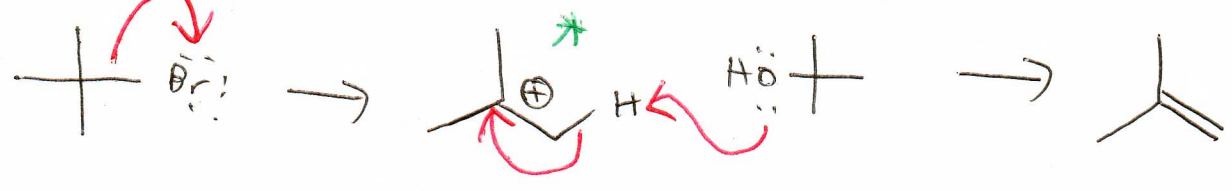


In ~~the~~ In both cases the leaving group (Br) and the hydrogen that can be eliminated are neither synperiplanar nor antiperiplanar, so ~~a~~ elimination cannot occur.

E1 - unimolecular elimination

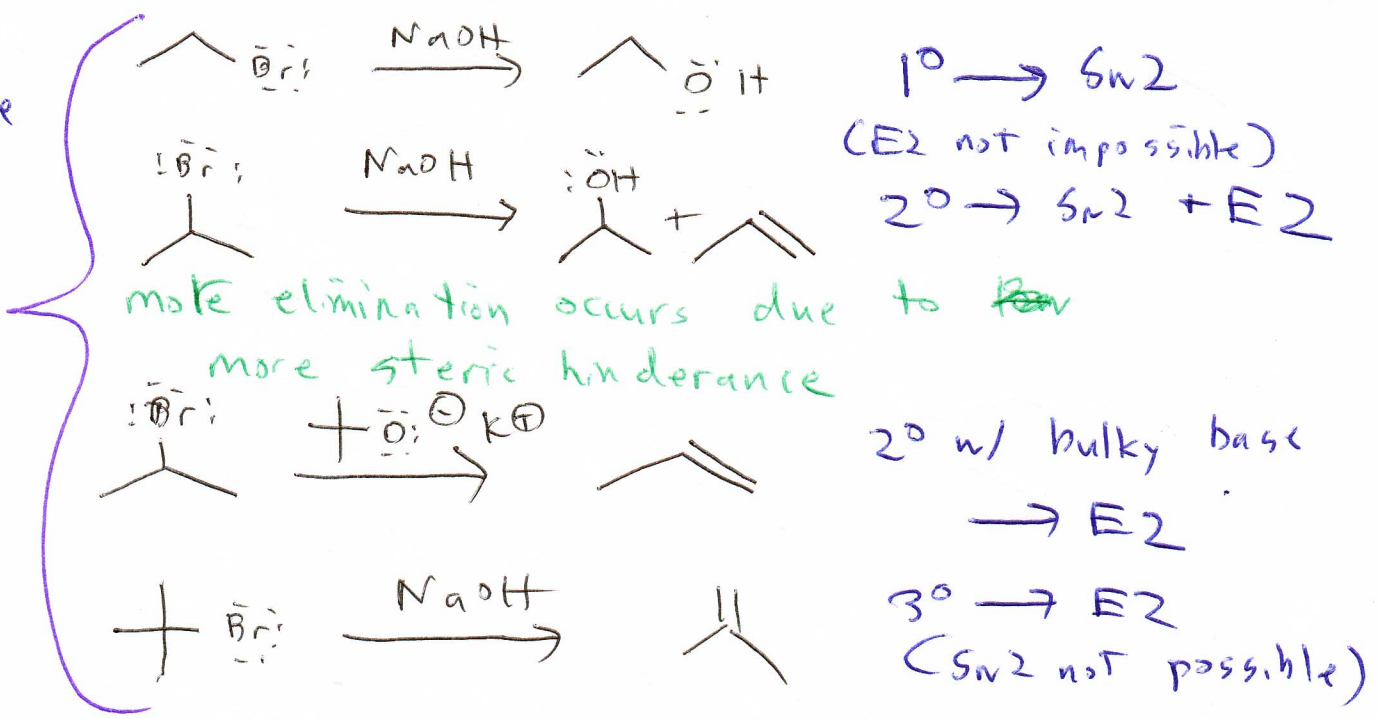


* Since the S_N1 + E1 reactions pass through exactly the same intermediate, there will always be some S_N1 that occurs with E1 and vice versa.

