Today

Finish Class 28

Sections 6.12 and 6.13
Regioselectivity, stereoselectivity, and stereospecificity

Next Class

Section 6.16

Chap 9
Substitution and Elimination

Test on Chapters 5 and 6 on Friday, December 2.

D = ^{2}H

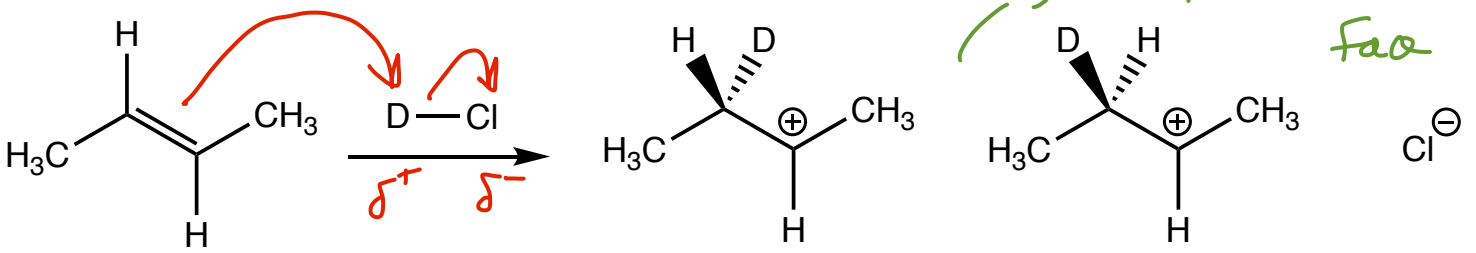
The stereochemical outcome of H^+ initiated Electrophilic Addition reactions Section 6.13

added to the same face

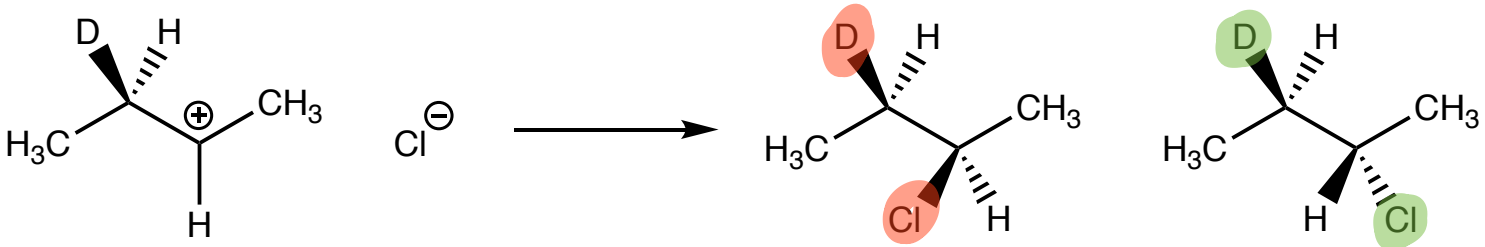
added to opposite faces

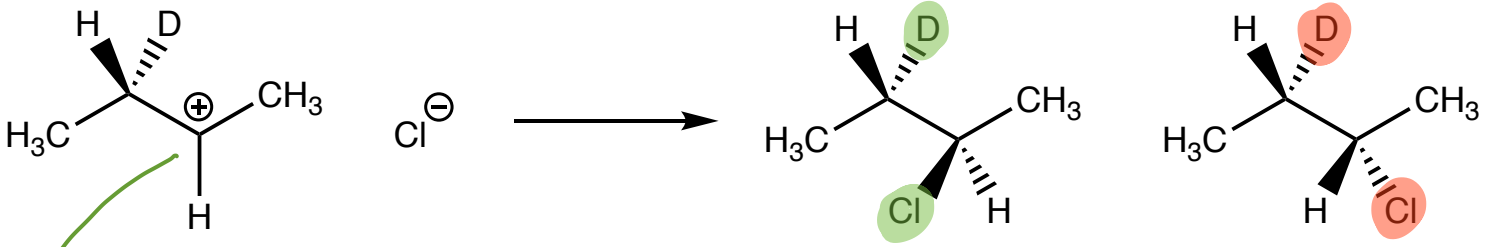
E Add via C^+ intermediates occurs via syn and anti addition, so all possible stereoisomers form.

