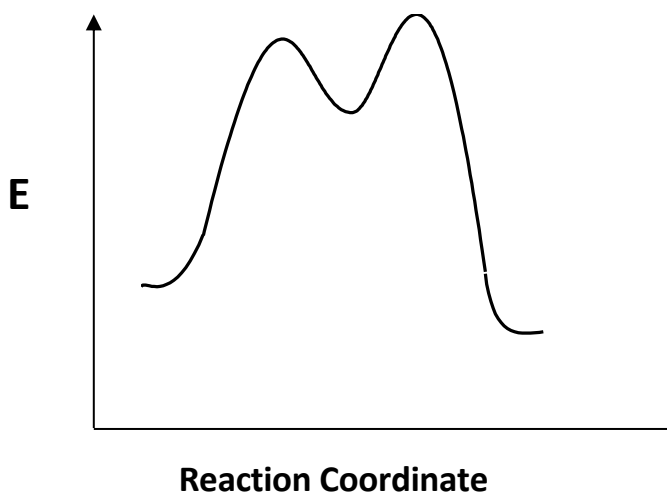


Reaction Energy Diagram Worksheet

Consider the Following diagram



Show the following on the energy-level diagram above:

- The activation energy for each step (E_{a1} and E_{a2})
- The Gibbs free energy for each step (ΔG_1 and ΔG_2)
- The overall free energy ($\Delta G_{\text{overall}}$).
- Where the transition states for each step (TS_1 and TS_2) are.
- Where the reagents, intermediates, and products would appear on the graph.

Answer the following questions about the reaction depicted in the diagram:

- Is the overall reaction spontaneous in the forward direction? Explain.
- Which step is rate-limiting? Explain.
- For the overall reaction, is K_{eq} large (>1) or small (<1)? Explain.