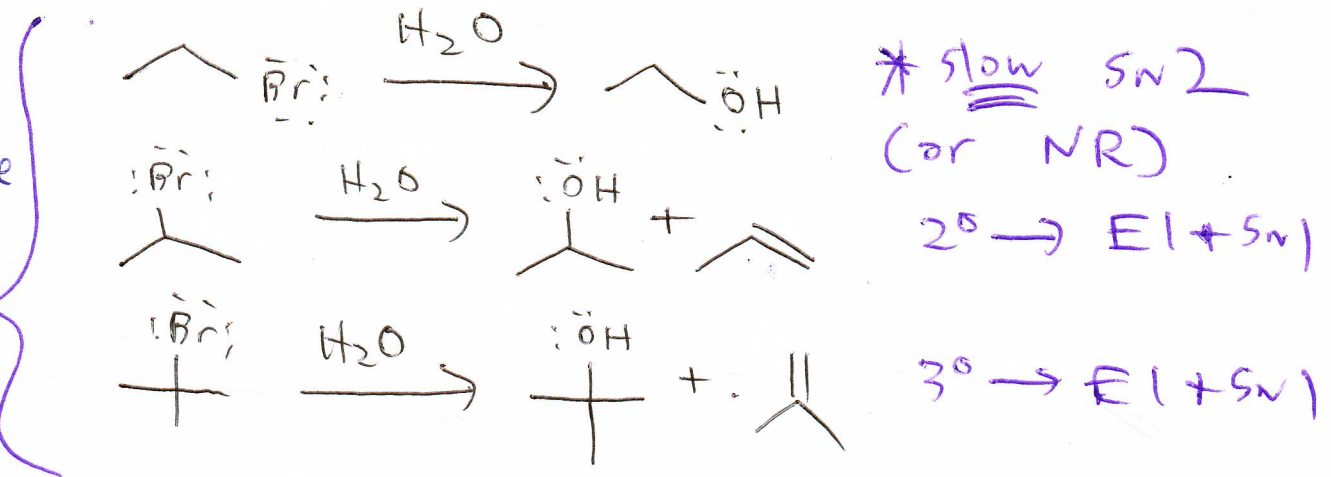
1. utility! alkyl halide \rightarrow alkene
2. reagents! weak, non-basic nucleophiles
3. conditions! polar, protic solvents
4. stereochem
6. regiochem! more substituted alkenes tend to form; carbocation rearrangement is possible.

SN2 vs SN1 vs E2 vs E1

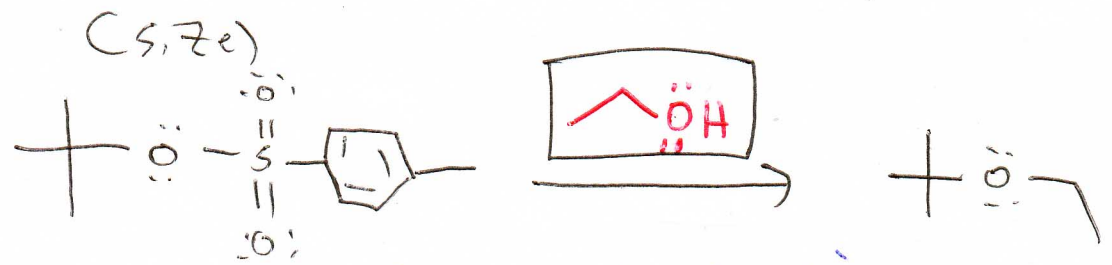
Basic nucleophile



non-basic nucleophile (weak)

