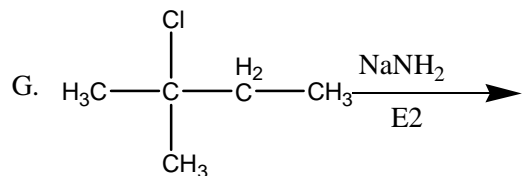
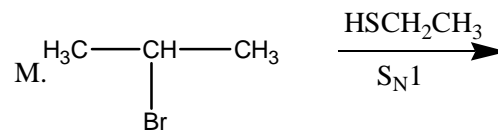
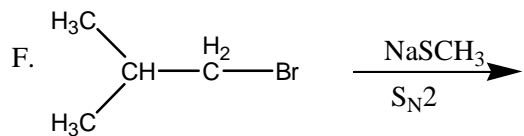
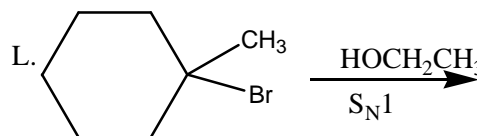
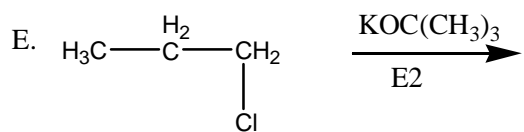
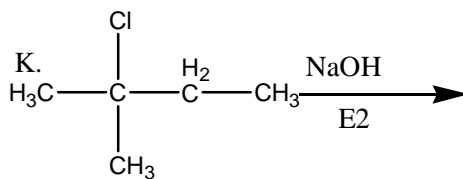
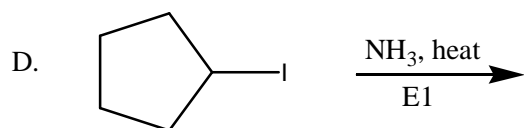
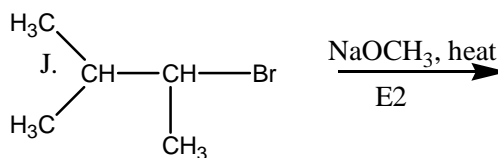
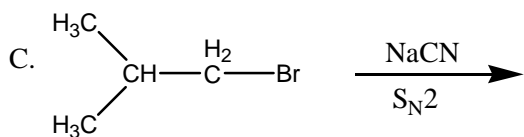
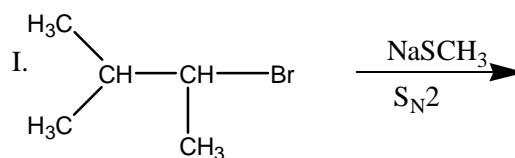
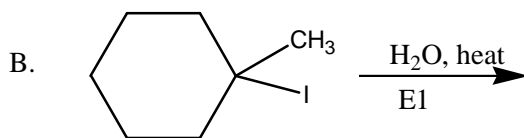
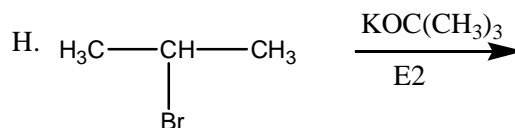
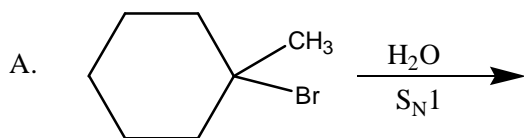
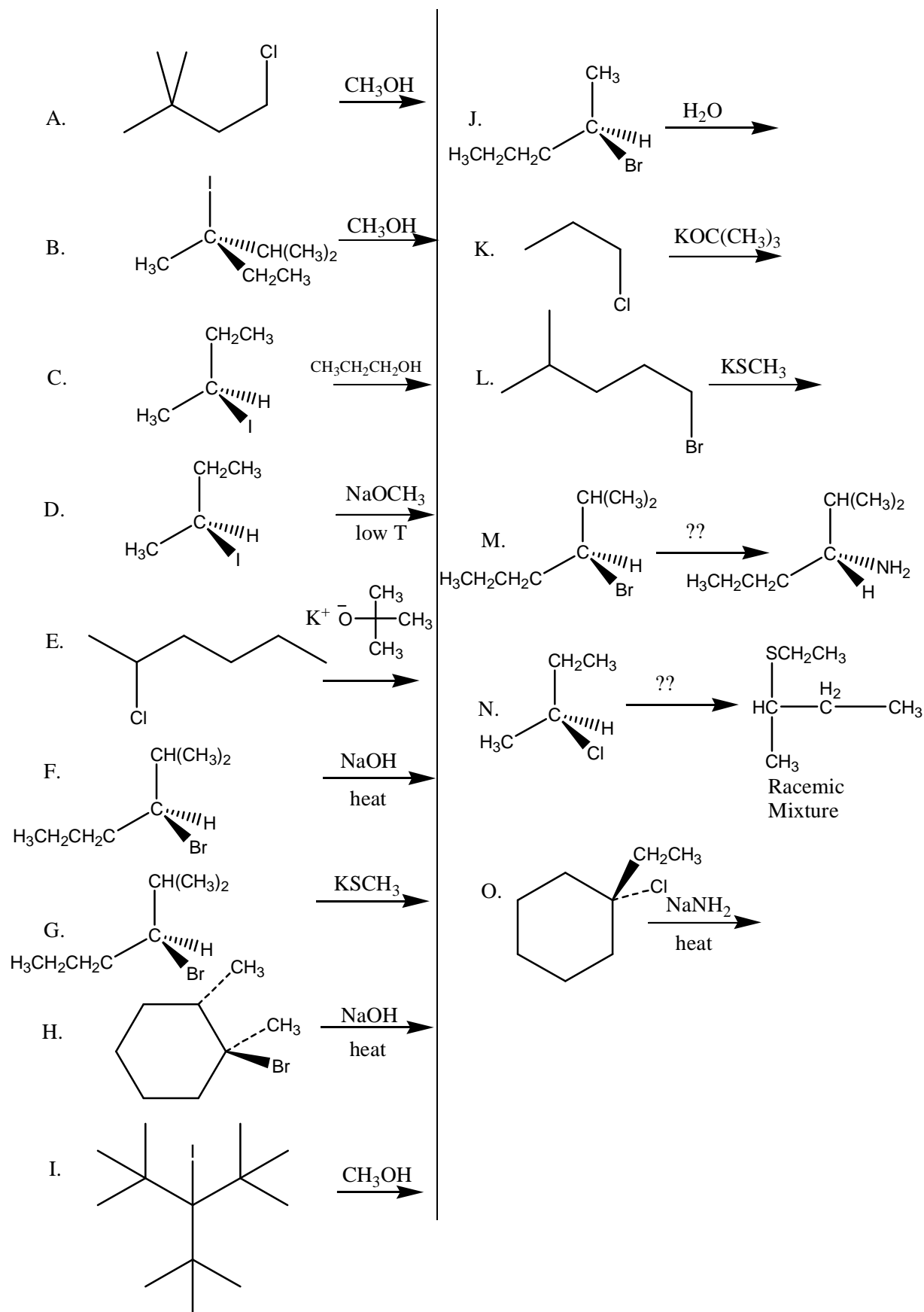


