Chem 233: Problem Set #8 (on Chapter 8)

1. 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° to 3°

2. 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° to 1°

3. Circle which of the following pairs will give a higher yield of elimination product over substitution product.

A. (CH₃)₂CH-I + NaNH₂ vs. (CH₃)₂CH-I + NaCN
   pKₐ(NH₃)=36 vs. pKₐ(HCN)=9.1
B. (CH₃)₂CH-I + NaOH vs. CH₃CH₂CH₂-I + NaOH
C. CH₃CH₂CH₂CH₂-Cl + KOCH₃ vs. (CH₃)₂CHCH₂-Cl + KOCH₃
D. (CH₃)₂CH-I + KOC(CH₃)₃ vs. (CH₃)₂CH-I + KOCH₃
E. (CH₃)₃C-Br + NaSCH₃ vs. (CH₃)₂CH-Br + NaSCH₃
F. (CH₃)₂CH-I + NaCN
   low temperature vs. (CH₃)₂CH-I + NaCN
   high temperature
4. For the following reactions: predict major product(s) and specify the mechanism ($S_N2$, $S_N1$, E1, or E2) by which the reaction occurs. Show stereochemistry where applicable.
O.  $\text{KCCCH}_3$ ether

P.  $\text{Br}_2$ heat

Q.  $\text{Br}_2$ heat

R.  $\text{Br}_2$ heat

S.  $\text{KOH}$ heat

T.  $\text{KOH}$ heat

U.  $\text{H}_2\text{O}$ heat

V.  ??

W.  ??
5. Place the following alkenes in order of stability.

6. Are cis/trans isomers possible for each of the following? If so, draw and label both isomers.

A. 2,3-dichloro-2-butene
B. 2,3-dichloro-1-butene
C. 1-pentene
D. 2-pentene