



IGCSE Chemistry

RATE OF REACTION

0620-MCQ

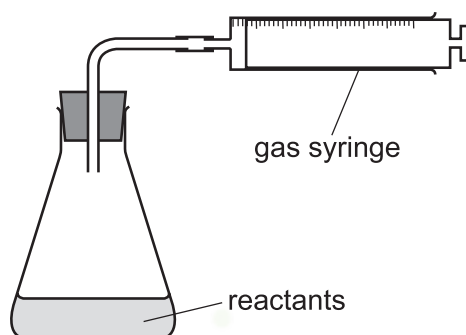
2026 EDITION

Q1

0620/22/F/M/21/Q16

Definition - Easy

16 The apparatus shown is used to measure the rate of a reaction.



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

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

Q2

0620/22/F/M/24/Q14

Definition - Easy

14 Which statement defines the activation energy, E_a , for a reaction?

- A It is the minimum energy that colliding particles must have to react.
- B It is the minimum energy that endothermic reactions take in from their surroundings.
- C It is the maximum energy that exothermic reactions transfer to their surroundings.
- D It is the maximum energy released when the bonds in the products of a reaction form.

Q3

0620/22/M/J/24/Q12

Definition - Hard

12 Three statements about activation energy, E_a , are listed.

- 1 Colliding particles must have at least E_a before they can react.
- 2 E_a for exothermic reactions is always greater than for endothermic reactions.
- 3 E_a is always endothermic.

Which statements are correct?

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



Q4

0620/23/O/N/25/Q18

Factors affecting the rate of reaction - Easy

18 Zinc reacts with dilute hydrochloric acid.

Which statement about the particles in the reaction is correct?

- A Increasing the concentration of dilute hydrochloric acid increases the collision rate but has **no** effect on the activation energy.
- B Increasing the concentration of dilute hydrochloric acid increases the collision rate and the activation energy.
- C Increasing the temperature of the reaction increases the activation energy.
- D Increasing the temperature of the reaction causes all collisions to lead to a reaction.



Q5

0620/22/F/M/25/Q19

Factors affecting the rate of reaction - Hard

19 Which statements explain why increasing the temperature in a reaction involving gases increases the rate of reaction?

- 1 It increases the collision frequency between the gas particles.
- 2 It lowers the activation energy.
- 3 It increases the kinetic energy of the gas particles.
- 4 It increases the number of gas particles per unit volume.

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

Q6

0620/21/M/J/23/Q12

Rate and temperature - Easy

- 12 Which row describes the effect on the activation energy and the frequency of particle collisions when the temperature of a chemical reaction is increased?

	activation energy	frequency of collisions
A	increases	increases
B	no change	increases
C	increases	no change
D	no change	no change

Q7

0620/21/O/N/21/Q13

Rate and temperature - Easy

- 13 Which statements about the effect of increasing the temperature on the rate of a reaction are correct?

- 1 It increases the rate of a reaction.
- 2 It increases the activation energy.
- 3 It increases the frequency of collisions.

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

Q8

0620/21/M/J/21/Q15

Rate and temperature - Hard

15 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 per second.
- 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

Q9

0620/21/M/J/24/Q19

Rate and temperature - Hard

19 Which statements explain why increasing the temperature changes the rate of a chemical reaction?

- 1 It increases the activation energy.
- 2 It increases the frequency of collisions between the reacting particles.
- 3 It increases the kinetic energy of the reacting particles.
- 4 It increases the number of particles per unit volume.

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

Q10

0620/22/O/N/25/Q16

Rate and temperature - Hard

16 Aqueous sodium thiosulfate, $\text{Na}_2\text{S}_2\text{O}_3$, reacts with dilute hydrochloric acid to form a yellow precipitate of sulfur.



The precipitate forms more quickly when the reactants are heated.

Which statements explain this observation?

