2025 Ch H1 Q13

Section: Chemical Changes and Structure

Topic: Rates of Reaction

Question summary

From the graph of rate versus temperature, determine the temperature increase required to double the rate of reaction.

Worked solution

The graph shows that as temperature increases, the rate rises exponentially.

To determine the temperature rise that doubles the rate, select two points where the rate doubles.

Example: at 30°C, rate ≈ 0.05 s^-1; at 40°C, rate ≈ 0.10 s^-1.

Therefore, the rate doubles for a 10°C rise in temperature.

Final answer

B. 10°C

Revision tips

- A 10°C rise often doubles the rate of many reactions — this is called the temperature coefficient rule (Q10 ≈ 2).

- Increasing temperature raises both the frequency and energy of molecular collisions.

- In enzyme-catalysed reactions, excessively high temperatures can cause denaturation, reducing reaction rate.