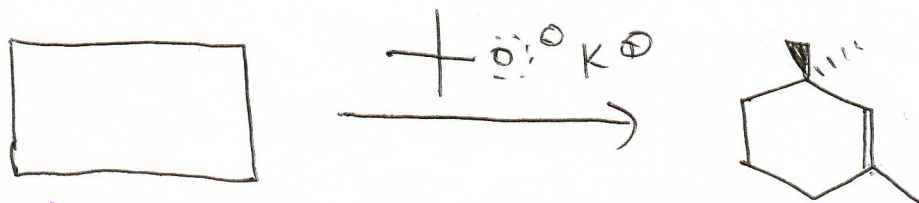
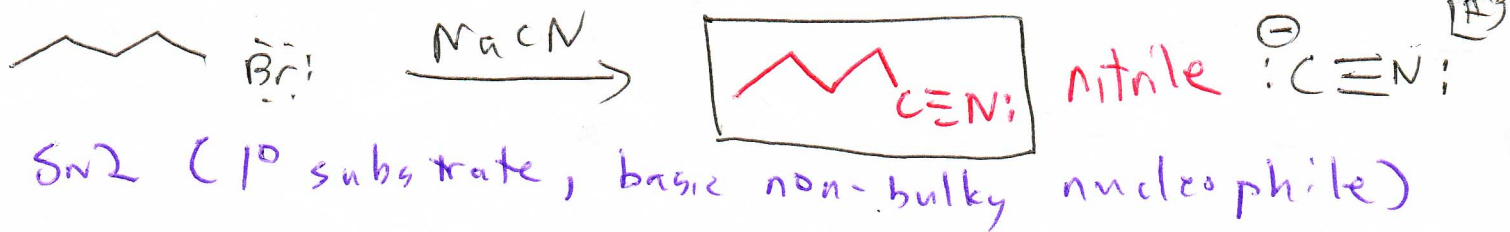


The type of reaction that occurs depends on the structure of the substrate and the basicity and bulkiness of the nucleophile.

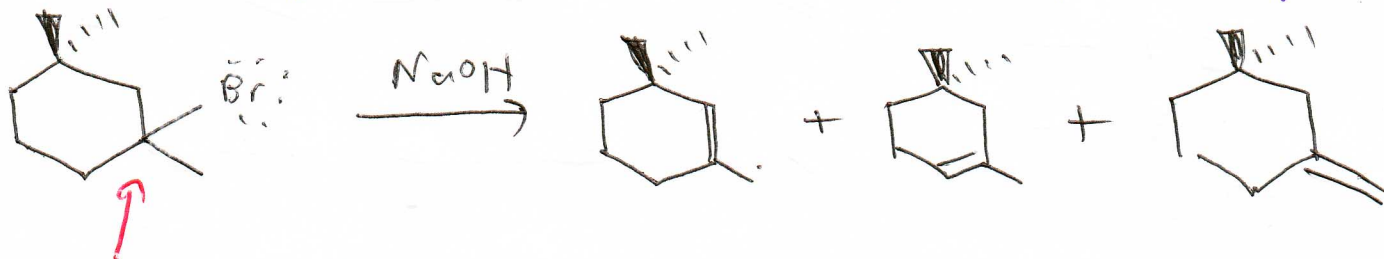


This reaction is a substitution rxn on a 3° substrate, which means a weak, non-basic nucleophile must be used.

