

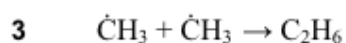
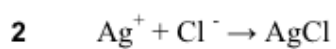
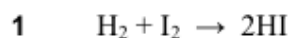
## Rates of Reaction

---

# 2009

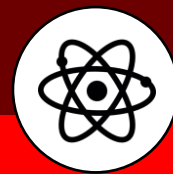
---

- 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.



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



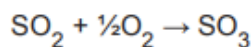
## Rates of Reaction

---

# 2013

---

- 26 The addition of NO as a catalyst to a mixture of SO<sub>2</sub> and O<sub>2</sub> speeds up the following reaction:

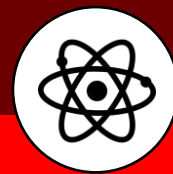


The following reactions could be involved in the process.

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



## Rates of Reaction

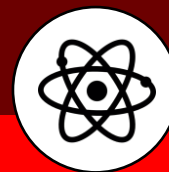
---

 2014
 

---

- 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>
<b>A</b>	decreases	no effect	increases
<b>B</b>	increases	no effect	no effect
<b>C</b>	no effect	increases	no effect
<b>D</b>	increases	increases	no effect
<b>E</b>	decreases	no effect	no effect
<b>F</b>	no effect	no effect	increases
<b>G</b>	decreases	increases	increases
<b>H</b>	no effect	increases	increases

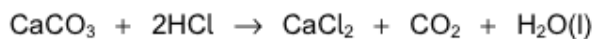


Rates of Reaction

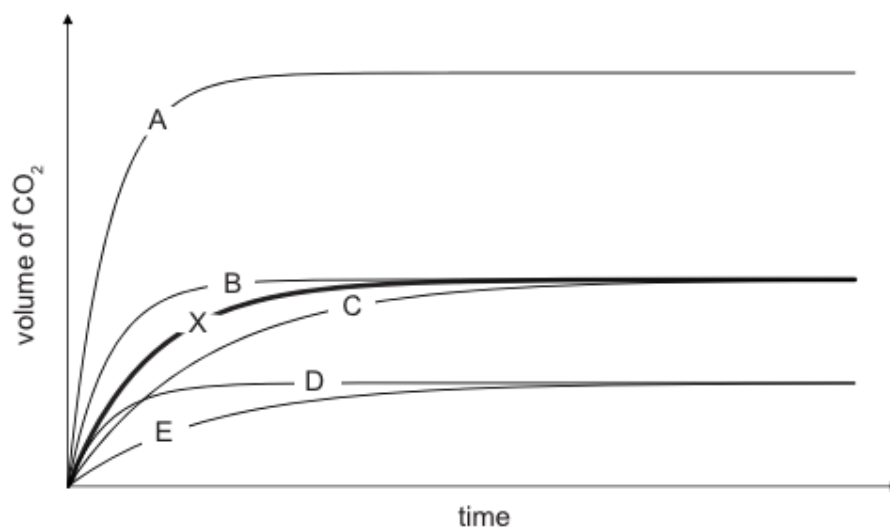
2016

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<sup>3</sup> of 1.0 mol dm<sup>-3</sup> 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<sup>3</sup> of 2.0 mol dm<sup>-3</sup> 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