



ST ANDREW'S SECONDARY SCHOOL

NAME

CLASS

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DATE

CHEMISTRY



Self-Assessment Topical Test

30 minutes

Speed of Reaction

INSTRUCTIONS

Write your name, class and date on the spaces provided above.

Complete **all** questions on this question paper.

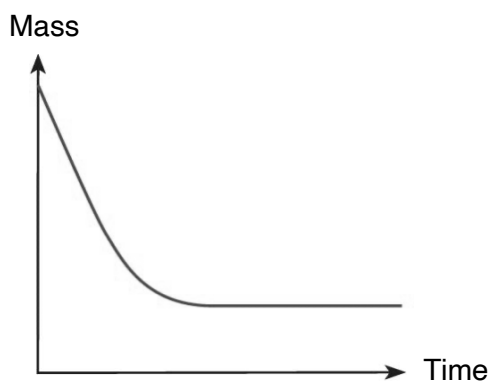
You are reminded to revise this topic first before attempting the questions.

MARKS OBTAINED
25

Multiple-Choice Questions

[10 marks]

- 1 Which of these factors does not affect the speed of a chemical reaction?
A Concentration of reactant **B** Colour of reactant
C Surface area of reactant **D** Temperature of reactant ()
- 2 Which of the following solutions would react the fastest if added to the same amount of magnesium?
A 4 g of acid in 50 cm³ of water
B 10 g of acid in 100 cm³ of water
C 40 g of acid in 250 cm³ of water
D 100 g of acid in 1000 cm³ of water ()
- 3 In which reaction is pressure least likely to affect the reaction?
A $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\text{g})$
B $\text{NaOH}(\text{aq}) + \text{HCl}(\text{aq}) \rightarrow \text{NaCl}(\text{aq}) + \text{H}_2\text{O}(\text{l})$
C $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$
D $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{SO}_3(\text{g})$ ()
- 4 Two reactants were mixed in a beaker and the mass of the beaker and its contents was recorded at regular time intervals. A graph of mass plotted against time is shown below.



Which of the following are possible reactants?

- A** Sodium hydroxide and hydrochloric acid
B Copper(II) sulfate and zinc
C Copper(II) carbonate and hydrochloric acid
D Sodium hydroxide and copper(II) sulfate ()

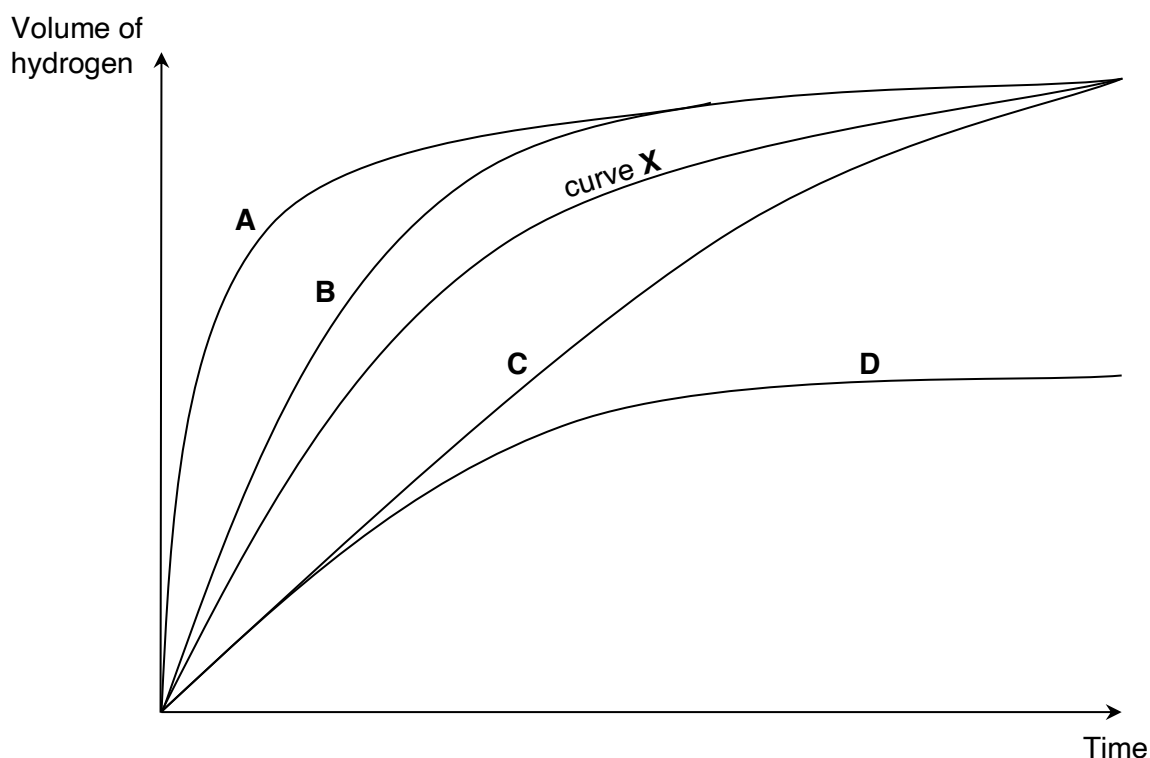
- 5 A teacher wanted to demonstrate a reaction between an acid and a solid reactant, but it was too violent to be safe. Which of these changes would make the reaction safer to demonstrate?

