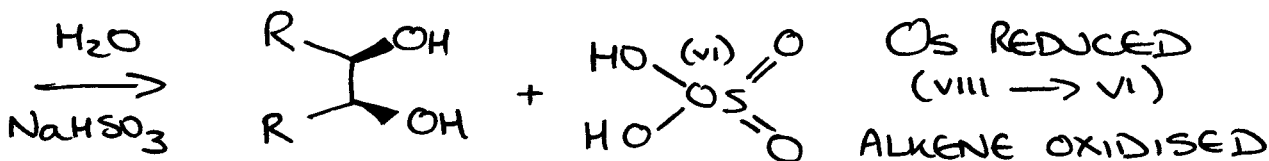
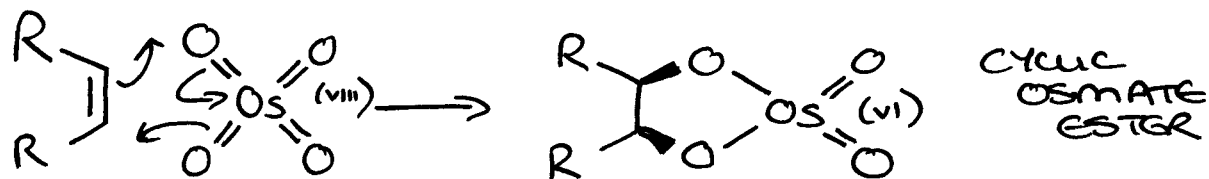
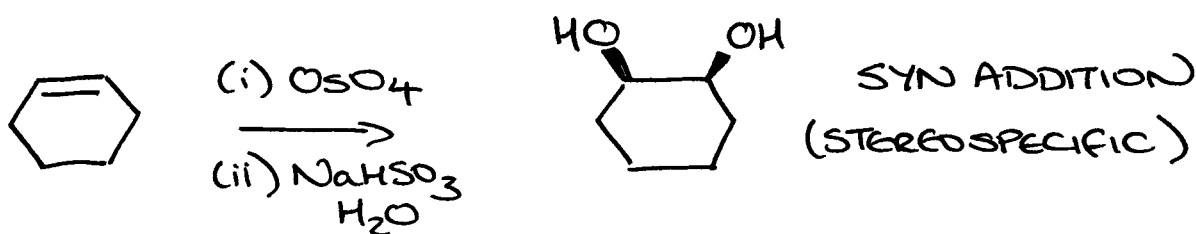


- ① OXIDATION
- ② REDUCTION
- ③ STEREOCHEM AGAIN
- ④ ALKYNES

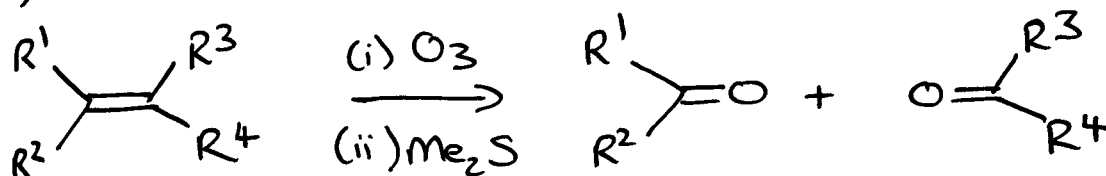
READ 6.5-6.7, 10.9
 PROBLEMS 6.39-6.49, 10.5

