

Marks
6

- The disproportionation of hydrogen peroxide into oxygen and water has an enthalpy of reaction of $-98.2 \text{ kJ mol}^{-1}$ and an activation barrier of 75 kJ mol^{-1} . Iodide ions act as a catalyst for this reaction, with an activation barrier of 56 kJ mol^{-1} . The enzyme, catalase, is also a catalyst for this reaction, and this pathway has an activation barrier of 23 kJ mol^{-1} . Draw a labelled potential energy diagram for this process both without and with each of the catalysts.



Calculate the factor by which the reaction speeds up due to the presence of each of these two catalysts at a temperature of $37 \text{ }^\circ\text{C}$. Assume that the pre-exponential Arrhenius factor remains constant.

