Self-test Questions

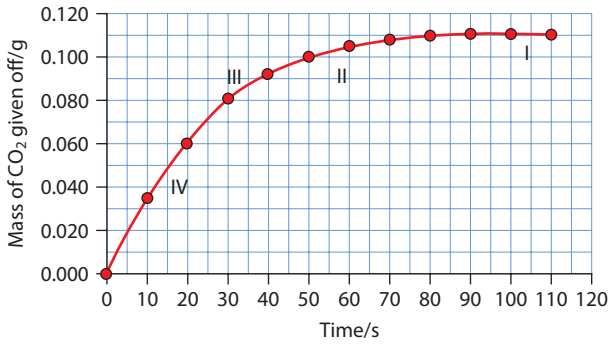
Topic 6 (SL)

1 Which of the following factors will **not** increase the rate of the reaction between calcium carbonate and excess dilute hydrochloric acid?

$CaCO_3(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + H_2O(l) + CO_2(g)$

A increasing the concentration of the HCl(aq)
B increasing the temperature
C increasing the surface area of the $CaCO_3(s)$
D increasing the volume of HCl(aq)

2 In which region of this graph is the rate of reaction fastest?

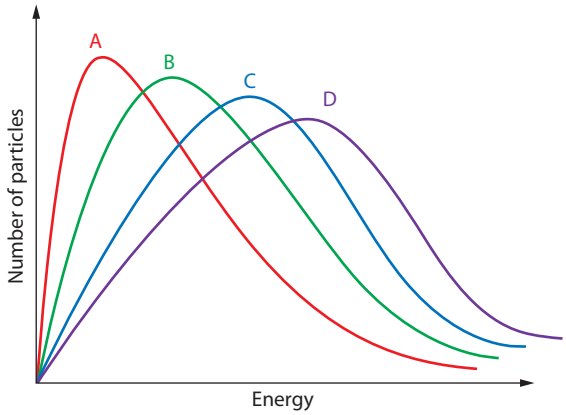


A I
B II
C III
D IV

3 Which of the following is the main reason that increasing the temperature increases the rate of a reaction?

A The activation energy increases.
B More particles have energy greater than the activation energy.
C The particles collide more.
D The collision frequency increases.

4 Which line on the graph shows the Maxwell–Boltzmann distribution at the lowest temperature?



A A
B B
C C
D D

5 Which of the following best describes how a catalyst works?

A It causes an increase in the collision frequency.

B It provides a surface on which the reaction can occur.

C It provides an alternative pathway of lower activation energy.

D It allows molecules to collide in the correct orientation.

6 Which of the following is likely to cause the greatest increase in the rate of reaction?

A Increasing the temperature from 50 °C to 100 °C.

B Doubling the concentration of one of the reactants.

C Doubling the temperature from 200 K to 400 K.

D Doubling the surface area of a solid reactant.

7 Which of the following is true?

A A catalyst is not used up in a chemical reaction.

B All collisions with $E > E_z$ result in reaction.

C E_a for an endothermic reaction is higher than that for an exothermic one.

D The rate of all reactions doubles as the temperature is increased by 10 K.

8 Sodium hydrogencarbonate reacts with dilute hydrochloric acid:

$2NaHCO_3(s) + 2HCl(aq) \rightarrow 2NaCl(aq) + 2H_2O(l) + 2CO_2(g)$

If 80 cm^3 of carbon dioxide were collected in 60 s, what was the average rate of reaction?

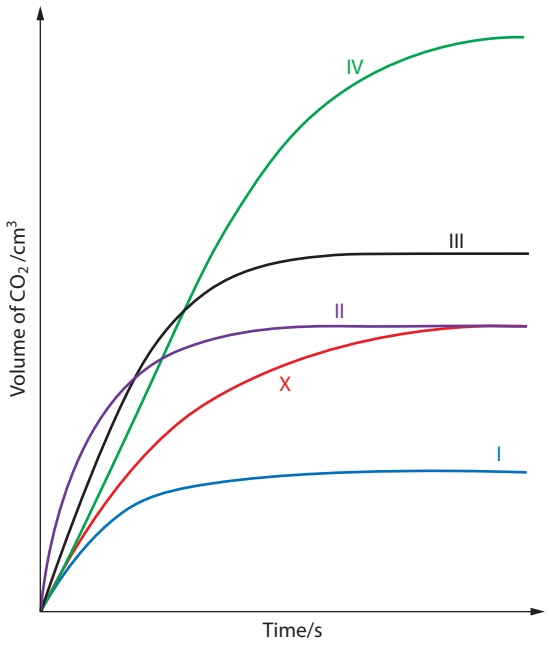
A 0.75 $cm^{-3}\,s^{-1}$

B 2.7 $cm^{-3}\,s^{-1}$

C 1.3 $cm^{-3}\,s^{-1}$

D 0.75 $cm^{-3}\,s^{-1}$

9 On the graph below, the line marked X is for the reaction of 1.0 g powdered $CaCO_3$ with 25 cm^3 of 1.0 mol dm^{-3} HCl at 20 °C. Which line(s) could represent the reaction of 1.0 g powdered $CaCO_3$ with 25 cm^3 of 1.0 mol dm^{-3} HCl at 30 °C?



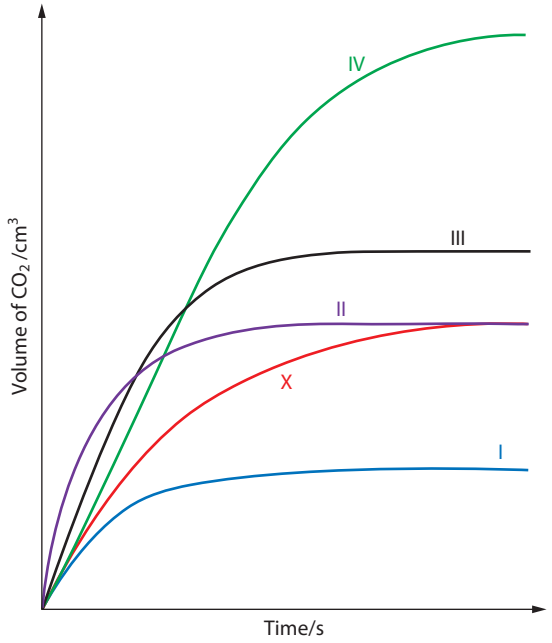
A III and IV only

B II only

C II and III only

D I only

10 On the graph below, the line marked X is for the reaction of 1.0 g powdered $CaCO_3$ with 25 cm^3 of 1.0 mol dm^{-3} HCl at 20 °C. Which line(s) could represent the reaction of 1.0 g powdered $CaCO_3$ with a higher concentration of HCl at the same temperature?



A IV only
B II and III only
C III and IV only
D I only