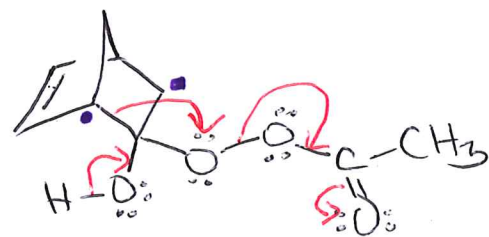
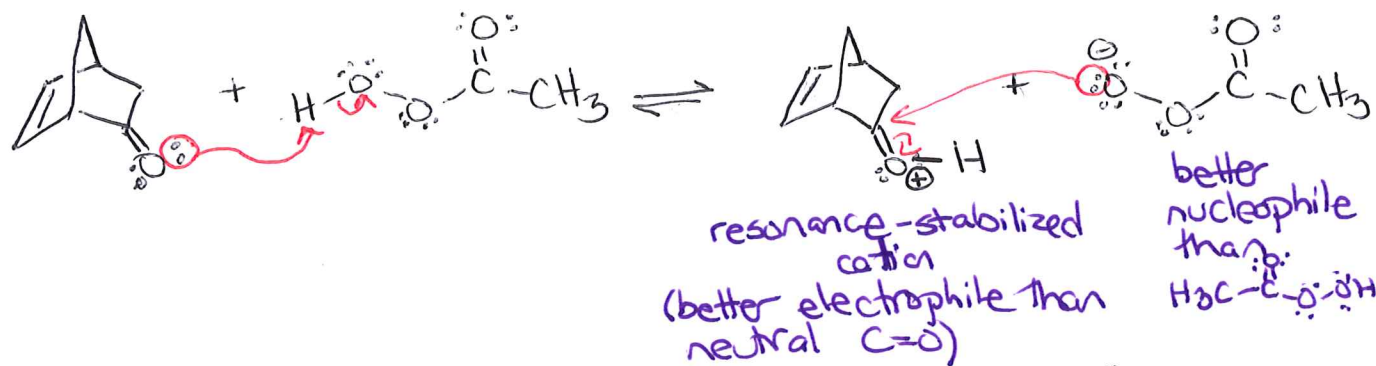
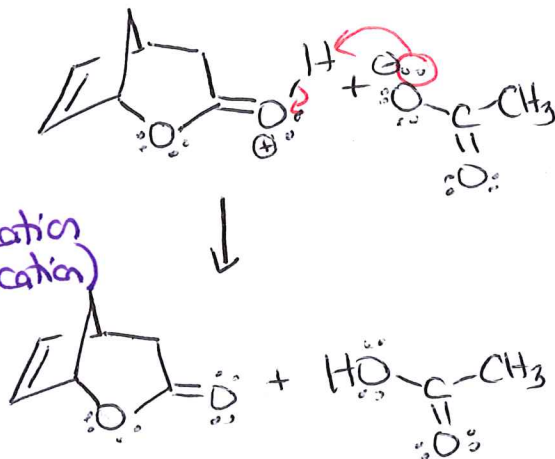


1. (a)



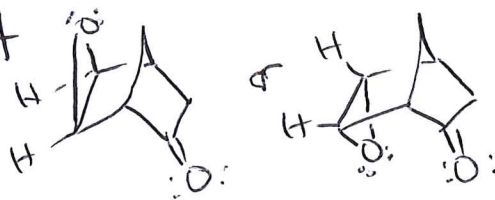
O inserts into the C-C bond on the side that would give a better carbocation.

- would give a 2° carbocation
- would give a 1° carbocation



(b) Norbornene contains an alkene and alkenes can react with peracids to give epoxides

\therefore the concern was that

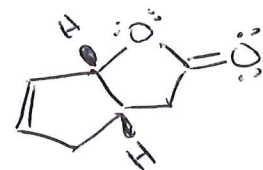
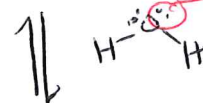
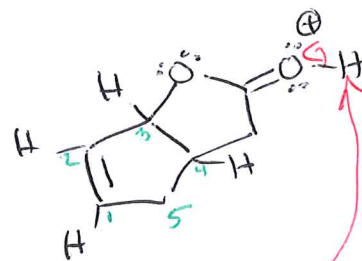
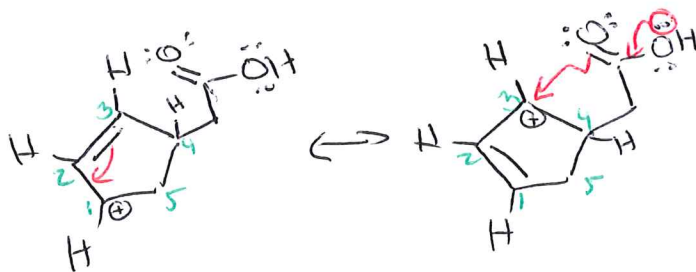


would form.