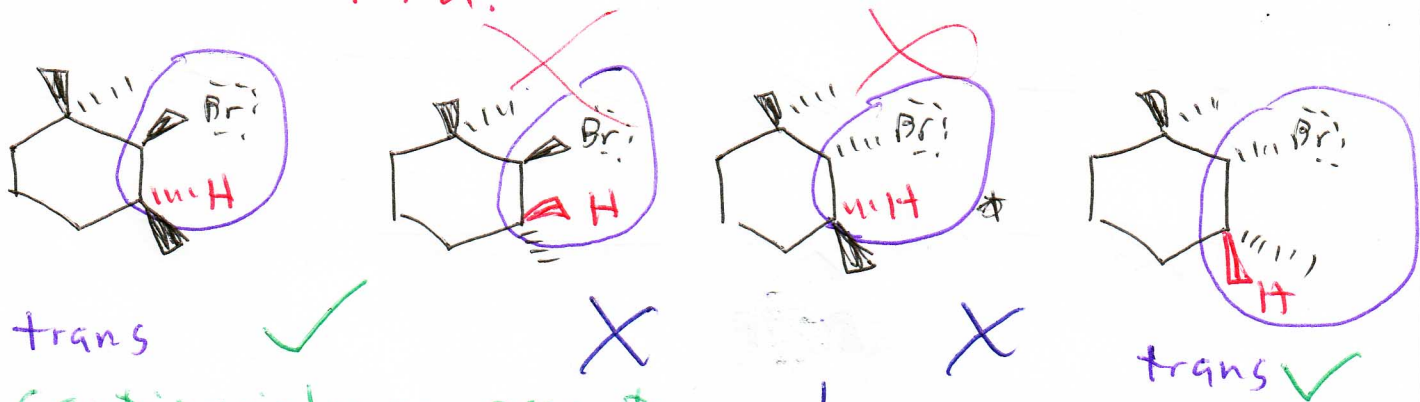
(cannot be CC(C)(C)[O-]Na+) \downarrow would cause E2



$\text{E}2$ (alkene produced; ~~strong~~ basic, bulky nucleophile)



