Organic Chemistry
Mrs. Meer

Name:		#
Date:	Period	

$S_N 1 \& S_N 2$ 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.
 - a. 3-methyl-1-butanol + PBr₃ \rightarrow
 - b. 1-bromo-3-methylbutane + trimethylamine ($(CH_3)_3N$) in water \rightarrow
 - c. bromocyclopentane + Mg then water \rightarrow
 - d. (S)-3-bromo-3-methyloctane + CH₃COONa →

$$H_2O$$
 Δ

- e.
- f. (S)-4-iodo-2,2-dimethylpentane + NaOH \rightarrow (show mechanism)

g. (S)-3-bromo-cyclopentene + warm methanol \rightarrow (show mechanism)