

Rate (speed) of reaction

Question Paper 2

Level	IGCSE
Subject	Chemistry (0620/0971)
Exam Board	Cambridge International Examinations (CIE)
Topic	Chemical reactions
Sub-Topic	Rate (speed) of reaction
Booklet	Question Paper 2

Time Allowed: 18 minutes

Score: /15

Percentage: /100

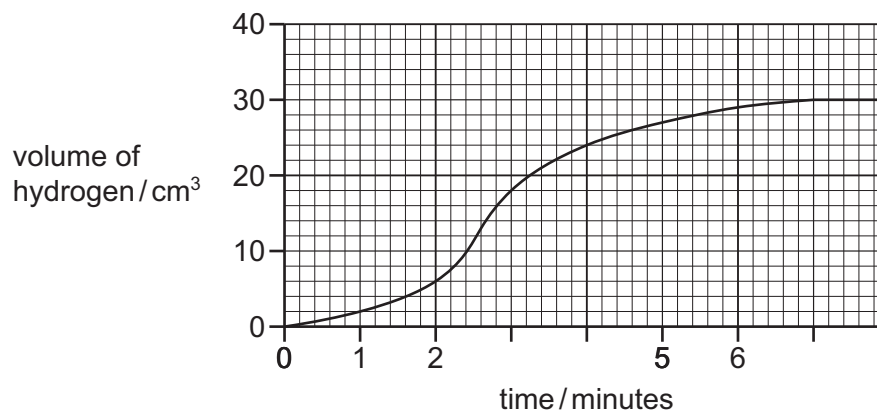
Grade Boundaries:

9	8	7	6	5	4	3	2	1
>85%	75%	68%	60%	53%	48%	40%	33%	<25%

1 Magnesium is reacted with a dilute acid.

The hydrogen gas is collected and its volume measured.

The results are shown on the graph.



Between which times was the reaction fastest?

- A** 0 and 1 minute
- B** 1 and 2 minutes
- C** 2 and 3 minutes
- D** 7 and 8 minutes

2 Which statements explain why increasing temperature increases the rate of a chemical reaction?

- 1 Heat makes the molecules move faster and collide more often.
- 2 Heat makes the molecules collide with more energy so they are more likely to react.
- 3 Increasing temperature lowers the activation energy for the reaction.

- A** 1 and 2 **B** 1 and 3 **C** 1 only **D** 2 only

- 3 Which row describes how the energy of collision between particles changes when concentration and temperature are increased?

	concentration	temperature
A	increases	increases
B	increases	no change
C	no change	increases
D	no change	no change

- 4 Which row explains why increasing temperature increases the rate of reaction?

	particles collide more often	particles collide with more energy
A	✓	✓
B	✓	x
C	x	✓
D	x	x

- 5 Which changes increase the rate of reaction?

- 1 increasing the concentration of the reactants
- 2 increasing the particle size of a solid reactant
- 3 increasing the temperature

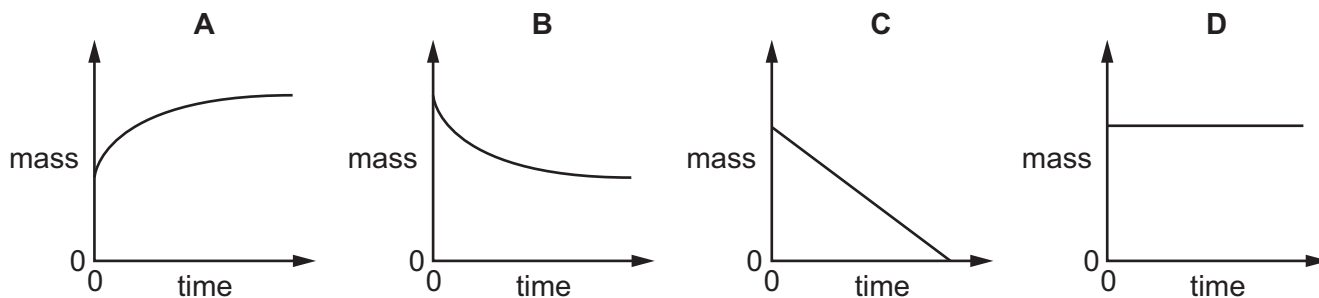
- A** 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

- 6 Which statement about catalysts in chemical reactions is **not** correct?