① OXIDATION

(i) OsO₄ osmium tetroxide



(ii) OZONOLYSIS

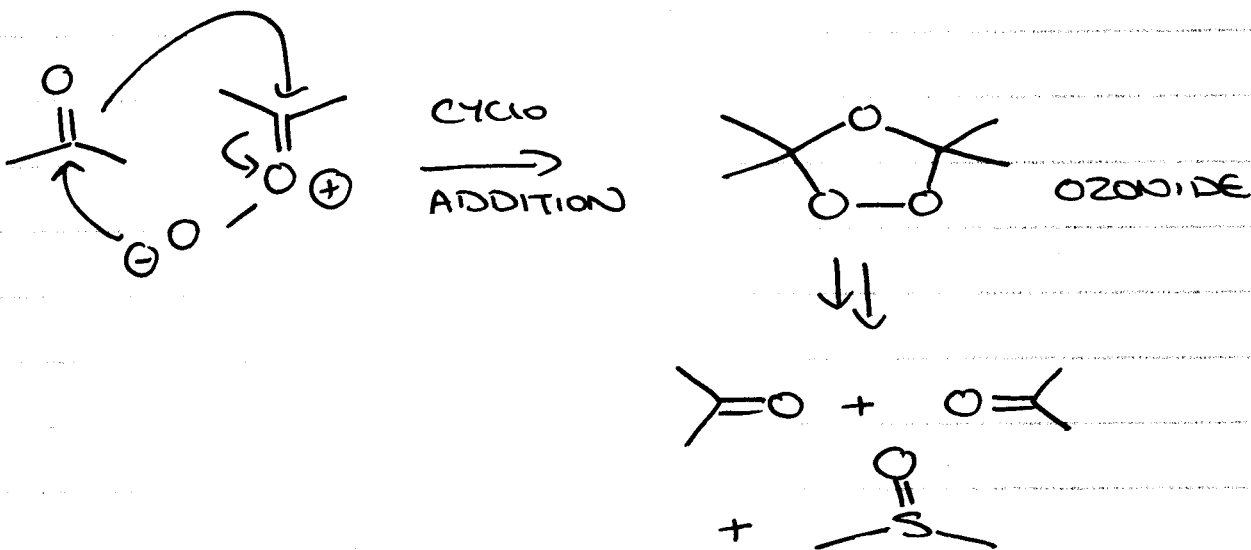
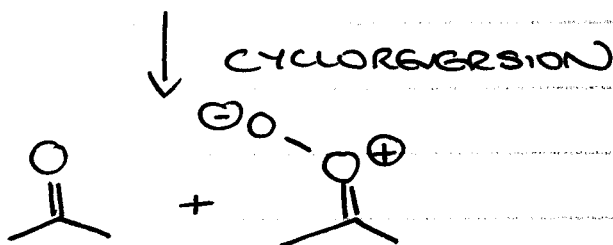
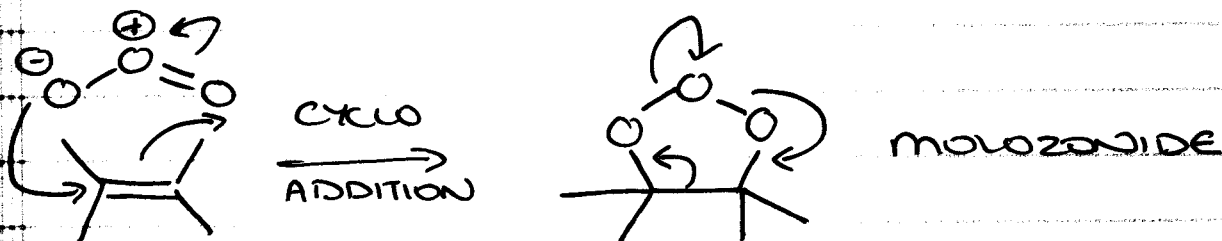


2

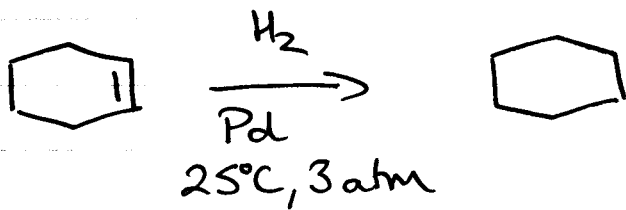
Ozone



Mechanism



2) REDUCTION

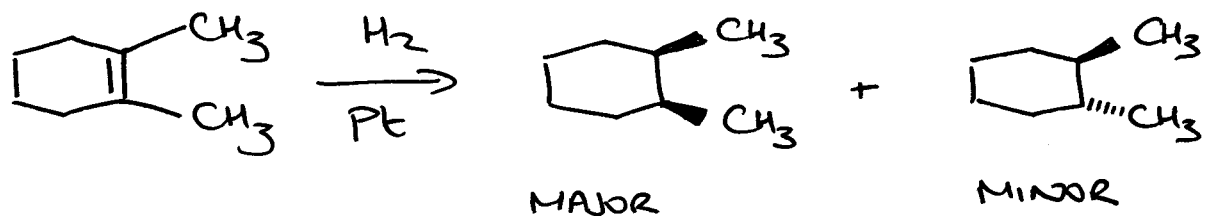


METAL CATALYST
(finely divided on
an inert support
→ charcoal)

