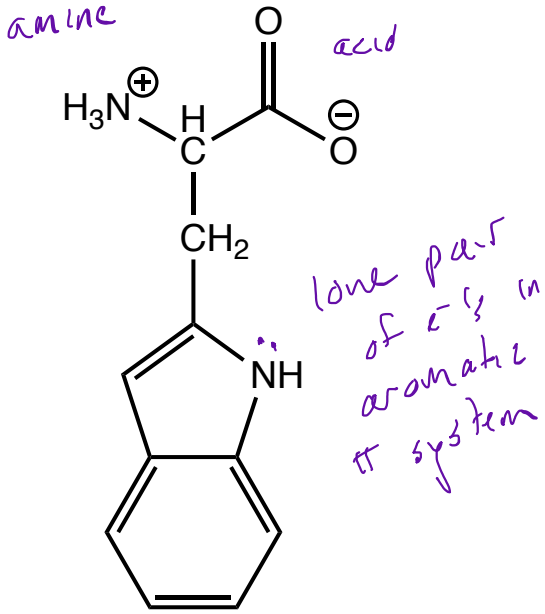
Loss of resonance makes rxn less favorable

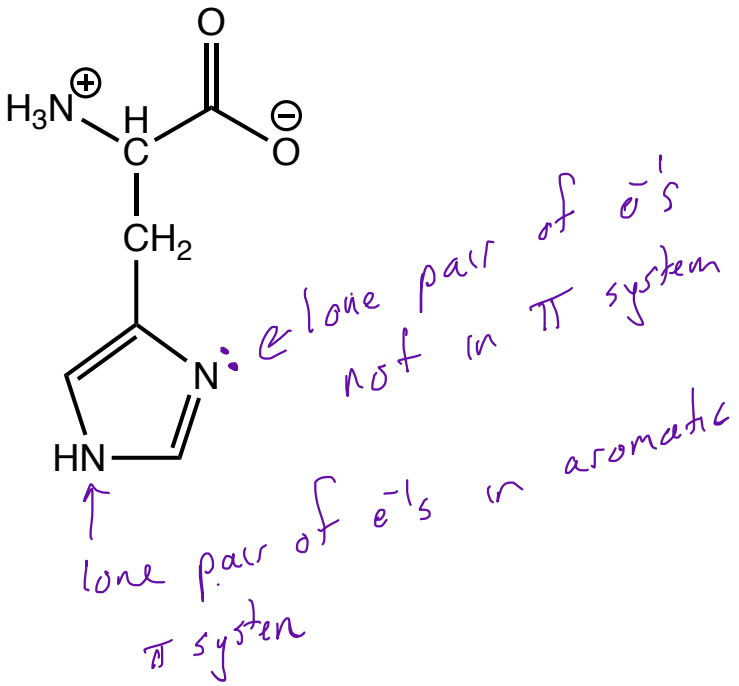


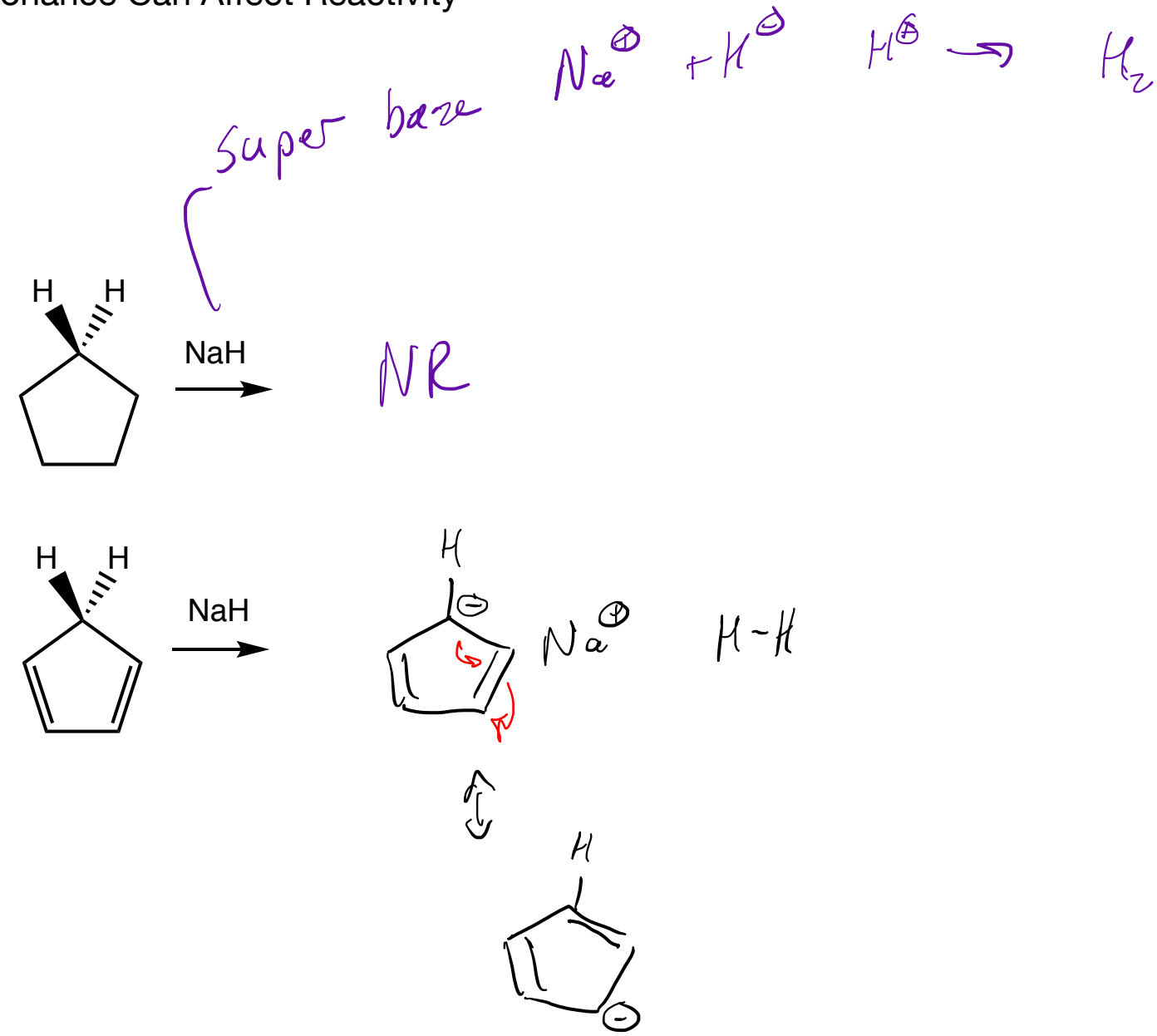
reactants were more resonance stabilized than products.

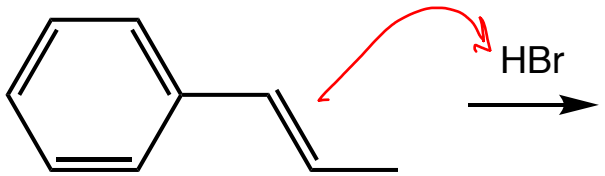

OH
vs
OH

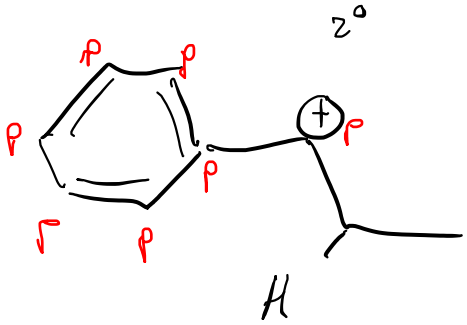

NH2
vs
NH2

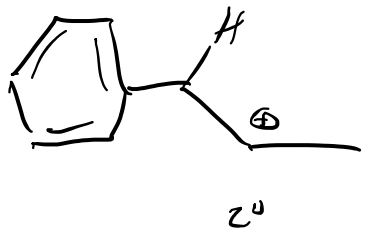

amine
acid
O
H3N
H
C
O
CH2
NH
lone pair of e⁻'s in aromatic π system

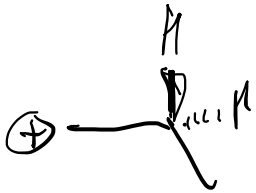

O
H3N
H
C
O
CH2
N
HN
lone pair of e⁻'s not in π system
lone pair of e⁻'s in aromatic π system

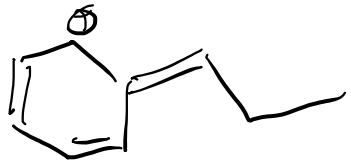

Super base
$Na^{\oplus} + H^{\ominus}$ $H^{\oplus} \rightarrow H_2$
H H
NaH
NR
H H
NaH
H
$Na^{\oplus}$
H-H
H