since π e⁻'s are on front & back face D can add to either face



all possible stereoisomers form in C^+ reactions

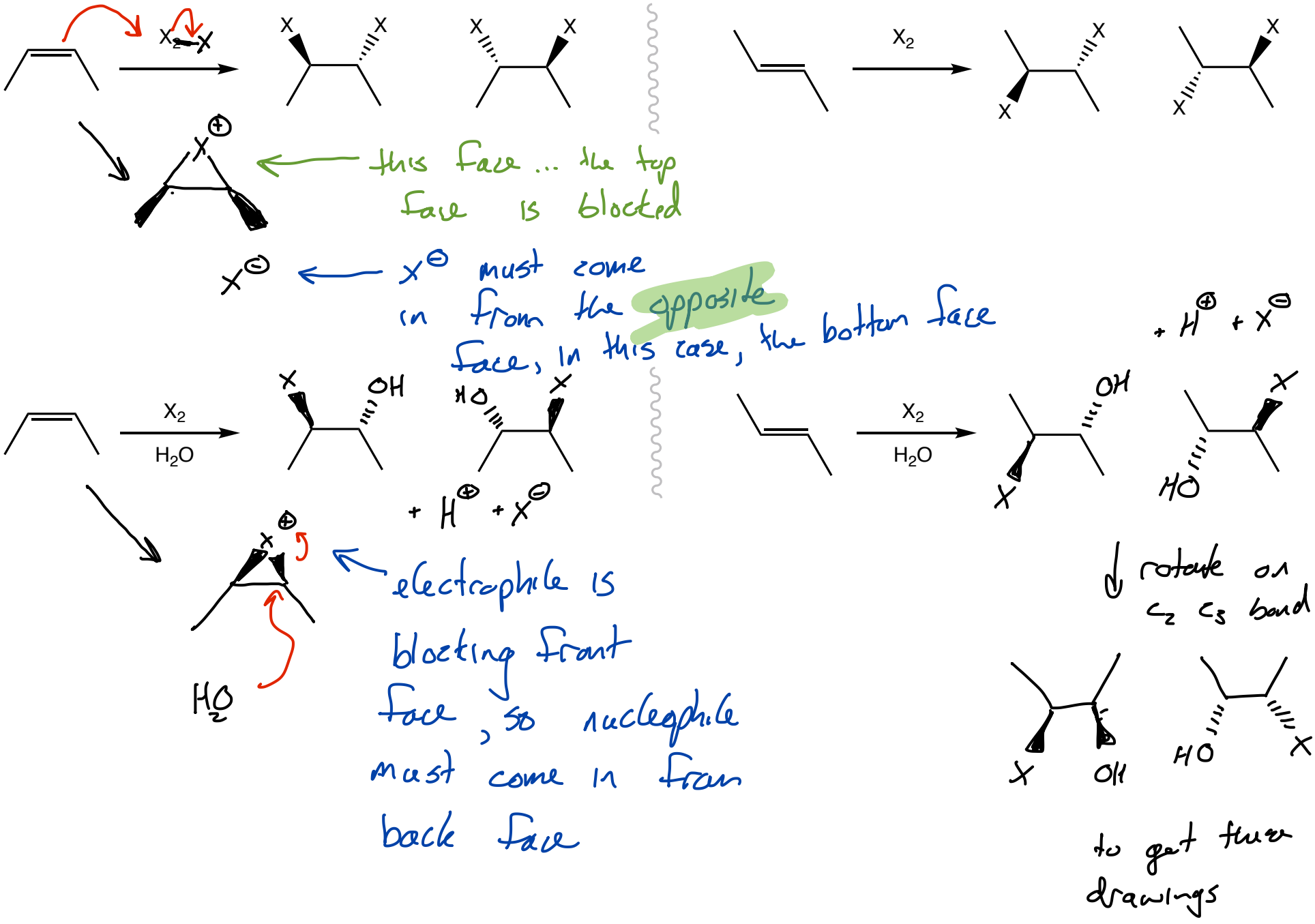




If the reaction forms enantiomers, a 50/50 mixture (also called a racemic mixture) is formed.

