CHM 227
Exam Three

Order these with respect to nucleophilicity. 1 = most nucleophilic, 4 = least nucleophilic.

NH_3 CH_3O^- H_2O I^-

Order these with respect to leaving group. 1 = best, 4 = worst.

R-Cl R-I R-OTs R-OH

Give a complete description of the S_N2 reaction Include **all** relevant details. Draw a representation of the transition state.

Show the structure of the product(s) when (S)-2-bromobutane reacts with;

I^-

$^-C{\equiv}N$

t-butoxide

Indicate the likely mechanism(s) that the following reactions will follow. Draw the structure of the product(s)

OH^- + $CH_3CH_2CH_2Cl$

OH^- + $CH_3CH(CH_3)CH_2Cl$

OH^- + 2-chloro-2-methylbutane

CH_3OH + $CH_3CH(CH_3)CH_2Cl$ $\xrightarrow[\text{heat}]{}$

CH_3OH + 2-chloro-2-methylbutane $\xrightarrow[\text{heat}]{}$

Show how this compound might be synthesized using alkyl halides with 3 carbons or less, and any other reagents having three carbons or less. You do not need to show structures or mechanisms, just a list of reagents for each step.

$CH_3CH_2CH_2C{\equiv}N$