- 1 The reacting particles collide more frequently.
- 2 The collisions between reacting particles have more energy.
- 3 The activation energy of the reaction is lower.

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

Q11

0620/22/F/M/22/Q19

Rate and concentration - Easy

19 How does increasing the concentration affect the reacting particles in a chemical reaction?

	increases the collision rate	increases the proportion of particles with the activation energy
A	✓	✗
B	✓	✓
C	✗	✗
D	✗	✓

Q12

0620/23/M/J/22/Q14

Rate and concentration - Easy

14 Which statement explains why increasing the concentration of a reactant increases the rate of the reaction?

- A A greater proportion of the particles have the activation energy so there are more successful collisions.
- B Particles have more energy so there are more frequent collisions.
- C There are more particles in the same volume so there are more frequent collisions.
- D The particles move more quickly so there are more frequent collisions.

Q13

0620/22/M/J/22/Q13

Rate and concentration - Hard

13 Which statements explain why increasing the concentration of a reactant increases the rate of reaction?

- 1 It increases the collision rate of particles.
- 2 It lowers the activation energy.
- 3 A greater proportion of the colliding molecules have the required activation energy.
- 4 There are more particles per unit volume.

A 1 and 3

B 1 and 4

C 2 and 3

D 2 and 4

Q14

0620/23/M/J/25/Q15

Rate and concentration - Hard

15 The rate of reaction between magnesium and dilute hydrochloric acid is increased by increasing the concentration of the acid.

How does this affect the reacting particles?

	collision rate of particles	proportion of particles with sufficient energy to react
A	increases	increases
B	increases	stays the same
C	stays the same	increases
D	stays the same	stays the same

Q15

0620/23/M/J/23/Q14

Rate and surface area - Easy

14 Magnesium reacts with hydrochloric acid to form magnesium chloride and hydrogen.

Why does magnesium powder react faster than magnesium ribbon?

- A The magnesium atoms in the powder have a lower activation energy.
- B The powder has a smaller surface area.
- C The magnesium atoms in the powder have more frequent collisions with acid particles.
- D The magnesium atoms in the powder have greater kinetic energy.



Q16

0620/22/F/M/23/Q13

Rate and surface area - Hard

13 Magnesium powder reacts with an excess of dilute hydrochloric acid to produce hydrogen gas.

Which statements about this reaction are correct?

- 1 The smaller the particles of magnesium powder, the more slowly the hydrogen is produced.
- 2 The higher the temperature, the faster the magnesium powder disappears.
- 3 The lower the concentration of dilute hydrochloric acid, the faster the rate of reaction.
- 4 The faster the magnesium powder disappears, the faster the rate of reaction.

A 1 and 2

B 2 and 3

C 2 and 4

D 3 and 4

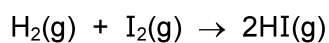


Q17

0620/22/F/M/23/Q15

Rate and pressure - Easy

15 Hydrogen reacts with iodine to form hydrogen iodide.



Which statements explain why the reaction is faster when the pressure is increased, at constant temperature?