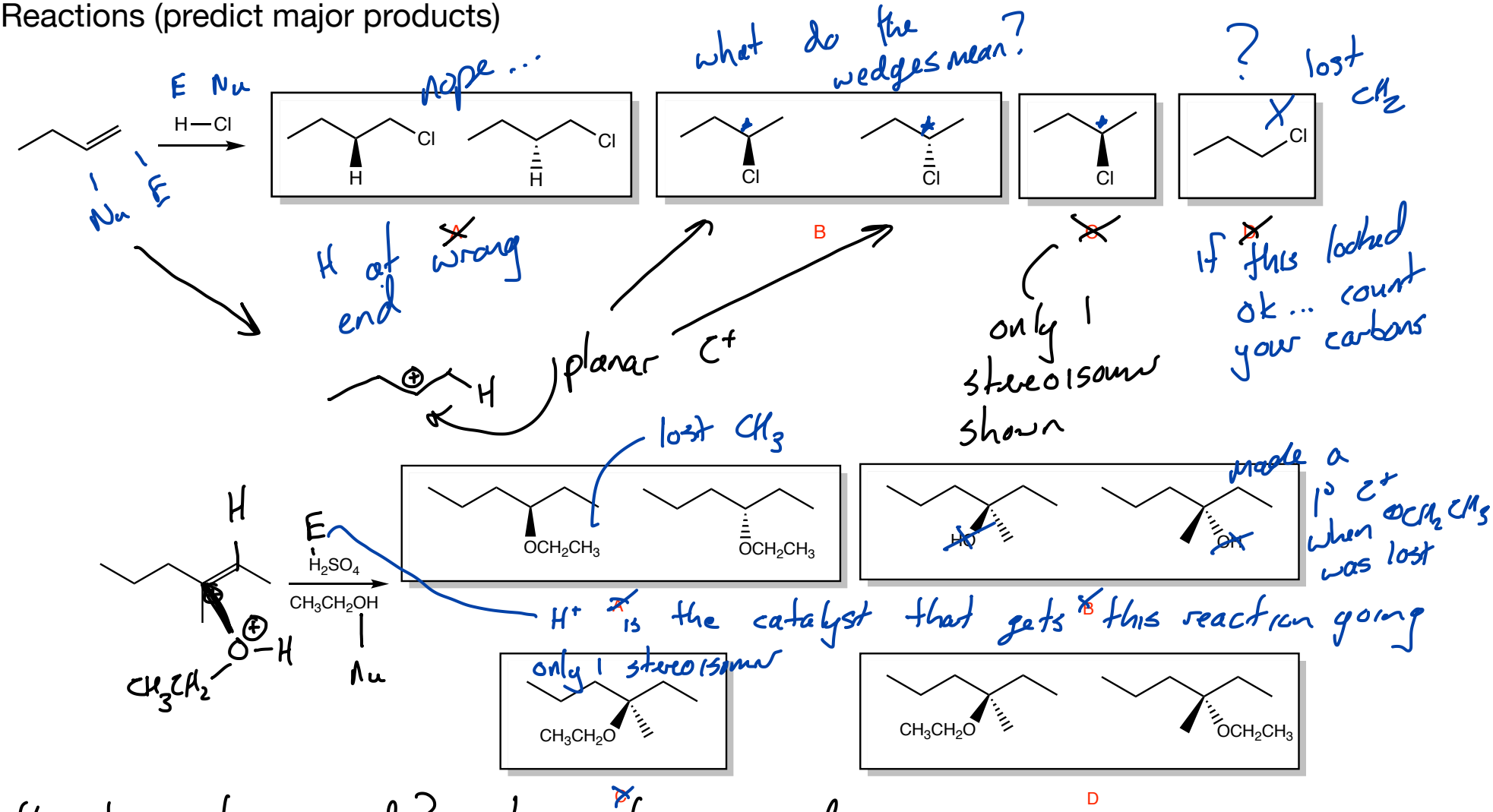
If the reaction forms diastereomers, an excess of one diastereomer will be formed, but predicting which one will be produced in excess is beyond the scope of this class. The energies of the transition states leading to each diastereomer would have to be determined.

