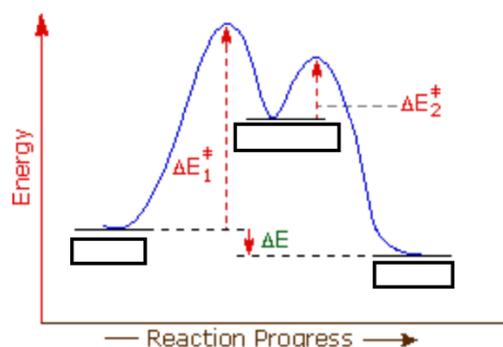


Label the S_N1 energy diagram.



An S_N1 (nucleophilic substitution, first order) reaction is a type of organic reaction in which a nucleophile replaces a leaving group on a tetrahedral intermediate, and occurs in two steps: formation of the intermediate, and its subsequent decomposition to form the product. The energy diagram for an S_N1 reaction is typically used to illustrate the relative energy levels of the reactants, transition state, intermediate, and products.

The key features of an S_N1 energy diagram:

1. Reactants: The reactants are typically represented as an alkyl halide ($R-X$) and a nucleophile ($Nu:$). They are on the left side of the diagram, and they have the lowest energy level.
2. Transition state: The transition state is represented as a transition state complex (TS). It's in the middle of the energy diagram and it represents the highest energy level. It is the point at which the nucleophile is about to attack the carbocation intermediate.
3. Intermediate: The intermediate is represented as a carbocation (R^+). It's on the right side of the energy diagram and it is lower in energy than the transition state. It is formed from the alkyl halide after the leaving group (X) leaves.
4. Products: The products are typically represented as an alcohol ($R-OH$) and a halide ion (X^-). They are at the bottom of the energy diagram and they have the lowest energy level.