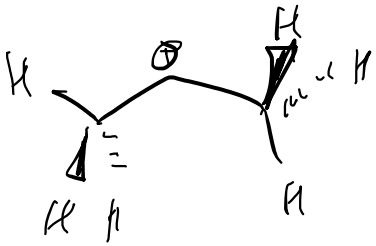

HBr

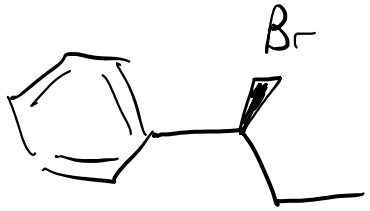

2°
H

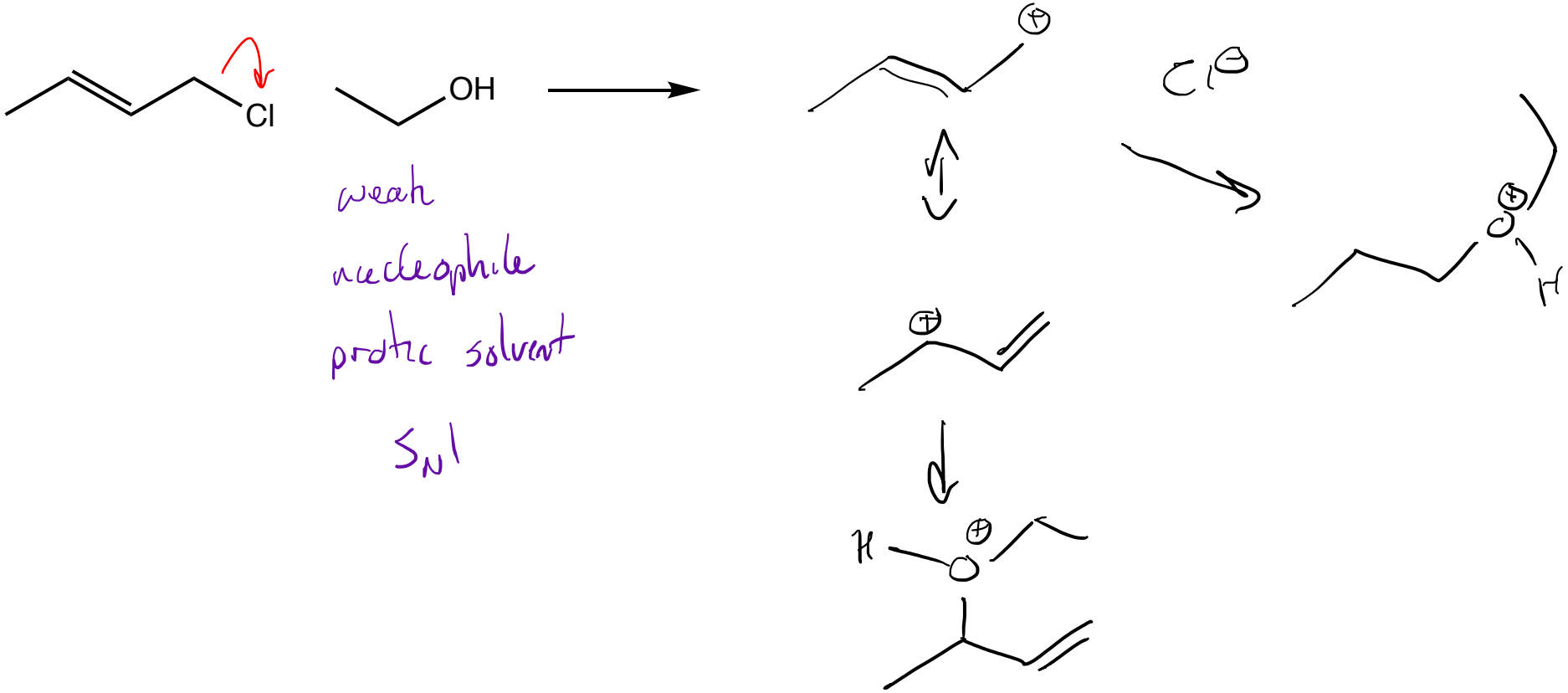

2°

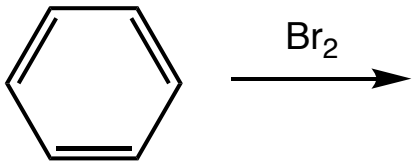






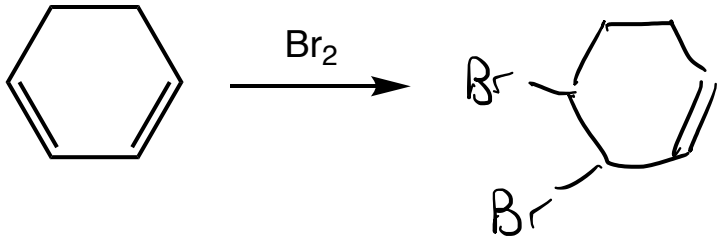

Br


Cl
OH
weak
nucleophile
protic solvent
S_N1

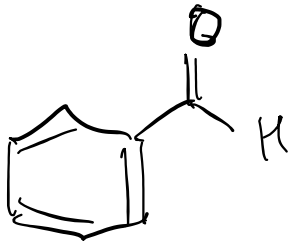


NR

benzene is "unusually" stable for a π bond



This stability is referred to as aromaticity



Benzene is an aromatic compound