sp^2 hybridized C which means there's an empty, unhybridized p orbital on the C^+


this face ... the top face is blocked
X⊖ must come in from the opposite face, in this case, the bottom face
electrophile is blocking front face, so nucleophile must come in from back face
rotate on C2 C3 bond
to get these drawings

3° C+ > 2° C+ >>>> 1° C+

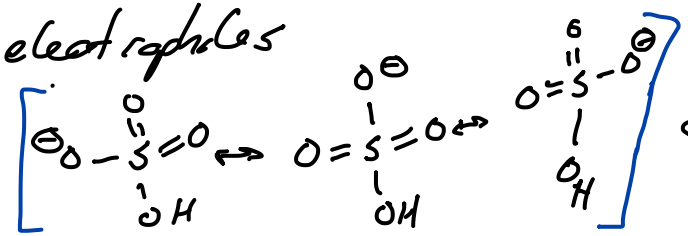
Reactions (predict major products)



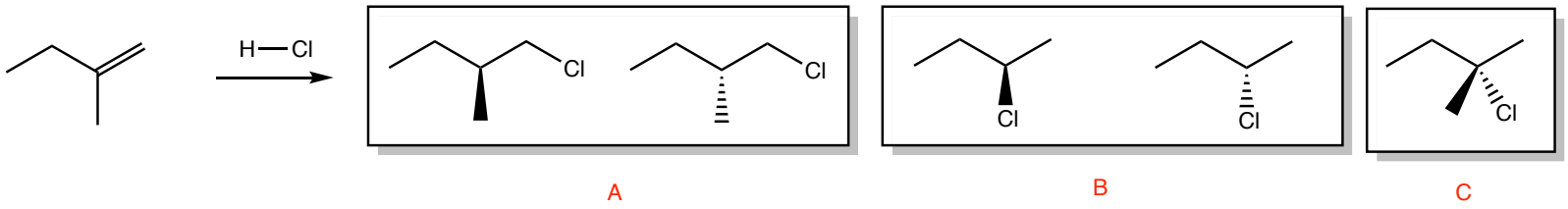
ethanol... strong acid? not a strong acid

