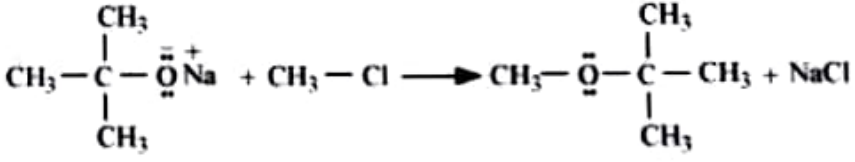
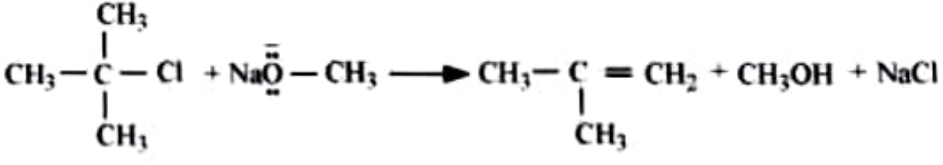
Illustrate with examples the limitations of Williamson synthesis for the preparation of certain types of ethers.

Answer

The reaction of Williamson synthesis involves S_N2 attack of an alkoxide ion on a primary alkyl halide.



But if secondary or tertiary alkyl halides are taken in place of primary alkyl halides, then elimination would compete over substitution. As a result, alkenes would be produced. This is because alkoxides are nucleophiles as well as strong bases. Hence, they react with alkyl halides, which results in an elimination reaction.



Tertiary alkyl halide

Alkene