# Worksheet

1 **Define the rate of a chemical reaction and write the formula used to calculate it.**

2 **Describe the role of a catalyst in a chemical reaction and how it influences the activation energy.**

3 **Write down a balanced chemical equation of decomposition of dilute hydrogen peroxide producing water and oxygen gas in the presence of a catalyst.** (Use correct states of matter)

4   List and explain other factors (apart from catalysts) that can affect the rate of a chemical reaction.

5   The schematic energy diagram[1] for the decomposition of H_2O_2 catalysed by MnO_2 is given below. From the information provided, identify whether this is an endothermic or exothermic reaction.

$E_a = 41.3 \pm 3.5 \text{ kJ mol}^{-1}$

$\Delta H = -99.0 \pm 1.9 \text{ kJ mol}^{-1}$

Reaction Coordinate ⟶
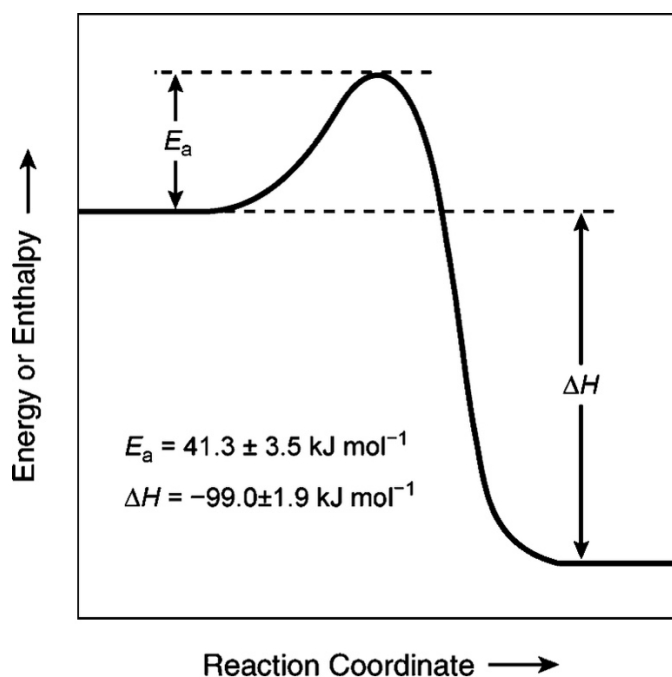
Circle your answer:
Endothermic   /   Exothermic

[1] *J. Chem. Educ.* 2013, 90, 5, 633−636

6 Draw an energy profile diagram[1] for the decomposition of H_2O_2 without the use of a catalyst. (Draw on top of the provided diagram.)

Energy or Enthalpy

E_a

E_a = 41.3 ± 3.5 kJ mol^{-1}

ΔH = −99.0±1.9 kJ mol^{-1}

ΔH

Reaction Coordinate