H–Cl is a strong or weak acid? Strong

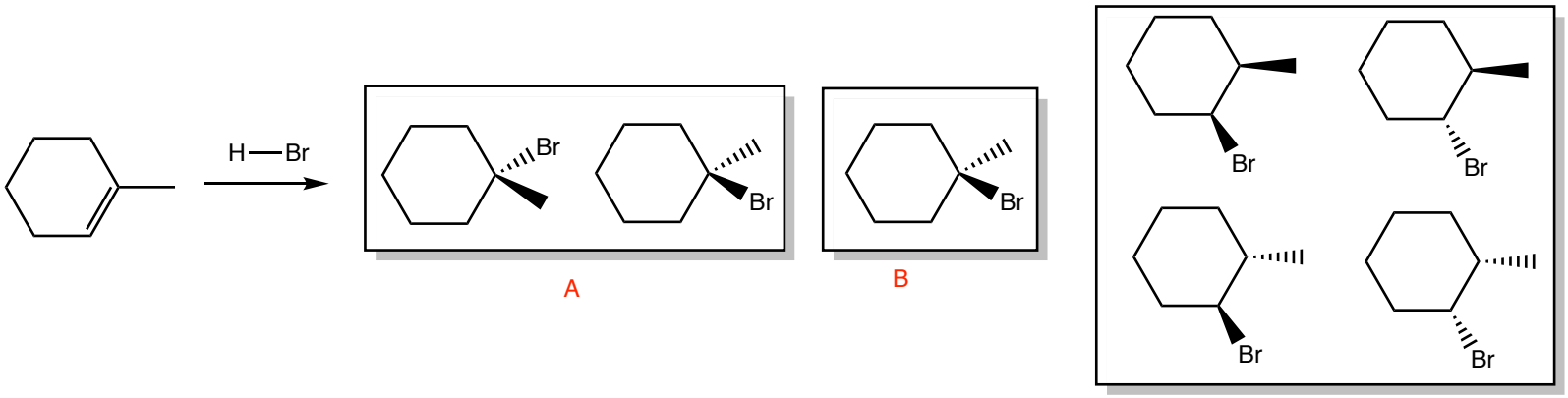
Strong acids act as electrophiles

$HOSO_3H \longrightarrow H^{\oplus}$ + 

$CH_3CH_2-O-H \longrightarrow H^{\oplus}$ + 



A B C



A B C

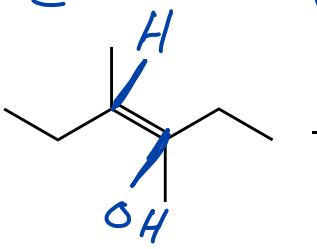
syn & anti

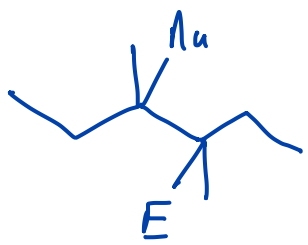
Reactions (predict major products) Section

chiral centers?

is this how we draw tetrahedral ? 2 atoms? can't have 3 in-plane bonds on a tetrahedral C

