CH 235 SI — Bliss Chang — 10/28/13

Substitution Reactions

- Leaving group + nucleophile
- Leaving group is substituted by the nucleophile

S_N1

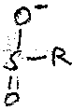
- Leaving group + solvent are KEY → Polar, protic, unreactive Lewis Bases
- Carbocation intermediate (2 step mechanism)
- Racemic product
- Reactivity: 3° > 2° = Benzylic = Allylic > 1° > Methyl

Rate = k [R-X]

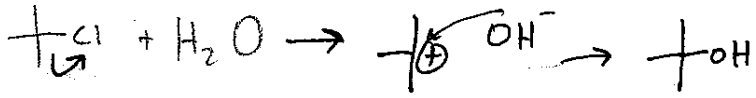
Usually weak nucleophiles

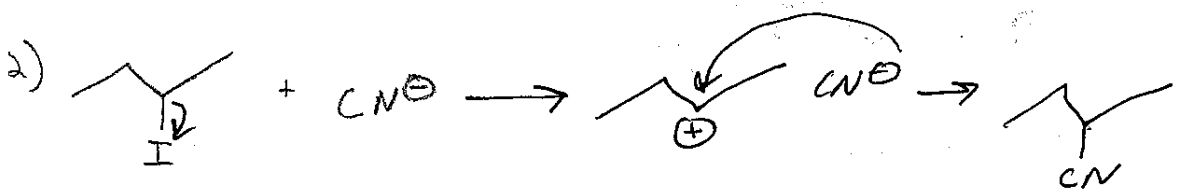
Leaving Groups: Prefers stable, weak anion bases

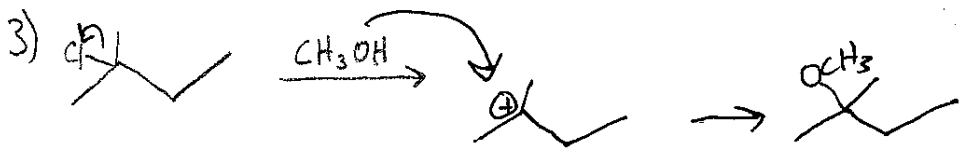
↓

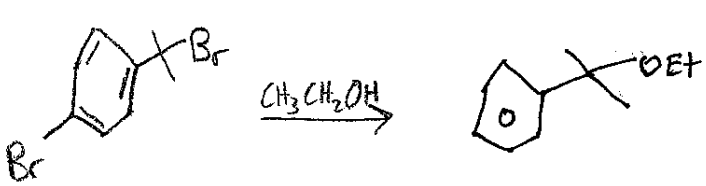
Resonance $TosO^-$ 

Anion size $I^- > Br^- > Cl^-$

1) 

2) 

3) 

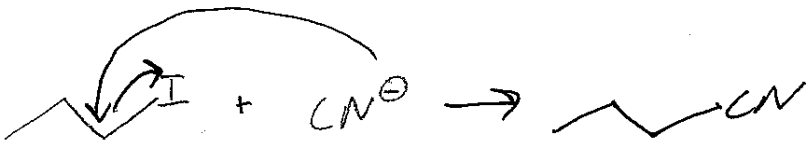
4) 

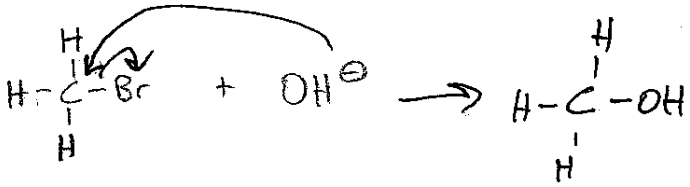
S_N2

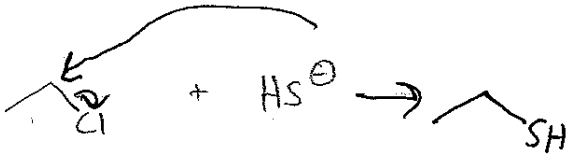
- Rate = k[nucleophile][R-X]
- Inversion of reaction center
- Does NOT like steric hindrance methyl > 1° > 2°
- No carbocation; one step mechanism
- More basic nucleophiles and stronger nucleophiles preferred

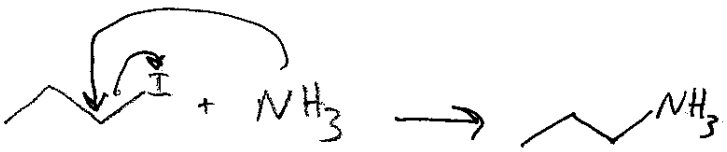
Good leaving groups preferred
- stable, weak base anions

Polar solvents preferred
- avoid solvents w/ H-bonding (aproti

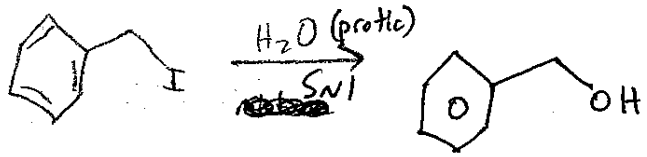
1) 

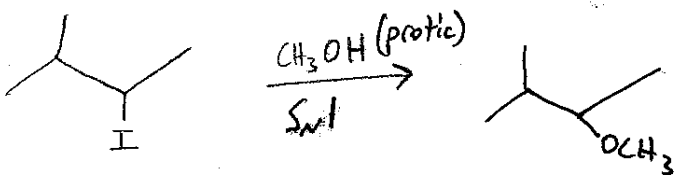
2) 

3) 

4) 

Determine whether each would undergo S_N1 or S_N2 and then determine the product.

1) 

2) 

3)