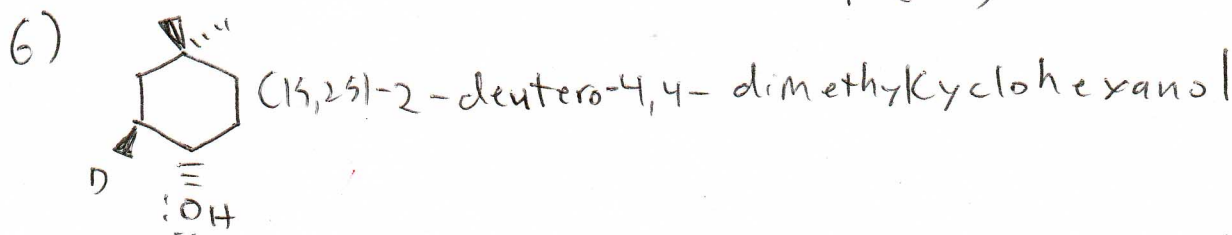
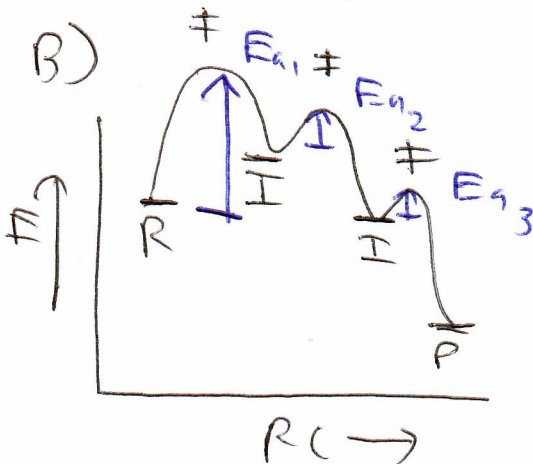
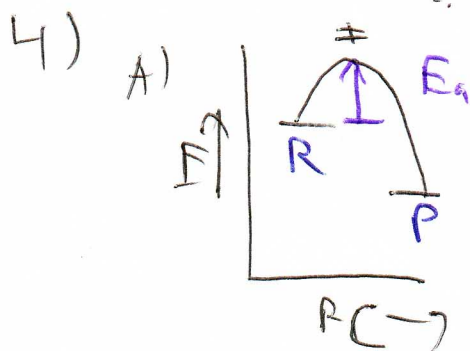
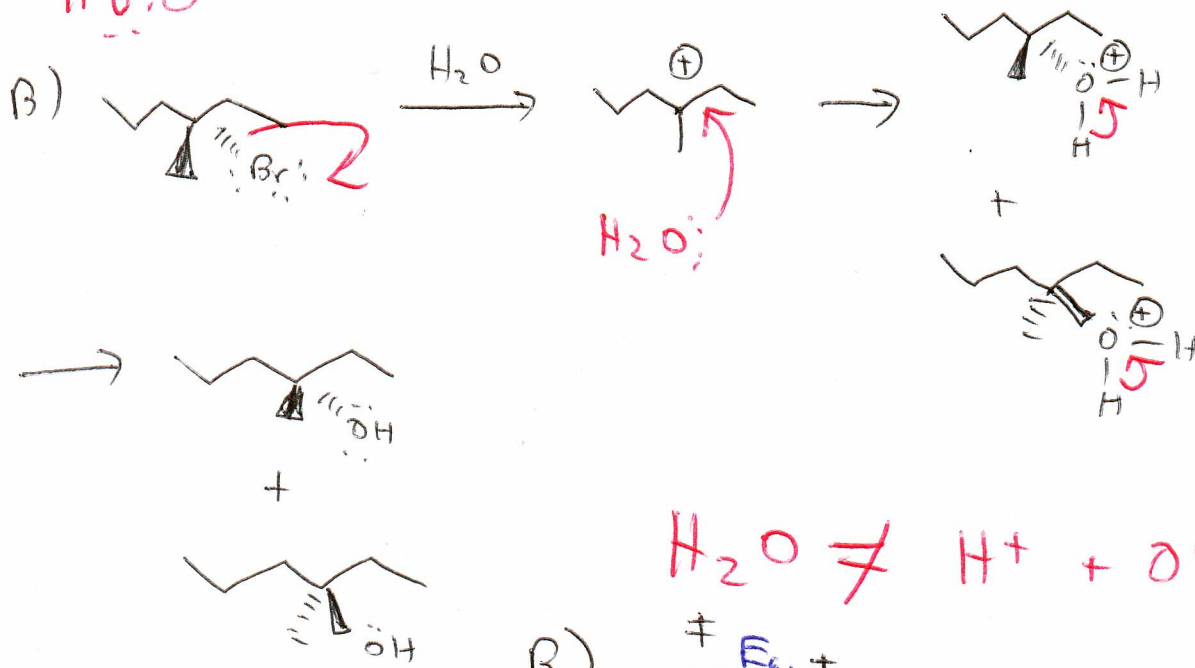
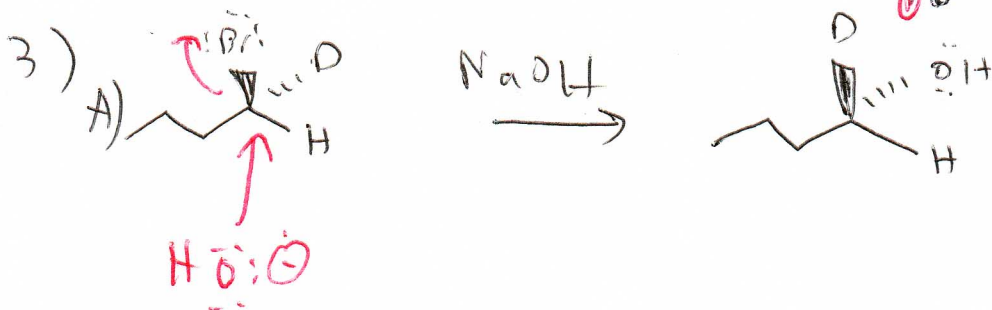
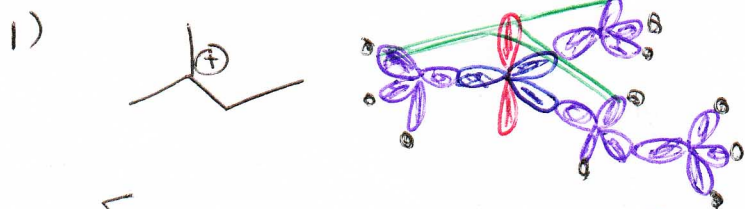
not a good answer since multiple products would form.