lost a CH_3



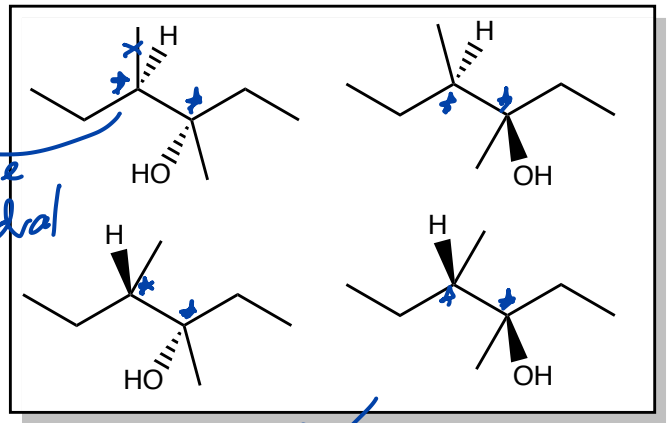


E

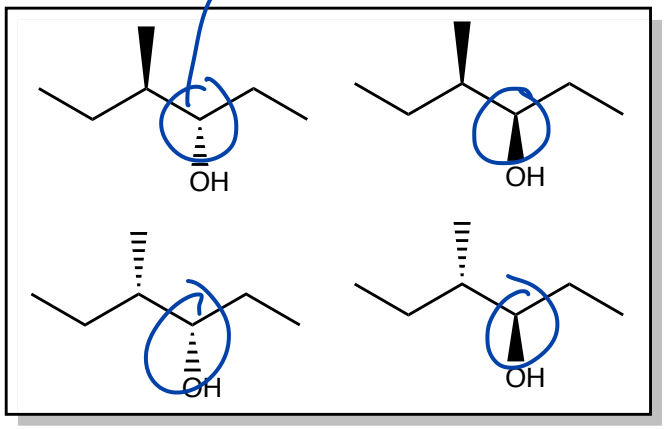
H_2SO_4 ~~—~~ not Nu

H_2O

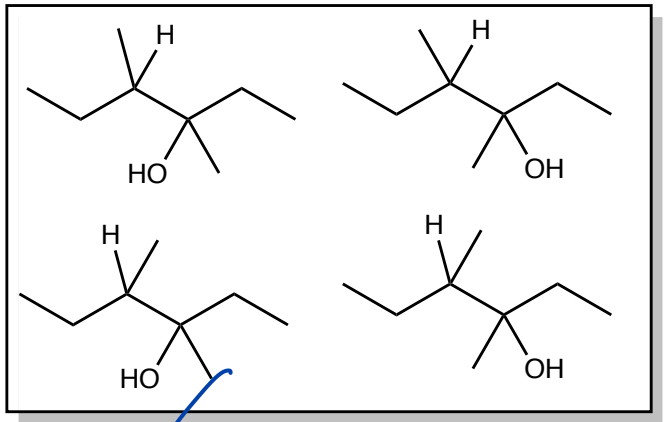
Nu



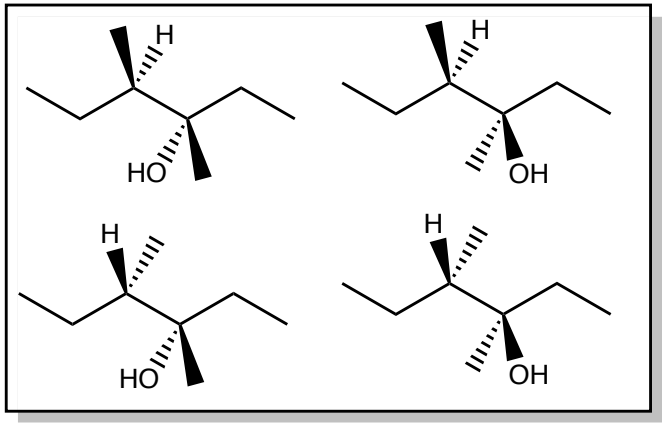
A



B



C



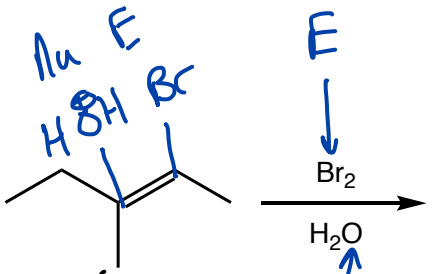
D

no effort to show stereochemical outcome

anti

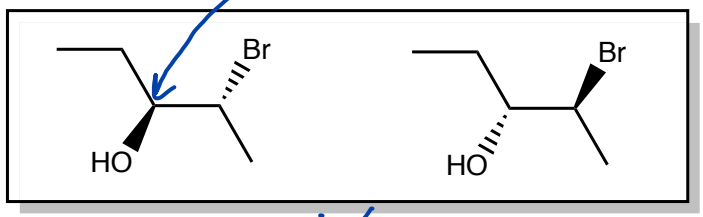
Reactions (predict major products)