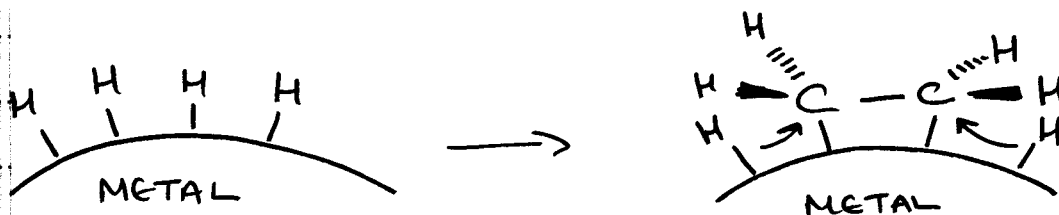
Transition metal catalyst Pt, Pd, Ru, Ni

- Catalytic Reduction / HYDROGENATION

- Stereoselective

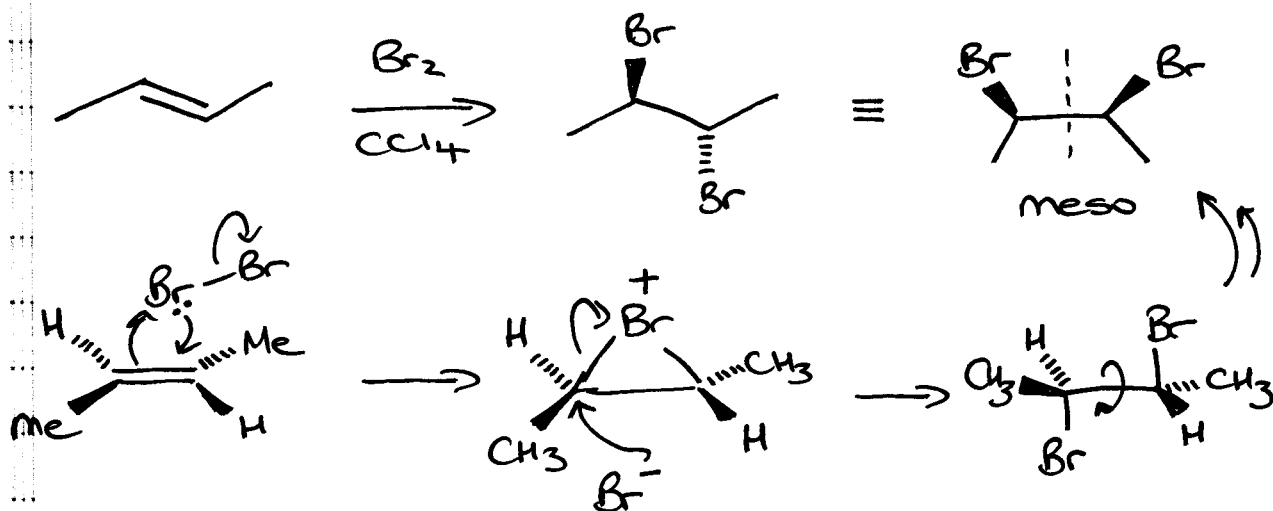


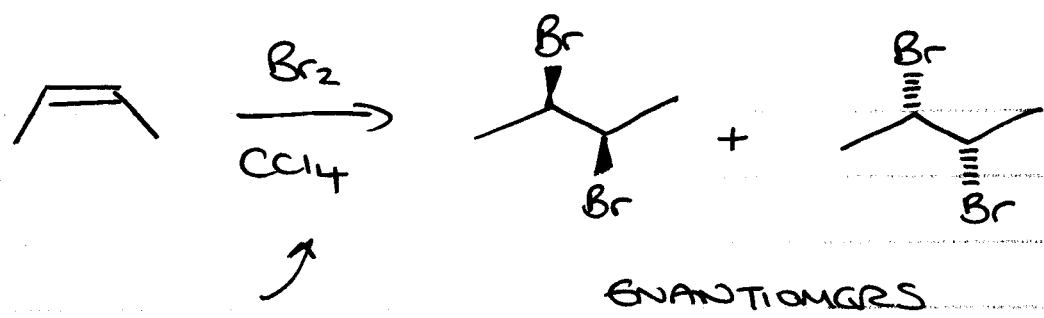
mechanism



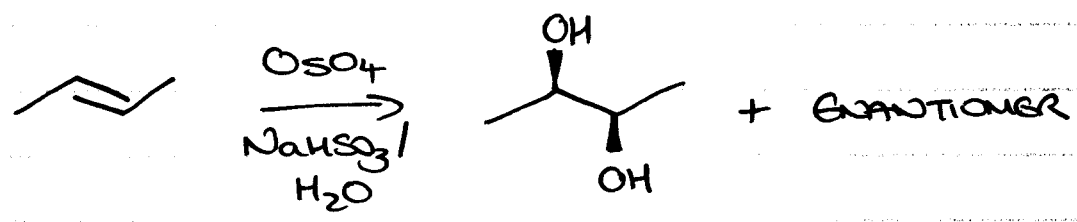
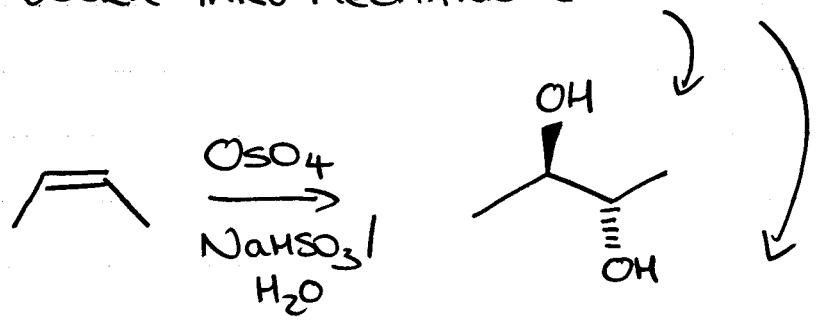