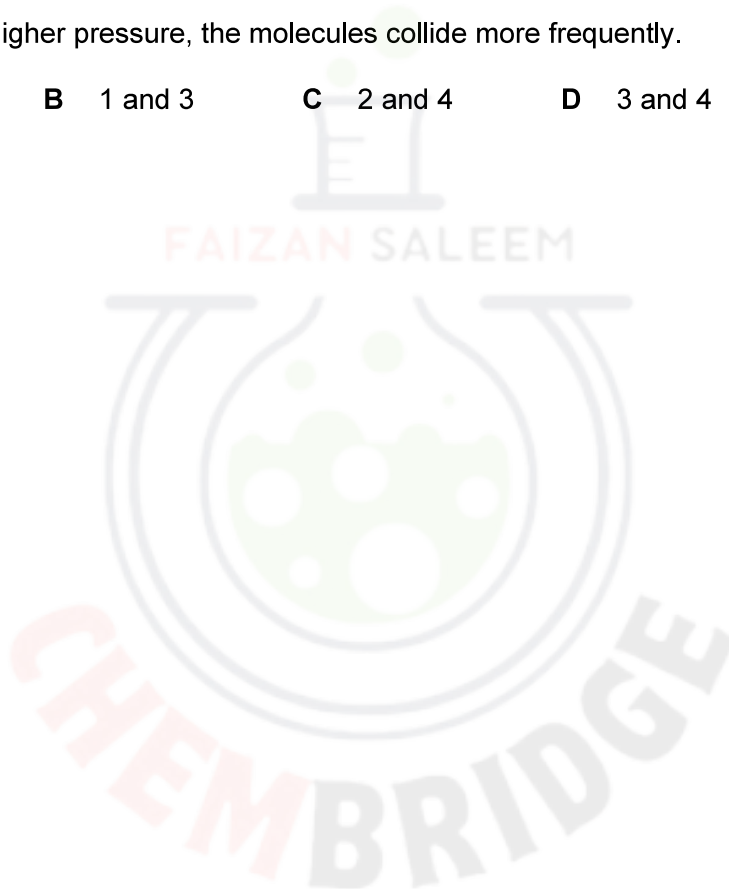
- 1 At higher pressure, the molecules are moving faster.
- 2 At higher pressure, more of the molecules have the required activation energy.
- 3 At higher pressure, the molecules are closer together.
- 4 At higher pressure, the molecules collide more frequently.

A 1 and 2

B 1 and 3

C 2 and 4

D 3 and 4



Q18

0620/11/O/N/18/Q2

Rate and pressure - Hard

- 2 The pressure of a sample of gas is decreased. The temperature is kept constant.

Which row describes the effects on the particles?

	movement of particles	collisions between particles
A	slower	occur less often
B	slower	occur with more force
C	no change in speed	occur less often
D	no change in speed	occur with more force

Q19

0620/22/M/J/23/Q12

Rate and catalyst - Easy

- 12 Which change increases the rate of reaction by decreasing the activation energy, E_a ?
- A addition of a catalyst
 - B decrease in size of solid reactants
 - C increase in concentration of solutions
 - D increase in temperature

Q20

0620/22/M/J/25/Q15

Rate and catalyst - Easy

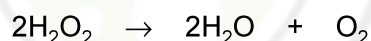
- 15 Which statement describes the effect of adding a catalyst to a chemical reaction?
- A The activation energy, E_a , of the reaction is increased.
 - B The enthalpy change, ΔH , of the reaction stays unchanged.
 - C The frequency of collisions between the particles is decreased.
 - D The kinetic energy of the particles is increased.

Q21

0620/23/M/J/24/Q17

Rate and catalyst - Easy

- 17 The equation for the decomposition of hydrogen peroxide, H_2O_2 , is shown.



In an experiment, the total volume of oxygen produced is 100 cm^3 .

The experiment is repeated using 1.00 g of a solid catalyst. All other conditions remain the same.

Which row describes the total volume of oxygen and the mass of the catalyst at the end of the second experiment?

	total volume of oxygen / cm^3	mass of catalyst /g
A	more than 100	less than 1.00
B	100	less than 1.00
C	100	1.00
D	more than 100	1.00