Section

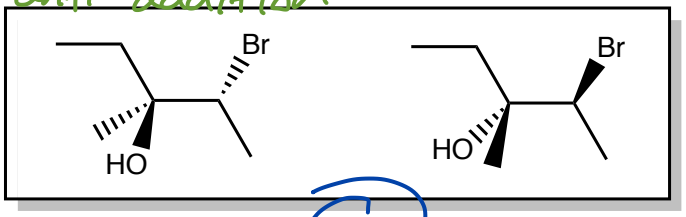


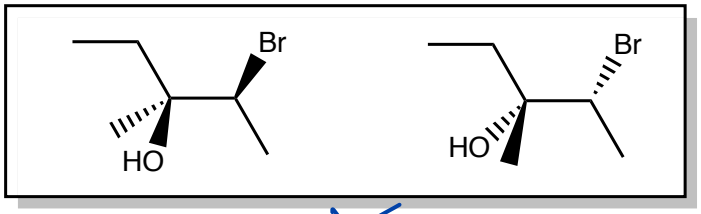
added nucleophile will out compete

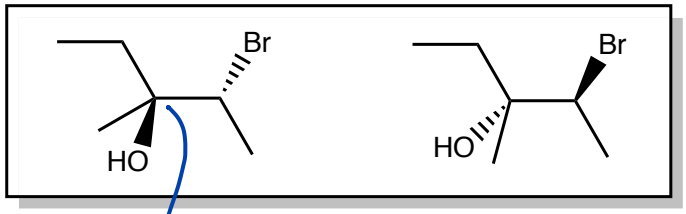
lost CH_3



electrophile & nucleophile bond to opposite faces
anti addition

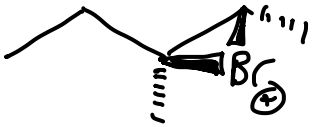






Electrophile & nucleophile bond to the same face
syn addition

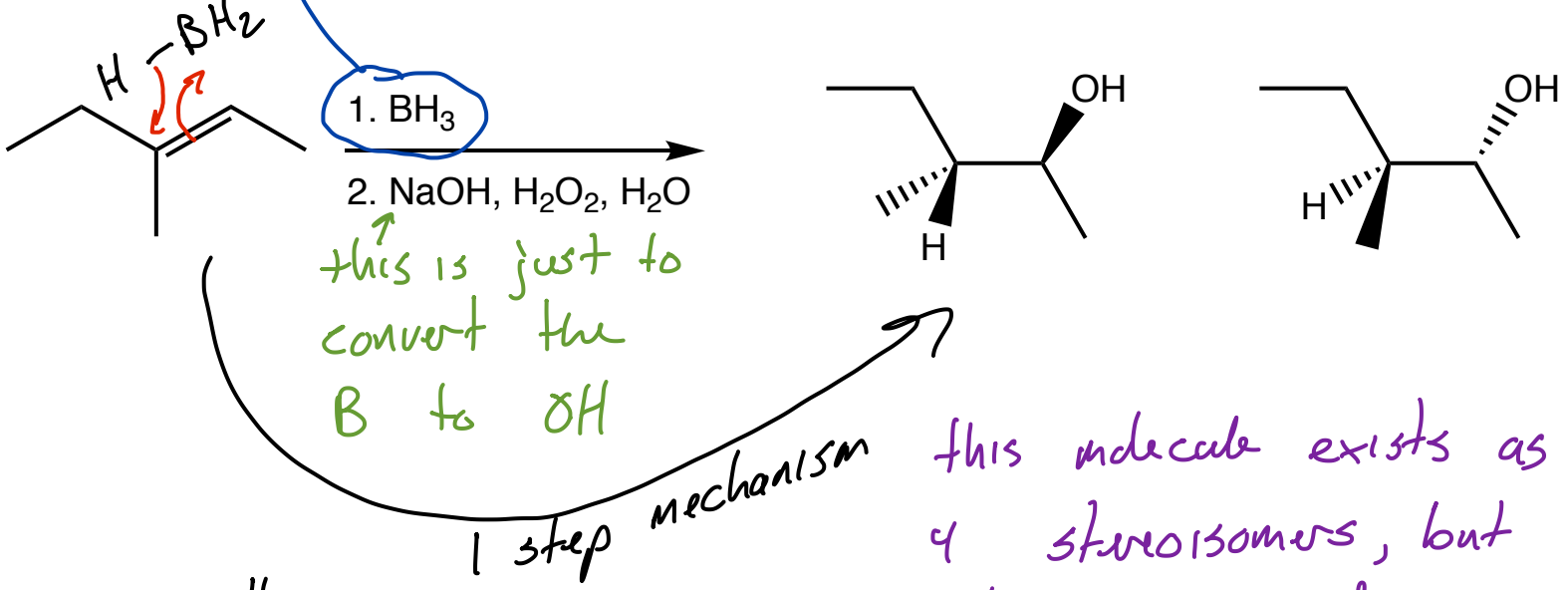
3 in-plane bonds on a tetrahedral C atom



Br blocks one face after initiating the reaction, so the Nu (H_2O) must bond to the other face
anti addition

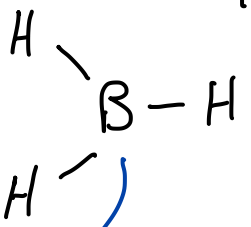
This is the E Add step

syn



this is just to convert the B to OH

1 step mechanism

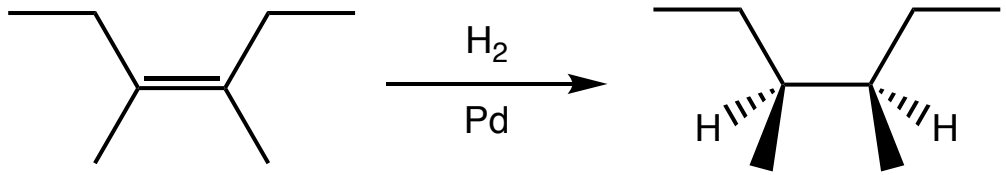


the sp^2 B has a vacant p orbital an that is what makes the B the electrophile

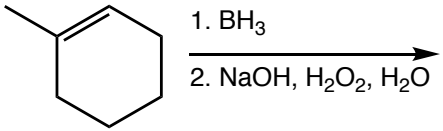
this molecule exists as 4 stereoisomers, but only 2 are drawn... only 2 are produced in this reaction.