2.

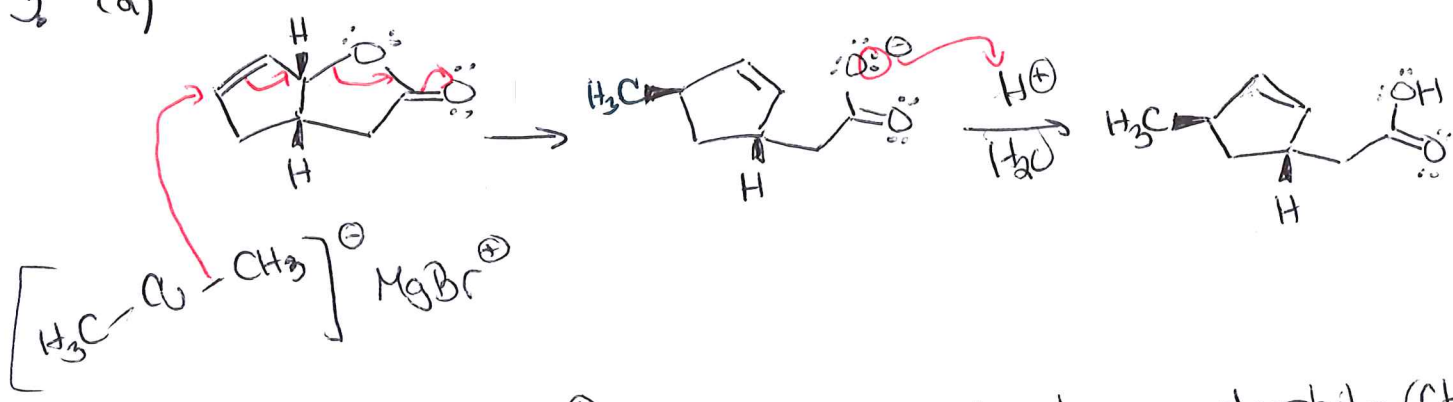


2° allylic carbocation
(stabilized by resonance)
redrawn flat. looks like:

