1. In what ways does a transition state differ from an intermediate?
2. Show an example of an SN2, SN1, E2, and E1. Identify transition states and intermediates.
3. Show the mechanisms, with all fundamental steps, for the following reactions.

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1. Suggest a mechanism for the following radical reaction. Look up the general mechanism of radical substation reactions for alkanes.



1. Show all steps for the mechanisms for each of the following reactions consistent with the conditions of the reaction.



1. Calculate the enthalpy for the following reaction. Will this reaction be thermodynamically favorable?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SiH4 | + CH3-Cl | → | CH4 | + SiH3Cl |

1. Show derivations of kinetic expression using the steady-state assumption for the following reactions as appropriate.

a.



b.



1. Show derivations of kinetic expressions for the following mechanisms using the steady-state assumption as appropriate.

a.

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b.



1. Show the derivation of the rate expression for the following reaction when k-1 >> k2 and k-1 << k2.



1. Determine the free energy of activation and the rate constant of a reaction when the activation enthalpy is 30 kcal/mol and the activation entropy is 20 cal K-1 mol-1 at 25 C and -50 C.
2. Determine the free energy of activation and rate constant of a reaction when the activation enthalpy is 20 kcal/mol and the activation entropy is -20 cal-1 K mol-1 at 25 C and -50 C.