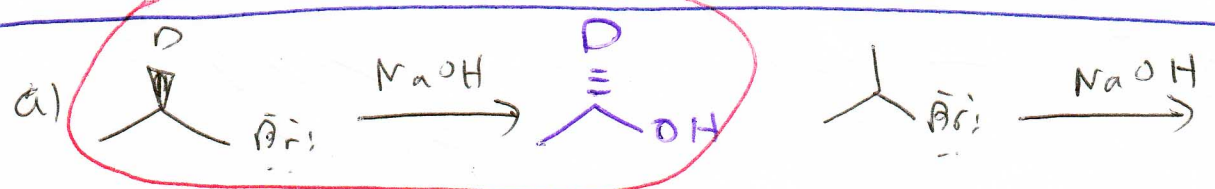
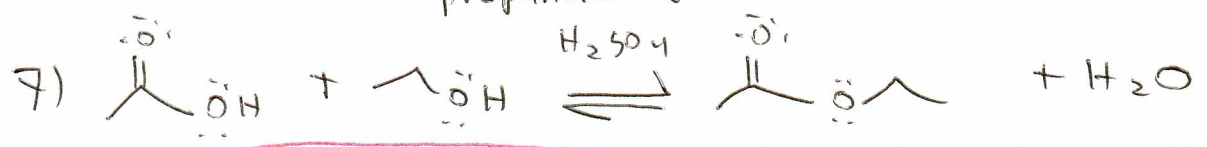
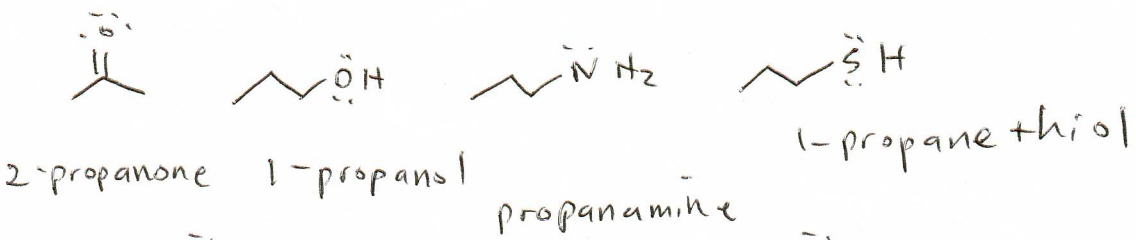
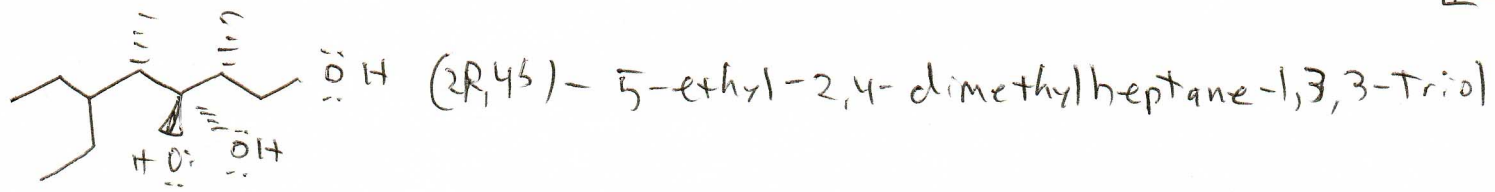


trans ✓
 Antiperiplanar geometry
 (is possible)