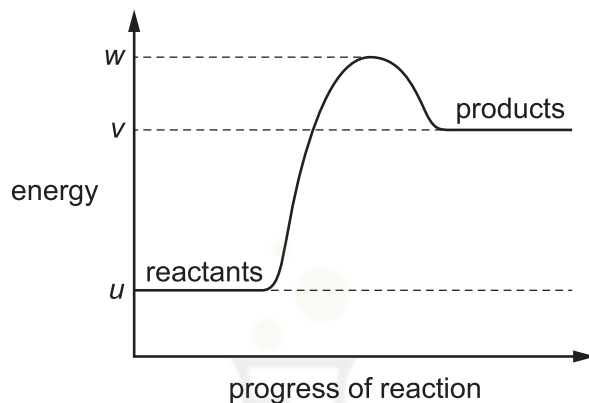
Q22

0620/23/M/J/24/Q14

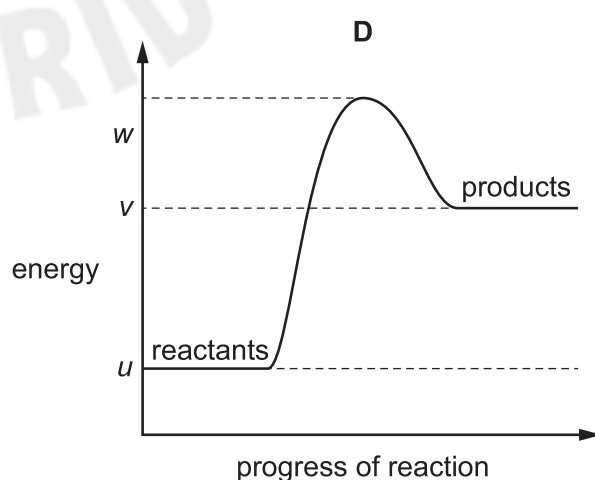
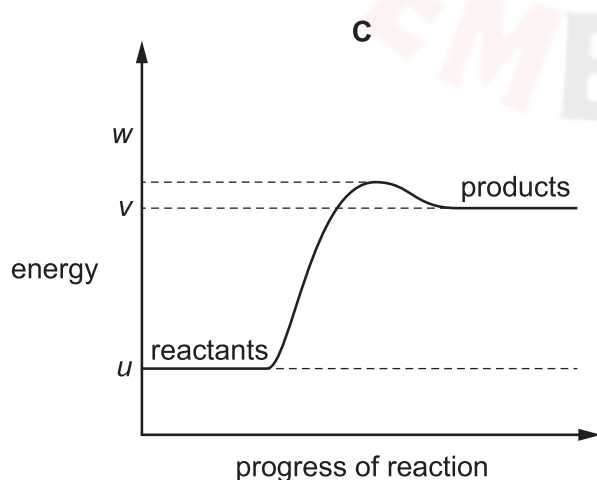
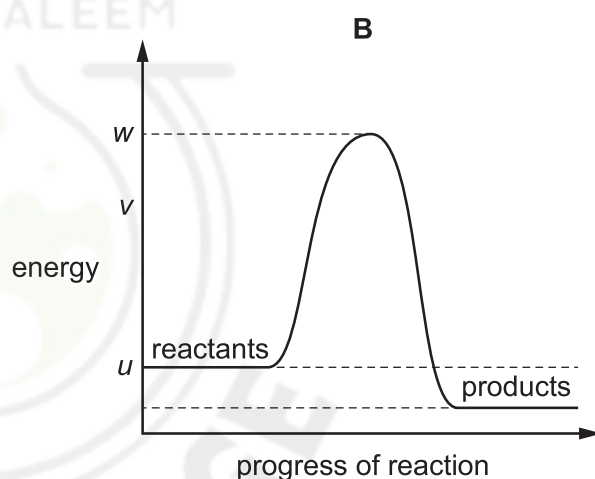
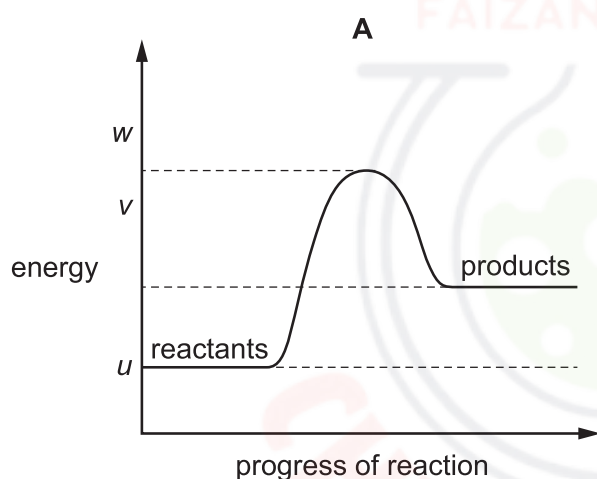
Rate and catalyst - Hard

14 The reaction pathway diagram for an endothermic reaction is shown.

u , v and w are known energy values.