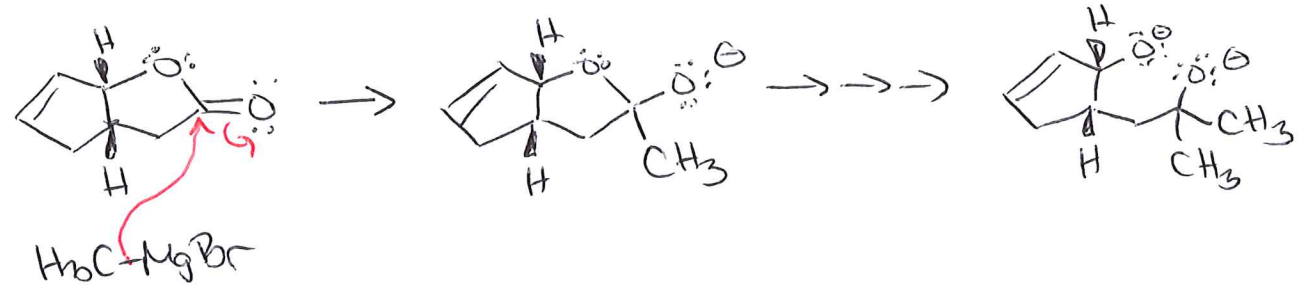


rings must be cis-fused

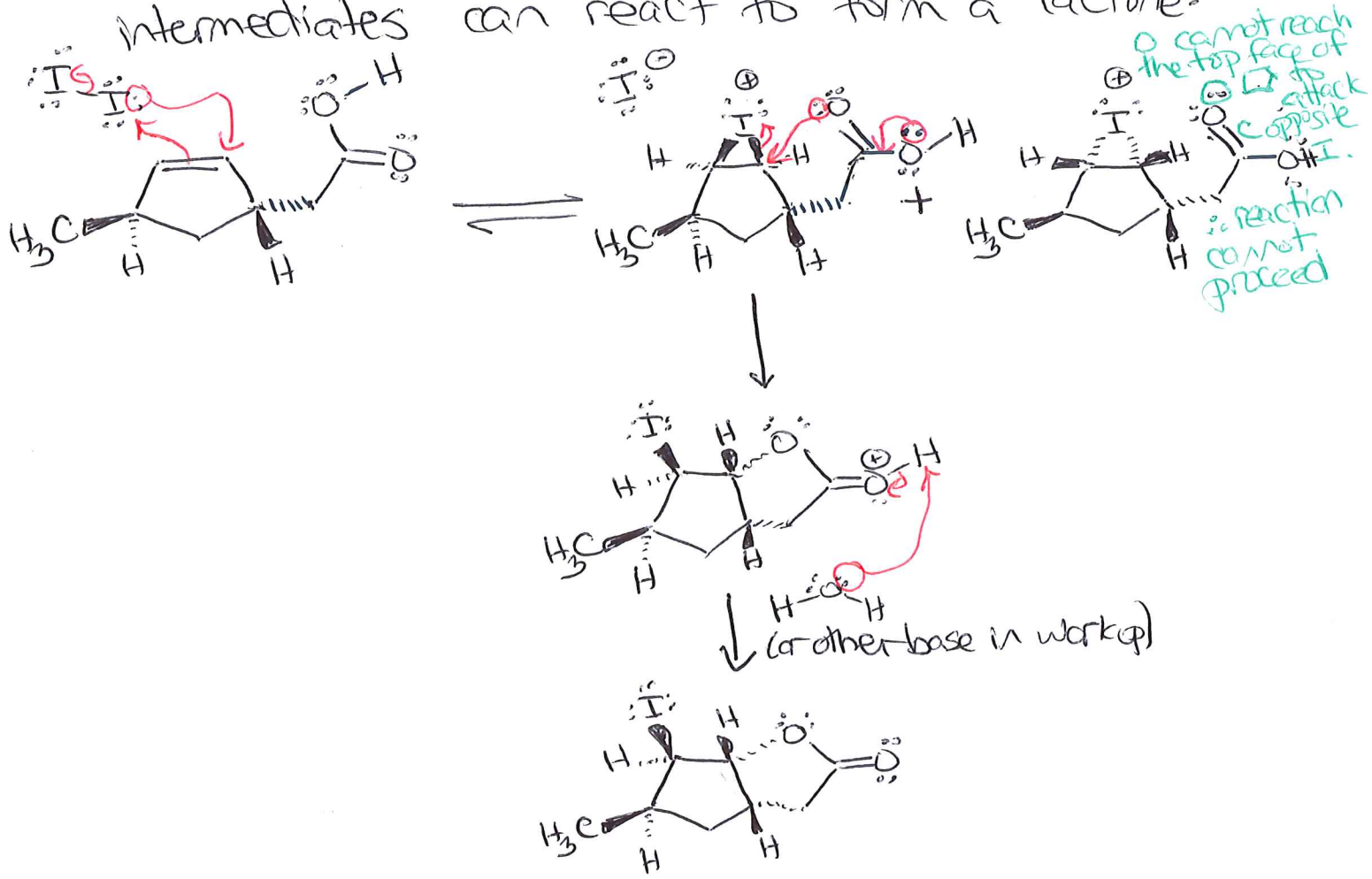
3 (a)



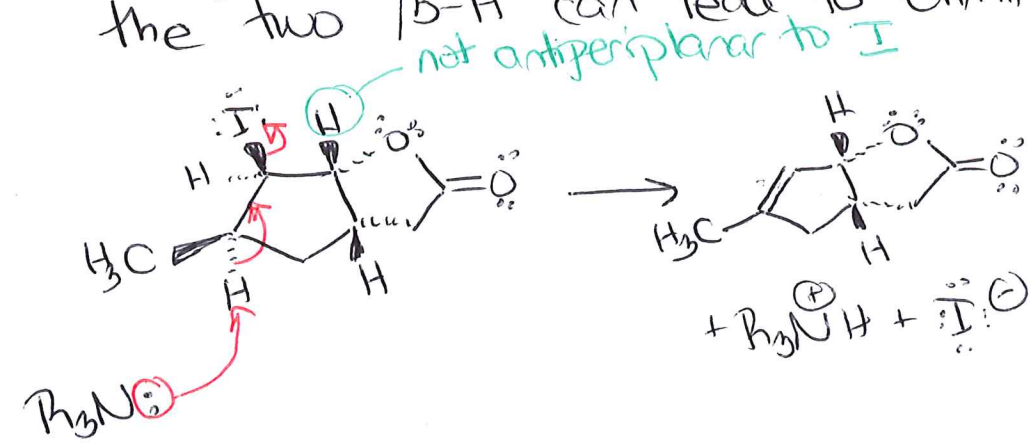
(b) The catalytic Cu^+ converts a harder nucleophile (CH_3MgBr) into a softer nucleophile ($(\text{CH}_3)_2\text{CuMgBr}$) so that the nucleophile attacks the softer electrophilic site (shown above) rather than the harder electrophilic site ($\text{C}=\text{O}$; shown below)



4. In an iodolactonization reaction, the oxygen will always attack from the opposite side of the iodine. Thus, while I_2 can initially react at either side of the alkene, only one of the two resulting intermediates can react to form a lactone:



5. Elimination of HI using a nonnucleophilic base is an E_2 reaction. In an E_2 reaction, the β -H must be antiperiplanar to the leaving group as only one of the two β -H can lead to elimination:



6.

