S_N2 Reactions of Alkyl Halides

1. Which alkyl bromide reacted fastest with sodium iodide in acetone: 1-bromobutane, 2-bromobutane or 2-bromo-2-methylpropane?

Which alkyl bromide reacted slowest?

Explain how the structure of the alkyl halide affects the rate of an S_N2 reaction.

2. Which alkyl bromide reacted faster with sodium iodide in acetone: 1-bromobutane or 1-bromo-2,2-dimethylpropane (neopentyl bromide)?

Both of these are primary halides. Why was there a difference in reactivity?

3. Which halide reacted faster with sodium iodide in acetone: 1-bromobutane or 1-chlorobutane?

Explain how the nature of the leaving group affects the rate of an S_N2 reaction. Would 1-iodobutane react faster or slower than the other halides?

How would we know that the reaction took place? Explain.

4. Write balanced equations and draw the mechanism for all substitution reactions that took place between the alkyl halidesand NaI. Propose intermediates or transition states for each reaction.