MINOR PRODUCTS RESULT FROM ISOMERIZATION OF THE ALKENE ON THE METAL CATALYST

3) STEREOCHEMISTRY AGAIN



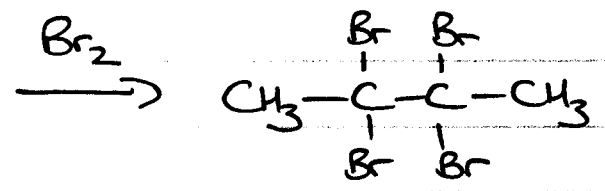
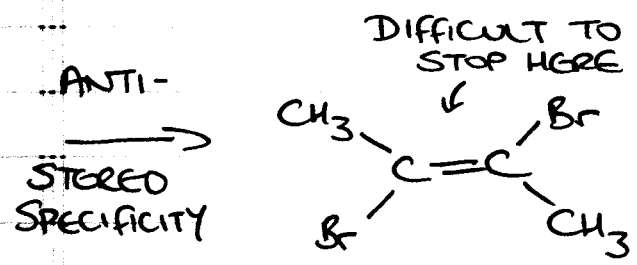
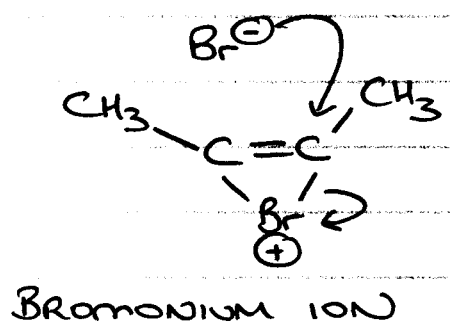
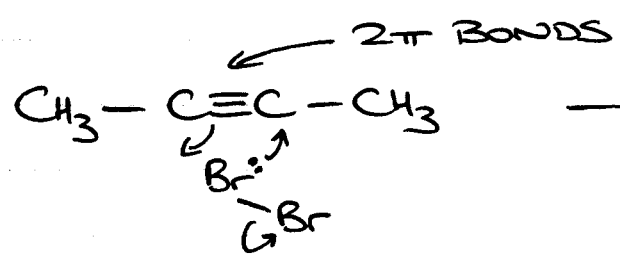


WORK THRU MECHANISM



4 ADDITION TO ALKYNES

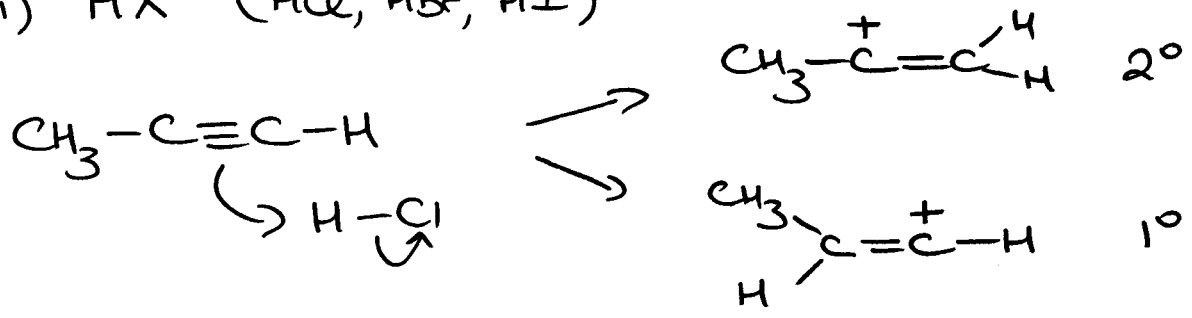
(i) X₂ (Br₂/Cl₂)



