



ST ANDREW'S SECONDARY SCHOOL

NAME

CLASS

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DATE

CHEMISTRY



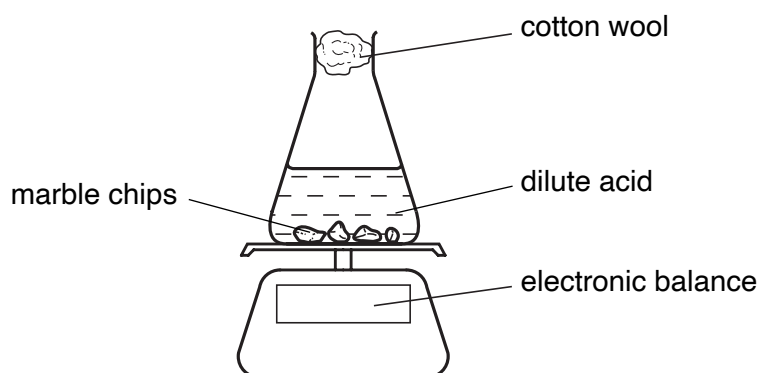
17.1 Measuring Speed of Reaction

Assessment for Learning

SPEED OF REACTION

Use the information provided below to answer questions 1 – 4.

A student investigates the rate of reaction between marble chips and dilute acid using the apparatus shown.



Effervescence was observed during the experiment.

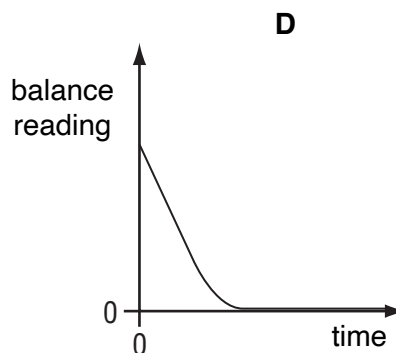
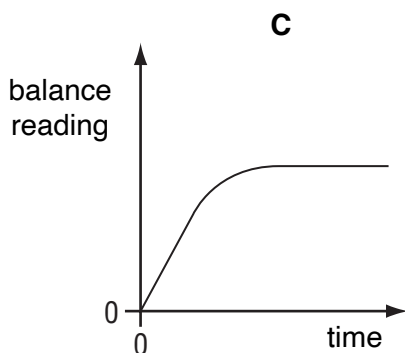
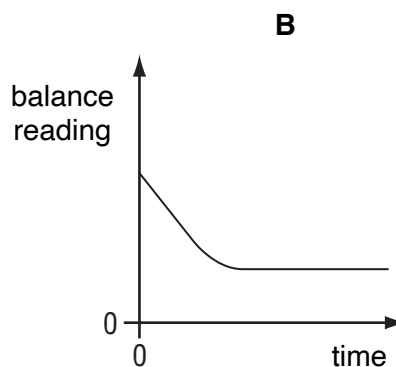
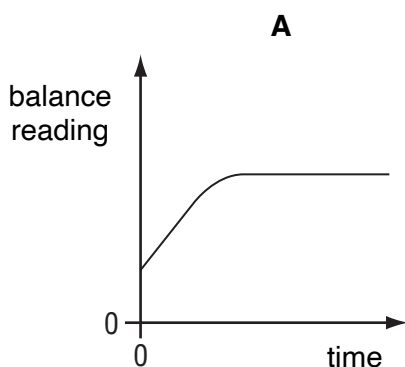
1 What is the chemical formula of the marble chips?

- A CaCO_3
- B CaO
- C MgCO_3
- D MgO

2 Why is cotton wool used in this apparatus?

- A To prevent acid spray leaving the conical flask.
- B To prevent air from entering the conical flask.
- C To prevent any gas formed from escaping the conical flask.
- D To prevent excessive bumping of the conical flask by the vigorous reaction.

