

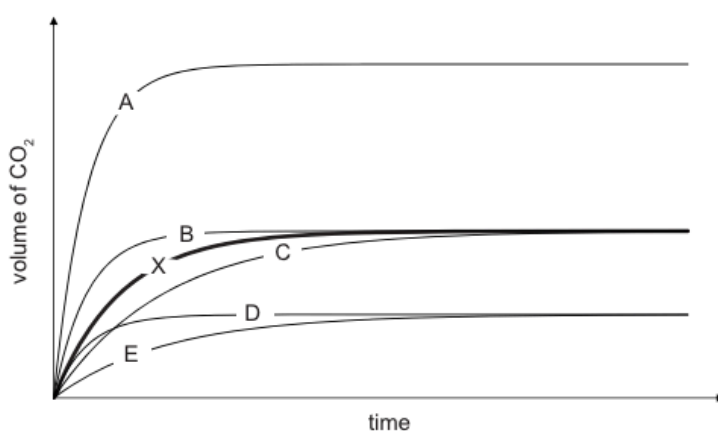
Rates

- 22** Calcium carbonate reacts with hydrochloric acid. The reaction gives off carbon dioxide gas.

Line **X** on the graph shows the volume of carbon dioxide formed against time when 100 cm^3 of 1.0 mol dm^{-3} of hydrochloric acid reacts with calcium carbonate chips at 20°C . There was an excess of calcium carbonate chips.



Which line best represents the volume of carbon dioxide formed against time when the reaction is repeated with 50 cm^3 of 2.0 mol dm^{-3} of hydrochloric acid reacting with excess calcium carbonate chips at 20°C ?



- A** line A
- B** line B
- C** line C
- D** line D
- E** line E

2016

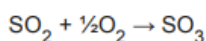
Rates

- 6 Which row in the table correctly explains why an increase in temperature increases the rate of a reaction?

	<i>Effect on activation energy of reaction</i>	<i>Effect on collision frequency between particles</i>	<i>Effect on proportion of collisions which are successful</i>
A	decreases	no effect	increases
B	increases	no effect	no effect
C	no effect	increases	no effect
D	increases	increases	no effect
E	decreases	no effect	no effect
F	no effect	no effect	increases
G	decreases	increases	increases
H	no effect	increases	increases

2014

- 26 The addition of NO as a catalyst to a mixture of SO₂ and O₂ speeds up the following reaction:



The following reactions could be involved in the process.

1. $\text{N}_2 + \text{O}_2 \rightarrow 2\text{NO}$
2. $\frac{1}{2}\text{N}_2 + \text{O}_2 \rightarrow \text{NO}_2$
3. $\text{NO} + \frac{1}{2}\text{O}_2 \rightarrow \text{NO}_2$
4. $\text{NO}_2 \rightarrow \text{NO} + \frac{1}{2}\text{O}_2$
5. $\text{SO}_2 + \text{NO} \rightarrow \text{SO}_3 + \frac{1}{2}\text{N}_2$
6. $\text{SO}_2 + \text{NO}_2 \rightarrow \text{SO}_3 + \text{NO}$

Which one of the following shows the most likely course of the overall reaction?

- A** 3, 1
B 3, 6
C 5, 1
D 3, 2, 4
E 5, 2, 4

2013



Rates

- 22 At room temperature, a reaction is very fast if no bonds are broken while it takes place, and is slow if bonds have to be broken.

- 1 $\text{H}_2 + \text{I}_2 \rightarrow 2\text{HI}$
- 2 $\text{Ag}^+ + \text{Cl}^- \rightarrow \text{AgCl}$
- 3 $\dot{\text{C}}\text{H}_3 + \dot{\text{C}}\text{H}_3 \rightarrow \text{C}_2\text{H}_6$
- 4 $\text{OH}^- + \text{CH}_3\text{Br} \rightarrow \text{CH}_3\text{OH} + \text{Br}^-$

Which of the following are the two fastest reactions?

- A 1 and 2
- B 1 and 3
- C 1 and 4
- D 2 and 3
- E 2 and 4
- F 3 and 4

2009