	Acid		Size of solid reactant
	Temperature	Concentration	
A	Lower	Lower	Larger
B	Lower	Lower	Smaller
C	Higher	Higher	Larger
D	Higher	Higher	Smaller

()

Use the following information to answer Questions 6 – 9.

In an experiment, a strip of magnesium ribbon is reacted with excess dilute hydrochloric acid. Curve **X** is obtained when the volume of hydrogen gas given off during the reaction is plotted against time.



Which of the following changes to the experiment would produce graphs, **A**, **B**, **C** or **D**?

- 6 Only half the amount of magnesium is reacted with excess acid. ()
- 7 The acid is diluted to half of its original concentration but is still in excess. ()
- 8 The strip of magnesium ribbon is grounded into powder form and then reacted with the acid. ()
- 9 The strip of magnesium ribbon is grounded into powder form and then reacted with the acid, which has been warmed. ()
- 10 Which of the following properties of a catalyst does not change during a chemical reaction?
- | | |
|-------------------------|-----------------------|
| A Appearance | B Mass |
| C Physical state | D Surface area |
- ()

Structured Questions**[15 marks]**

11 Name four factors that can affect the rate at which a chemical reaction occurs.

[4]

1. _____
2. _____
3. _____
4. _____

12 Some students investigated the effect of particle size of a reactant on the speed of reaction. Samples of quicklime (calcium oxide) of three particle sizes were dissolved in water and the temperature of each reaction mixture was measured at every half-minute for two minutes. The results of the experiments are shown in the table below.

Time/min	Temperature/°C		
	Powdered quicklime	Large lumps of quicklime	Small lumps of quicklime
0	25.0	25.0	25.0
0.5	30.0	26.0	28.0
1.0	43.0	28.0	37.0
1.5	56.0	31.0	46.0
2.0	54.0	30.0	44.0

(a) Explain the results in the table.

[2]

(b) What type of energy change has occurred?

[1]

(c) Write a balanced chemical equation for the reaction between calcium oxide and water.

[1]

13 Consider the reaction between magnesium and dilute hydrochloric acid.

(a) (i) Describe how the speed of this reaction can be determined.

[1]

(ii) Draw a labelled diagram of a suitable experimental set-up.

[2]

(b) (i) Explain, in terms of effective collisions, how an increase in concentration of hydrochloric acid increases the speed of reaction.

[2]

(ii) State two other methods that would increase the speed of this reaction.

[2]

1. _____

2. _____