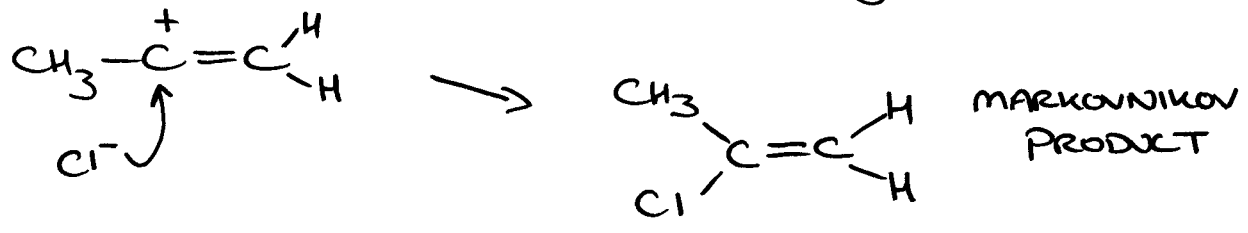
ANTI-STEREO SPECIFICITY

DIFFICULT TO STOP HERE

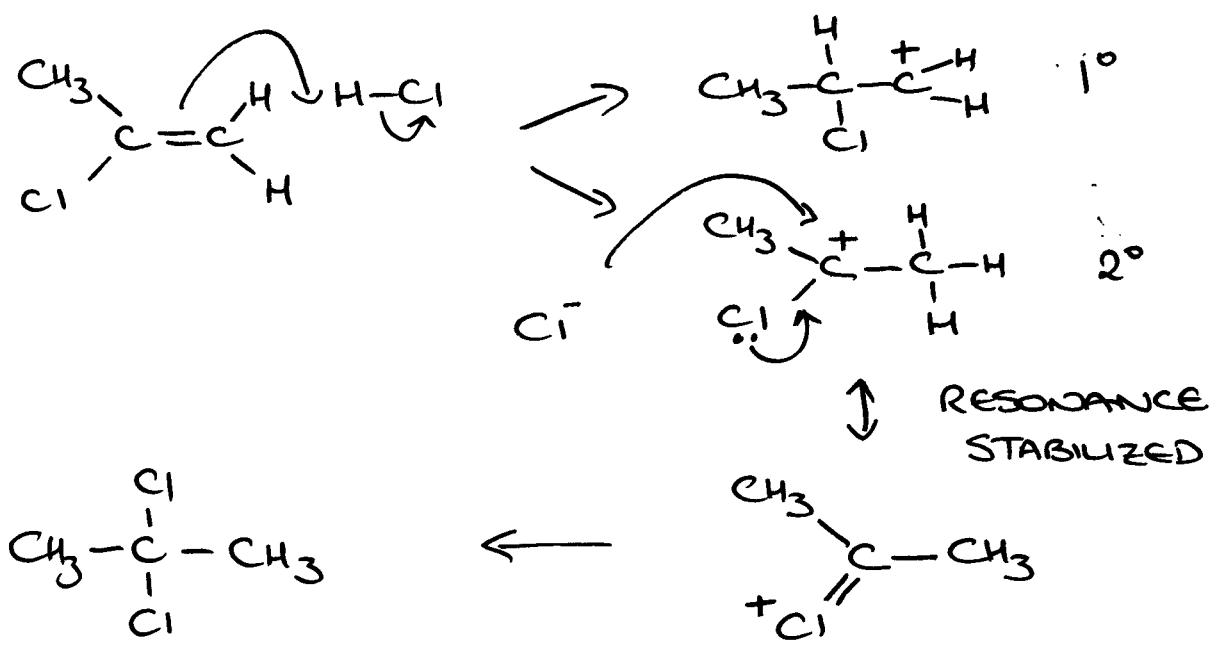
(ii) HX (HCl, HBr, HI)



VINYL CARBOCATIONS (not very stable)



ALKENE PRODUCT COMPETES WITH ALKYNE FOR H-Cl IN THE REACTION (ALKENES MORE REACTIVE)



mechanisms actually more complicated, but these are good models.