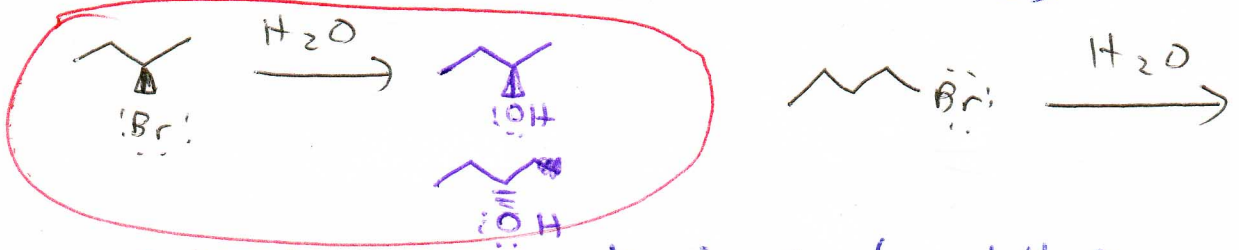
↓
 cis

Antiperiplanar geometry
 is not possible

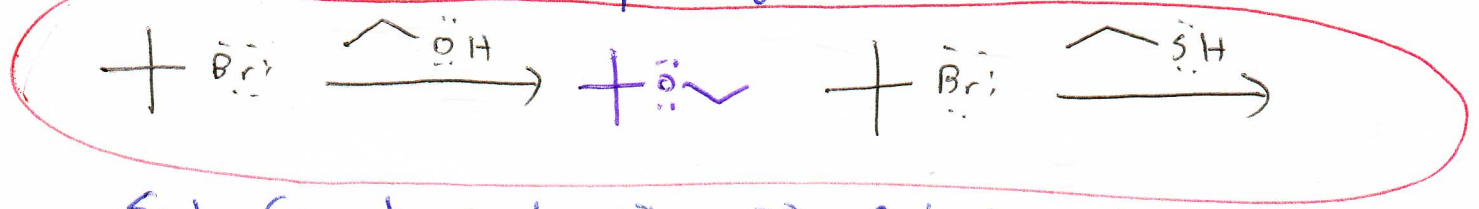




SN2 (1° + 2°; strong, basic nucleophile)
 1° > 2° (steric hindrance)



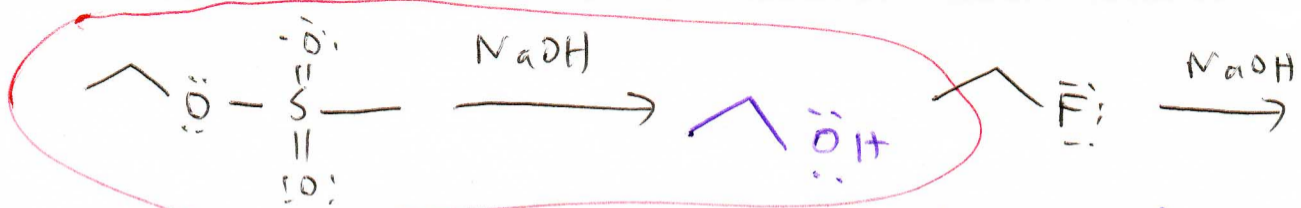
SN1 (weak, non-basic nucleophile)
 2° > 1° (hyperconjugation)



SN1 (weak nucleophile, 3° substrate)
 Same rate (only substrate is in rate law)



SN2 (1°; basic, strong nucleophiles)
 S better nucleophile due to polarizability



S_N2 (1° ; basic, strong nucleophile)

Sulfonates good leaving groups (F^- is basic)