Chem 231: Problem Set #6 (on Chapter 6)

1. Given the mechanisms by which the following reactions occur: 1) give at least two reasons for why the reaction proceeds by the specified mechanism (e.g. class of alkyl halide, strong/weak nucleophile or strong/weak base present), 2) predict the correct products and then, 3) show the step-by-step mechanism as to how reactant becomes product.



2. Give the major organic product or the necessary reagent(s) for each reaction. Show stereochemistry where appropriate.



3. Specify how each of the following affects the rate of an S_N1 reaction. Does it increase, decrease, or have no effect on the rate of an S_N1 reaction?
- increase in concentration of nucleophile
 - decrease in nucleophile strength
 - decrease in concentration of alkyl halide
 - increase in strength of halide as a leaving group
 - increase in polarity of solvent
 - change in alkyl halide from 3 $^\circ$ to 1 $^\circ$?
4. Specify how each of the following affects the rate of an S_N2 reaction. Does it increase, decrease, or have no effect on the rate of an S_N2 reaction?
- increase in concentration of nucleophile
 - decrease in nucleophile strength
 - decrease in concentration of alkyl halide
 - increase in strength of halide as a leaving group
 - increase in polarity of solvent
 - change in alkyl halide from 3 $^\circ$ to 1 $^\circ$?
5. Circle which of the following will proceed faster by an S_N2 reaction mechanism.
- $(CH_3)_2CH-I$ vs. $CH_3CH_2CH_2-I$
 - $CH_3CH_2CH_2CH_2-Cl$ vs. $(CH_3)_2CHCH_2-Cl$
 - $(CH_3)_2CH-I + NaSCH_3$ vs. $(CH_3)_2CH-I + HSCH_3$
 - $(CH_3)_2CH-I + NaSCH_3$ vs. $(CH_3)_2CH-I + NaOCH_3$
 - $CH_3CH_2CH_2-Br + \text{high conc. } F^-$ vs. $CH_3CH_2CH_2-Br + \text{low conc. } F^-$

6. Circle which of the following will proceed faster by an S_N1 reaction mechanism.
- A. $(CH_3)_3C-Br$ vs. $(CH_3)_3CCH_2-Br$
- B. chlorocyclopentane + low conc. OH^- ? vs. chlorocyclopentane + high conc. of OH^- ?
- C. iodocyclohexane + NH_2^- ? vs. iodocyclohexane + NH_3
- D. $(CH_3)_2CH-I + HSCH_3$
(polar protic solvent) vs. $(CH_3)_2CH-I + HSCH_3$
(CCl_4 solvent: a non-polar aprotic solvent)
7. Specify how each of the following affects the rate of an $E1$ reaction. Does it increase, decrease, or have no effect on the rate of an $E1$ reaction?
- A. increase in concentration of base
- B. increase in base strength
- C. increase in concentration of alkyl halide
- D. decrease in strength of halide as a leaving group
- E. change in alkyl halide from 1 $^\circ$ to 3 $^\circ$?
8. Specify how each of the following affects the rate of an $E2$ reaction. Does it increase, decrease, or have no effect on the rate of an $E2$ reaction?
- A. decrease in concentration of base
- B. decrease in base strength
- C. decrease in concentration of alkyl halide
- D. increase in strength of halide as a leaving group
- E. change in alkyl halide from 3 $^\circ$ to 1 $^\circ$?
9. Circle which of the following pairs will give a higher yield of elimination product over substitution product.
- A. $(CH_3)_2CH-I + NaOH$ vs. $CH_3CH_2CH_2-I + NaOH$
- B. $(CH_3)_2CH-I + KOC(CH_3)_3$ vs. $(CH_3)_2CH-I + KOCH_3$
- C. $(CH_3)_3C-Br + NaSCH_3$ vs. $(CH_3)_2CH-Br + NaSCH_3$
- D. $(CH_3)_2CH-I + NaCN$ vs. $(CH_3)_2CH-I + NaCN$
low temperature high temperature.