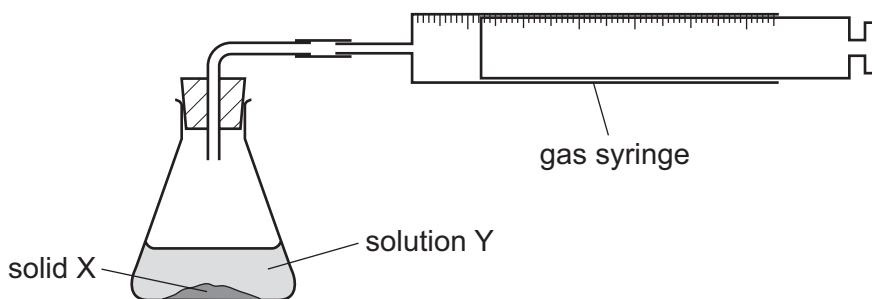
- A** Catalysts are not used up in the reaction.
- B** Catalysts increase the energy of the reacting particles.
- C** Catalysts increase the rate of the reaction.
- D** Catalysts lower the activation energy.

7 The mass of a beaker and its contents is plotted against time.

Which graph represents what happens when sodium carbonate reacts with an excess of dilute hydrochloric acid in an open beaker?



8 An experiment was carried out to find the rate of reaction when 1 g of solid X reacts with 100 cm³ of solution Y.

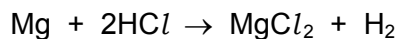


The experiment took place too quickly for measurements to be made.

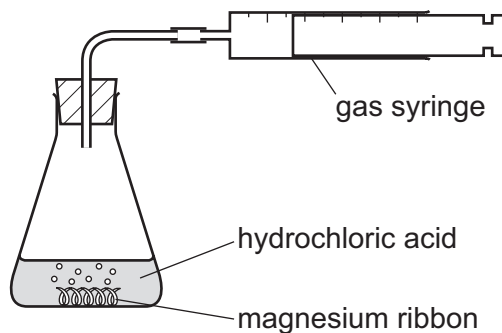
Which change could be made to slow down the reaction?

- A add a catalyst
- B decrease the concentration of solution Y
- C decrease the particle size of solid X
- D increase the temperature

9 The equation for the reaction between magnesium and hydrochloric acid is shown.



The rate of this reaction is studied using the apparatus shown.



Which change increases the rate of reaction?

- A lowering the temperature of the acid
- B using a larger volume of the same hydrochloric acid
- C using less concentrated hydrochloric acid
- D using the same mass of magnesium powder

10 Ethanoic acid reacts slowly with calcium carbonate.

Which statements explain why an increase in temperature increases the rate of the reaction?

- 1 The activation energy of the reaction is decreased.
- 2 There is an increase in collision rate.
- 3 The particles have more energy.
- 4 There will be fewer successful collisions.

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

11 Four statements about the effect of increasing temperature on a reaction are shown.

- 1 The activation energy becomes lower.
- 2 The particles move faster.
- 3 There are more collisions between reacting particles.
- 4 There are more collisions which have energy greater than the activation energy.

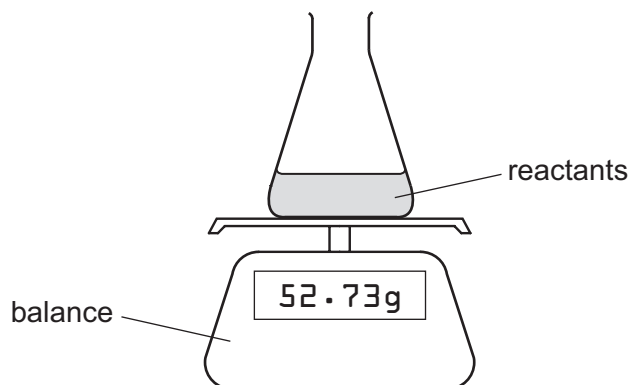
Which statements are correct?

- A** 1, 2 and 3 **B** 1, 3 and 4 **C** 2, 3 and 4 **D** 2 and 3 only

12 Which statement about the effect of concentration and temperature on the rate of a reaction is **not** correct?

- A** If the concentration of a reactant is increased, the rate of reaction increases because more particles have sufficient energy to react.
- B** If the concentration of a reactant is increased, the rate of reaction increases because there are more collisions between particles per second.
- C** If the temperature is increased, the rate of reaction increases because there are more collisions between particles per second.
- D** If the temperature is increased, the rate of reaction increases because more particles have sufficient energy to react.

13 The diagram shows the apparatus used to measure the rate of a chemical reaction.



For which reaction can the rate be measured using this apparatus?

- A** $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$
- B** $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
- C** $\text{Na}_2\text{O} + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\text{O}$
- D** $\text{Na}_2\text{CO}_3 + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$

14 Which reaction is **not** affected by the presence of light?

- A a candle burning
- B methane reacting with chlorine
- C photosynthesis
- D silver bromide decomposing to form silver

15 A student investigates two acids W and X.

The same volumes of W and X are reacted separately with excess magnesium.

The student makes the following observations.

- 1 Hydrogen gas is produced at a faster rate with W than with X.
- 2 The total volume of hydrogen gas produced is the same for both acids.

Which statement explains these observations?

- A The pH of W is higher than the pH of X.
- B W is an organic acid.
- C W is a stronger acid than X.
- D W is more concentrated than X.