3 Which graph shows the results of this experiment?

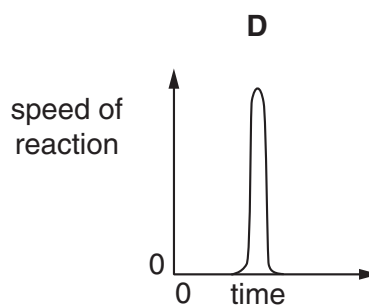
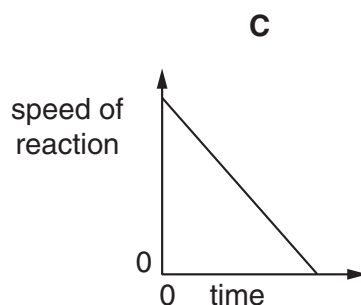
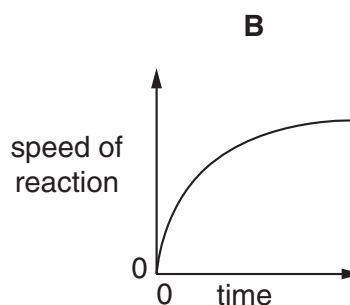
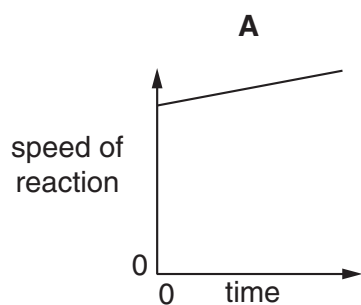


4 The student repeats the experiment using a **different** acid instead. All other variables were kept constant in both experiments. However, no effervescence was observed during this experiment.

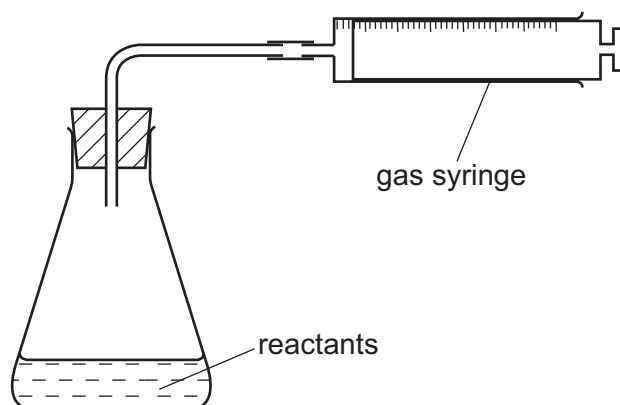
Which acid was used for this experiment?

- A** CH_3COOH
- B** HCl
- C** HNO_3
- D** H_2SO_4

5 Which graph could represent the explosive combustion of methane gas?



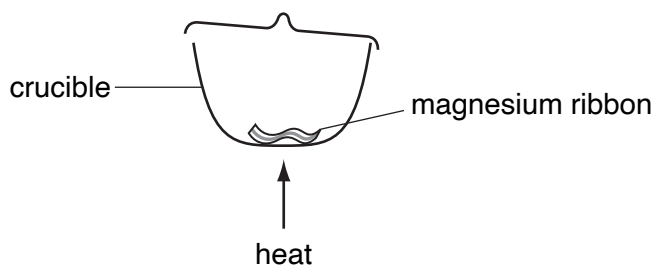
- 6 The apparatus shown is used to measure the speed of a reaction.



Which equation represents the reaction where the speed can be measured using this apparatus?

- A $\text{Mg} + 2 \text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$
- B $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
- C $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$
- D $2 \text{Na} + \text{Br}_2 \rightarrow 2 \text{NaBr}$

- 7 The diagram shows an experiment.

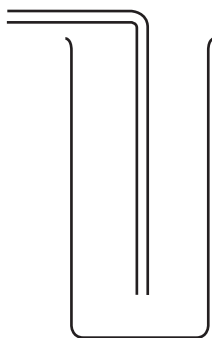


The crucible and contents are weighted before heating and then reweighted when cool.

What happens to the mass of the crucible and contents?

	The mass	because magnesium is
A	decreases	oxidised
B	decreases	reduced
C	Increases	oxidised
D	increases	reduced

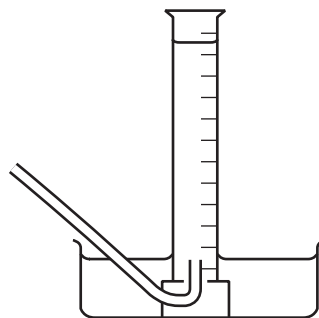
- 8 The diagrams show pieces of apparatus commonly used in experiments to collect gases.



1



2



3

Which apparatus are suitable for use to investigate the rate of reaction between a Group II metal and hydrochloric acid?