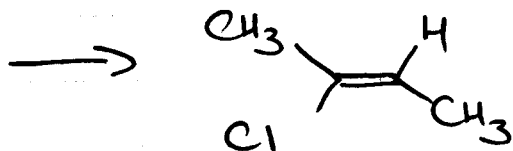
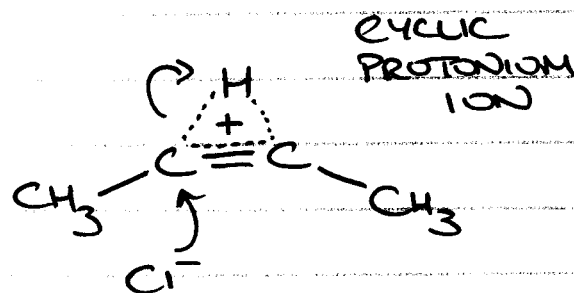
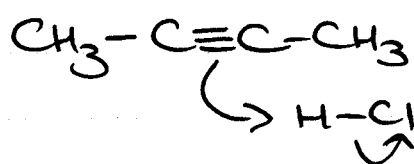
6

... VINYLIC C⁺ QUITE UNSTABLE

... 2° VINYLIC C⁺ ≈ 1° C⁺

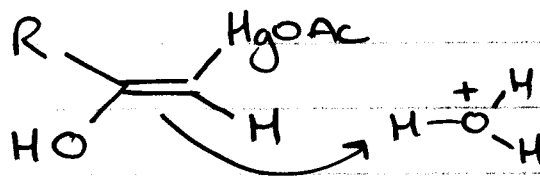
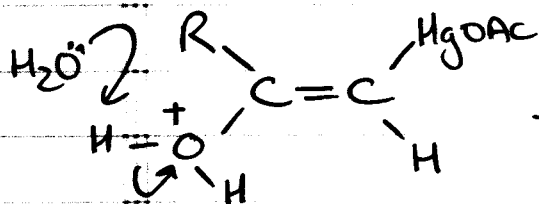
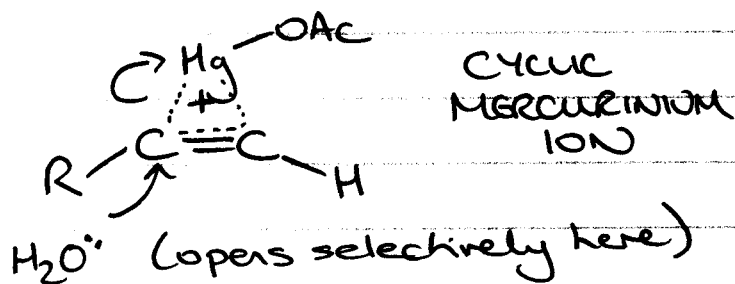
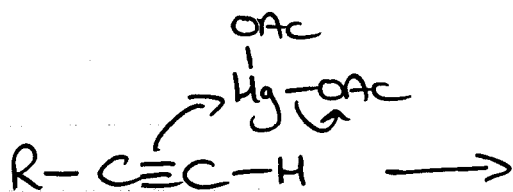
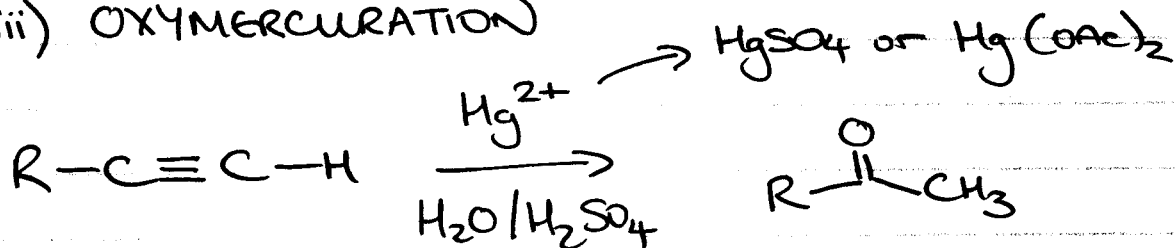
... and 1° C⁺ not usually a viable reaction intermediate.