one step mechanism means B + H must attach to the same face

Pd catalyzed addition of H_2 occurs via syn addition

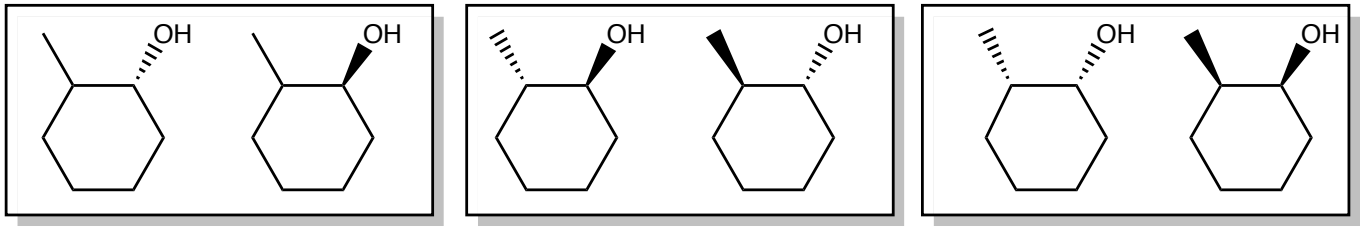


Reactions (predict major products)

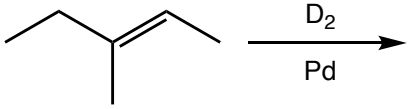


1. BH_3

2. NaOH, H_2O_2, H_2O

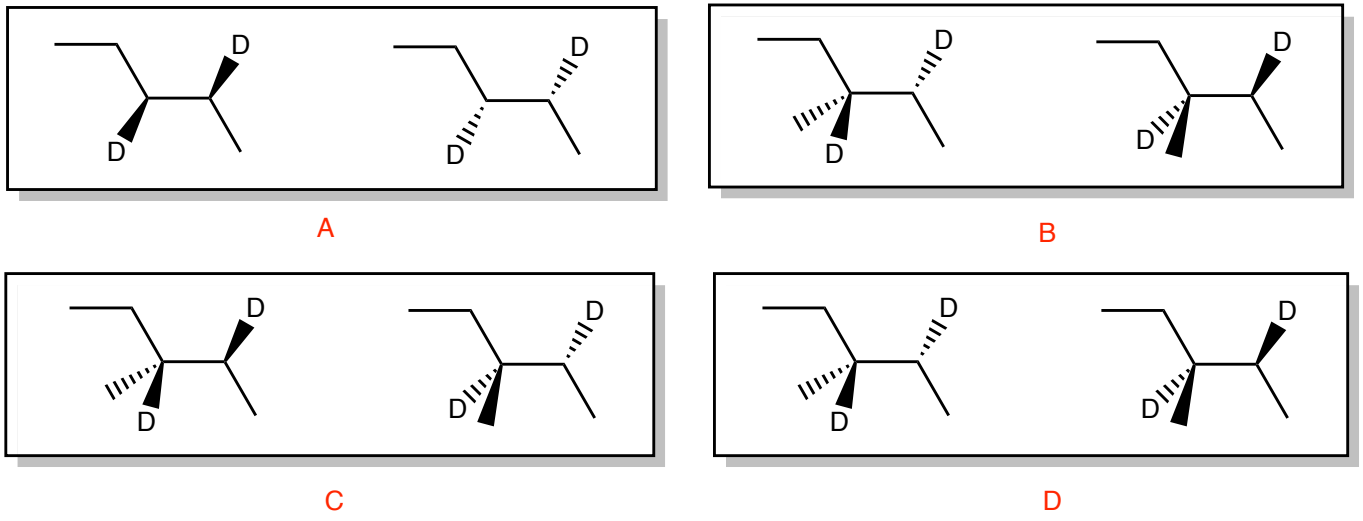


A B C



D_2

Pd



A B C D