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



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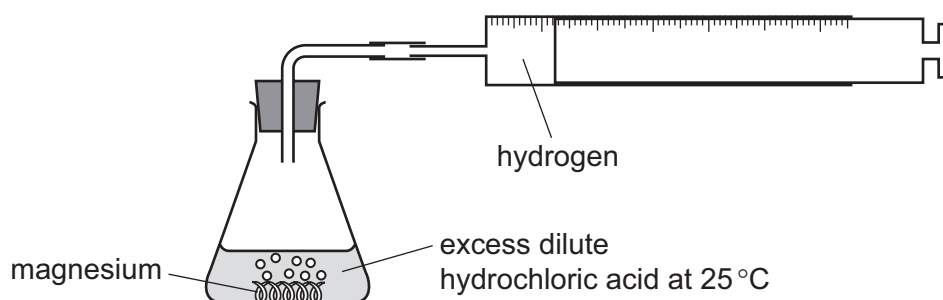


17.2 Factors Affecting Speed of Reaction

Assessment for Learning

SPEED OF REACTION

- 1 The diagram shows a rate of reaction experiment.



Increasing both the concentration of the acid and the temperature will affect the rate of reaction.

Which row is correct?

	Increase the concentration of acid	Increase the temperature
A	Decrease rate of reaction	Decrease rate of reaction
B	Decrease rate of reaction	Increase rate of reaction
C	Increase rate of reaction	Decrease rate of reaction
D	Increase rate of reaction	Increase rate of reaction

- 2 Which change does **not** increase the speed of reaction between zinc and 1.0 mol/dm³ nitric acid?

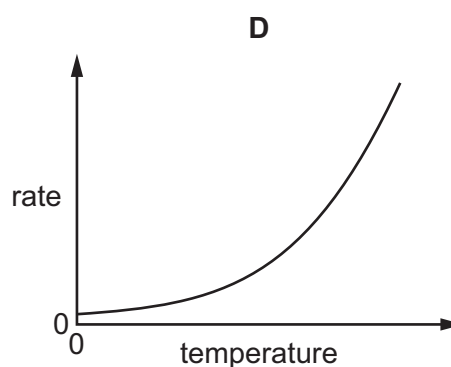
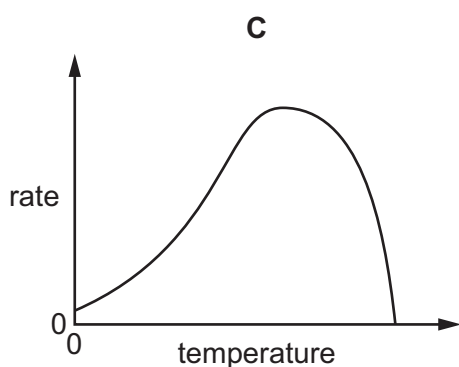
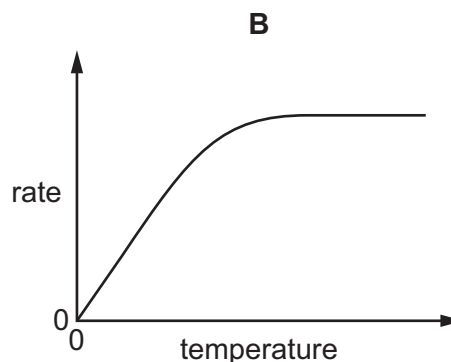
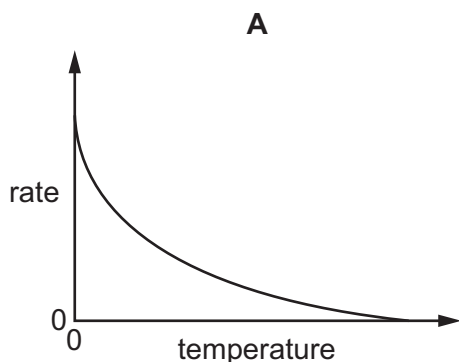
- A** Decreasing the particle size of the zinc used
- B** Decreasing the temperature
- C** Decreasing the volume of the conical flask used
- D** Using 1.5 mol/dm³ nitric acid instead

- 3 Which change decreases the rate of reaction between magnesium and air?

- 1 Heating the magnesium to a higher temperature
- 2 Using a higher proportion of oxygen in the air
- 3 Using magnesium ribbon instead of powdered magnesium

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

- 4 Which graph shows the effect of increasing temperature on the rate of reaction of calcium carbonate with dilute hydrochloric acid?

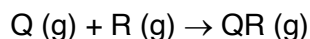


- 5 The speed of reaction between magnesium carbonate and dilute sulfuric acid can be changed by varying certain conditions.

Which conditions would **always** increase the speed of this reaction?