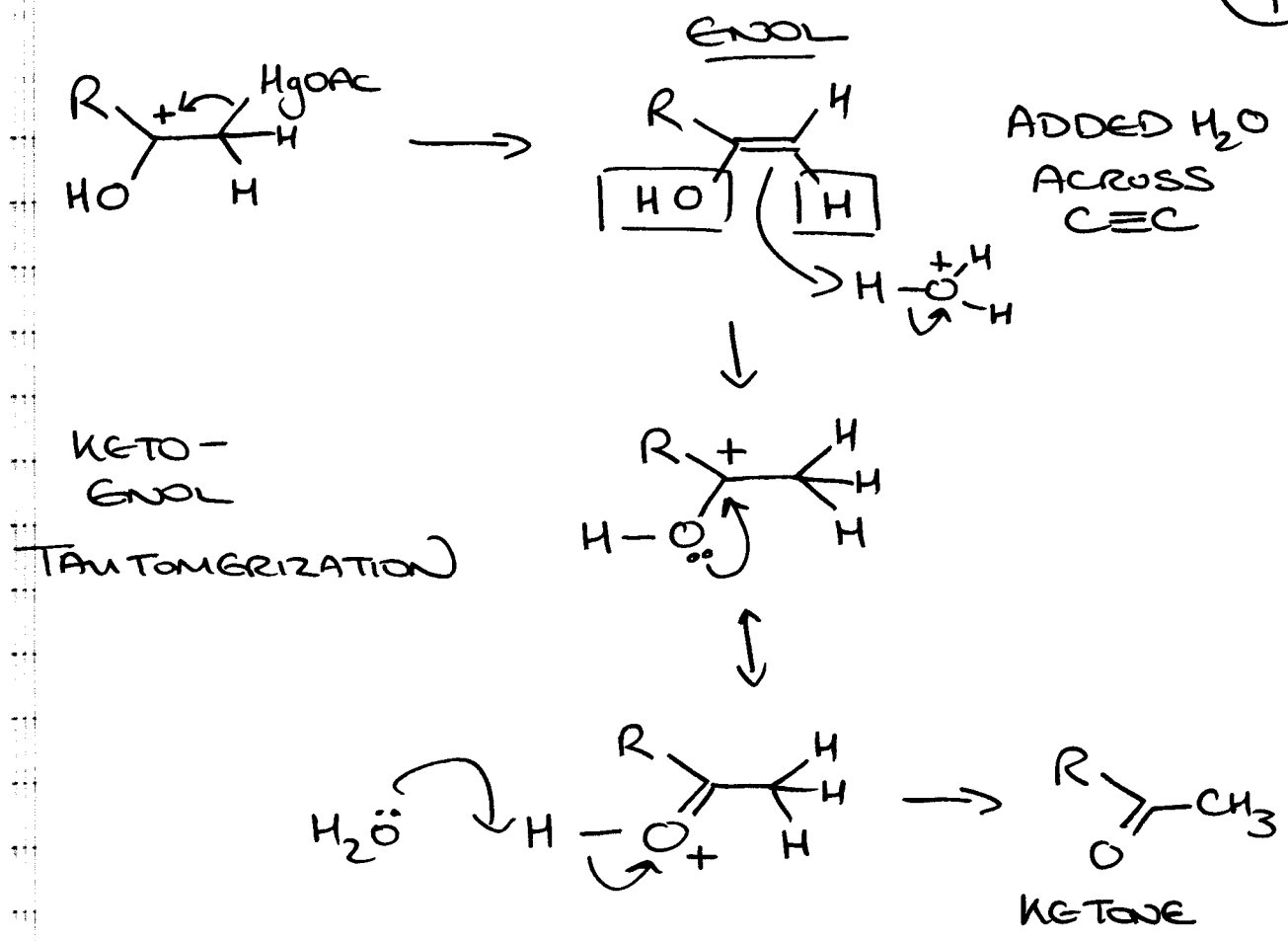
... PROPOSED INTERMEDIATE



ACCOUNTS FOR OBSERVED TRANS SELECTIVITY

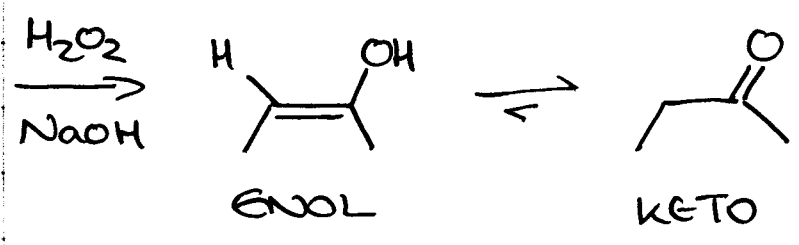
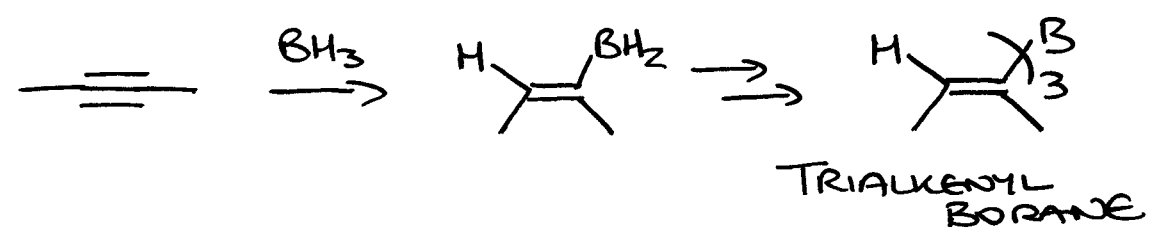
(iii) OXYMERCURATION





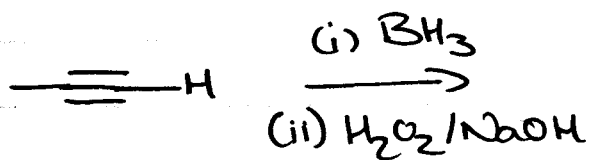
(iv) HYDROBORATION

$(R-C\equiv C-H, R-C\equiv C-R)$
 terminal non-terminal

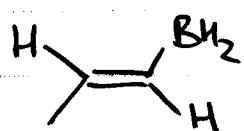
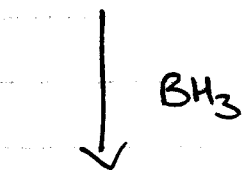


(SAME MECHANISM AS FOR ALKENES)

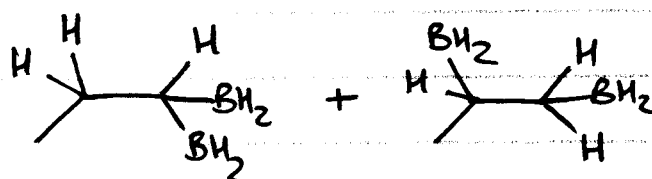
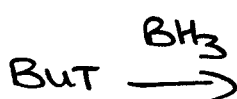
Terminal Alkynes



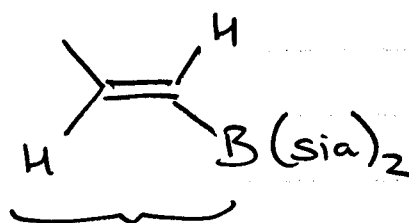
