

## $S_N1$ & $S_N2$ Practice

Chapter 11 – Reactions of Alkyl Halides

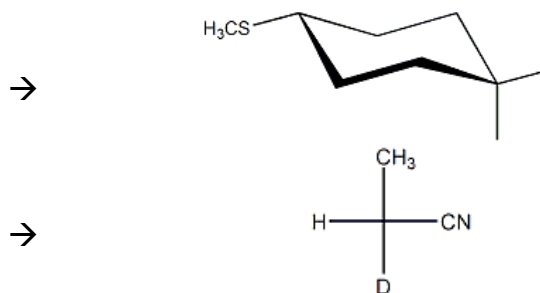
1. Considering the three constitutional isomers: 1-bromo-3-methylbutane, 2-bromo-3-methylbutane, and 2-bromo-2-methylbutane, please answer the following questions:

a. Choose the isomer that will be most reactive in an  $S_N2$  reaction and illustrate its  $S_N2$  mechanism when it reacts with sodium methoxide. Show the transition state.

b. Choose the isomer that will be most reactive in an  $S_N1$  reaction and illustrate its  $S_N1$  mechanism when it reacts with warm ethanol.

c. Select the only isomer that could be prepared in an optically active form and show the  $S_N2$  reaction (with stereochemistry) of the (R) enantiomer of that isomer with the azide anion ( $N_3^-$ ).

2. Show an appropriate substrate for each of the following reactions. Indicate the substrate with stereochemistry if appropriate, the nucleophile, and the solvent.



3. 2-bromo-1,1-dimethylcyclopentane is heated to form a carbocation intermediate. Show the six final products formed when this carbocation is treated with water. (Remember, a carbocation intermediate has the possibility for...what?)

4. Show the organic product(s) of the following substitution reactions. State whether it is an  $S_N1$  or an  $S_N2$  reaction if applicable. If there is no substitution reaction, please state so.