- 1 Increasing the concentration of the reactants
- 2 Increasing the size of the pieces of magnesium carbonate
- 3 Increasing the temperature
- 4 Increasing the volume of sulfuric acid of the same concentration

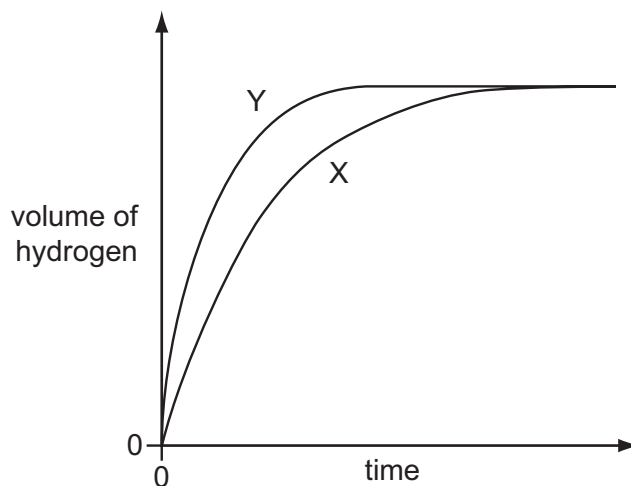
- A** 1, 3 and 4
B 1 and 3 only
C 2 and 3 only
D 3 and 4 only
- 6 Q and R react in a sealed container according to the equation shown.



What can be done to speed up the formation of the product, QR?

- A** Adding argon to the reaction mixture
B Decreasing the volume of the gaseous reactant
C Placing the container in a basin of cold water
D Pressurising the container

- 7 A student investigates the rate of reaction between zinc and excess sulfuric acid. The graph shows the results of two experiments, X and Y.



Which change explains the difference between X and Y?

- A A catalyst is added in Y.
 - B A lower temperature is used in Y.
 - C Larger pieces of zinc are used in Y.
 - D Less concentrated acid is used in Y.
- 8 Manganese(IV) oxide, MnO_2 , decreases the time taken for the decomposition of hydrogen peroxide to oxygen and water.

Which statement is true about MnO_2 ?

- 1 MnO_2 causes the hydrogen peroxide molecules to move faster.
- 2 MnO_2 decreases the activation energy of the reaction.
- 3 MnO_2 remains chemically unchanged after the reaction.
- 4 Mass of MnO_2 remains unchanged after the reaction.

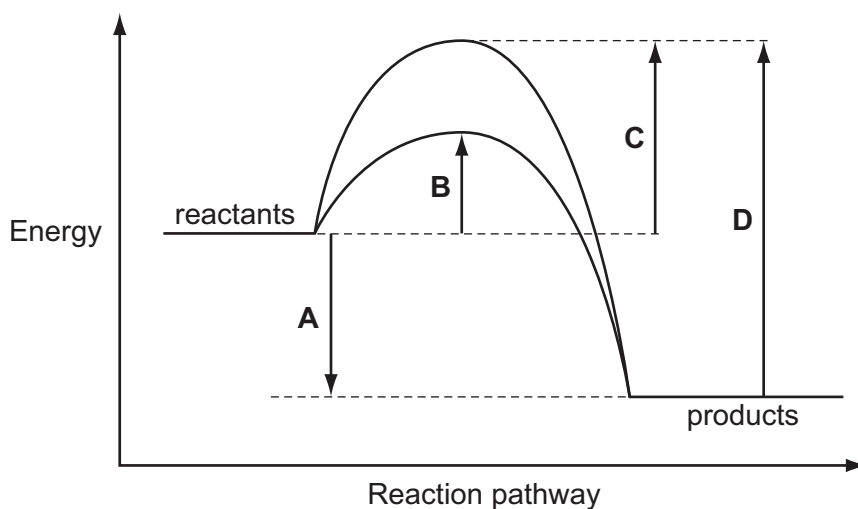
- A 1 and 2 only
- B 1 and 3 only
- C 2, 3 and 4 only
- D 3 and 4 only

- 9 Which element is most likely used as an industrial catalyst?

- A Na
- B Ni
- C Pb
- D Sr

Use the information provided below to answer questions **10 – 12**.

The energy profile diagram below shows the pathways for a chemical reaction with and without the presence of a catalyst.



- 10** Which energy change is the activation energy for the uncatalysed reaction?
- 11** Which energy change is the activation energy for the catalysed reaction?
- 12** Which statements about the catalysed reaction are **false**?
- 1 The catalysed reaction is achieved by lowering the activation energy of the uncatalysed reaction.
 - 2 The catalysed reaction takes a shorter time to complete.
 - 3 The catalyst used increases the speed of reaction by providing an alternative pathway that requires a smaller amount of activation energy.
- A** 1 and 2
- B** 1 only
- C** 2 and 3
- D** 3 only