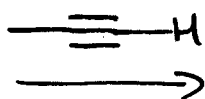
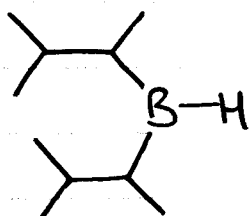
mixture of products



ANTI-MARKOVNIKOV



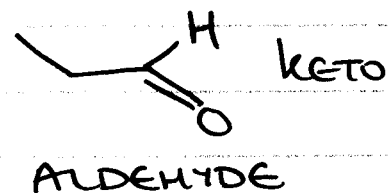
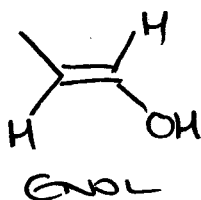
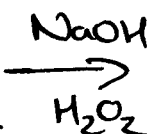
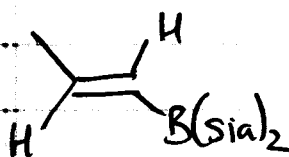
DISIAMYL BORANE (sia)₂BH



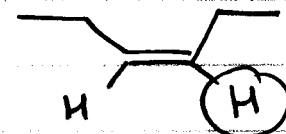
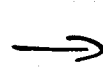
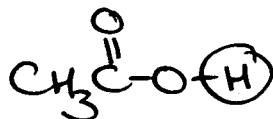
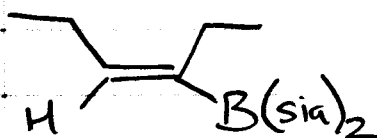
STOPS HERE
(only one B-H addition)
STERICS

Same side SYN

ANTI-MARKOVNIKOV



REACTION w/ ACETIC ACID



STEREOSPECIFIC HYDROBORATION / PROTONOLYSIS