Which diagram shows the reaction pathway diagram when a catalyst is used in the reaction?



Q23

0620/22/F/M/16 /Q16

Rate and catalyst - Hard

15 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.

Q24

0620/21/O/N/25/Q16

Rate and catalyst - Hard

- 16 Hydrogen peroxide solution decomposes very slowly at room temperature to produce oxygen gas. This gas forms a rising foam when liquid detergent is added.

Five test-tubes are half-filled with hydrogen peroxide solution. A drop of liquid detergent is added to each one.

Different metal oxides are added to four of the test-tubes and the height of the foam formed after one minute is measured. The results are shown.

metal oxide	height of foam / cm
no metal oxide added	0.1
aluminium oxide	0.1
calcium oxide	0.2
copper(II) oxide	2.3
manganese(IV) oxide	5.4

Which conclusion can be drawn from these results?

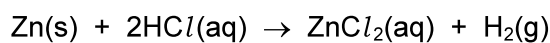
- A Metal oxides do **not** affect the rate of this reaction.
- B All metal oxides increase the rate of this reaction and act as catalysts.
- C Manganese(IV) oxide is the best catalyst of the four metal oxides tested.
- D Only transition element oxides increase the rate of this reaction.

Q25

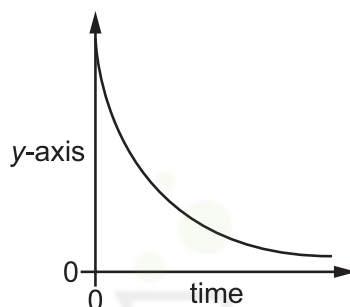
0620/21/O/N/23/Q13

Graph questions - Easy

- 13 An experiment is carried out to find the rate of reaction between hydrochloric acid and zinc.



The results of the experiment are shown.



What is the label on the y-axis?

- A amount of ZnCl_2 produced
- B concentration of HCl
- C mass of Zn reacted
- D volume of H_2 produced

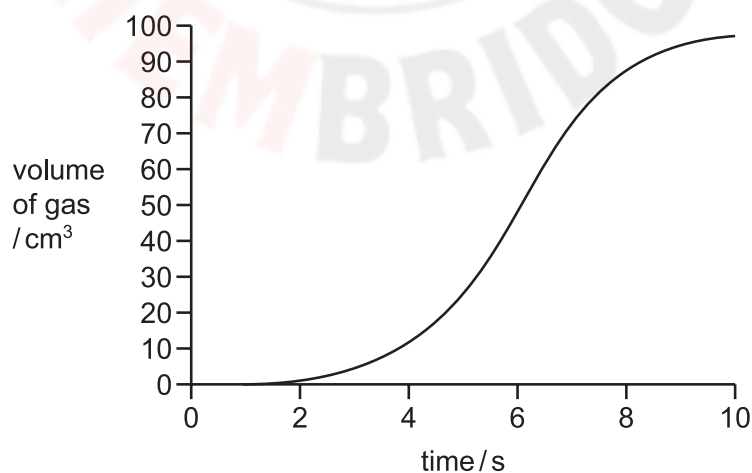
Q26

0620/22/O/N/22/Q15

Graph questions - Easy

- 15 The volume of gas given off in a chemical reaction is measured over time.

The results are shown.



At which time is the rate of reaction greatest?

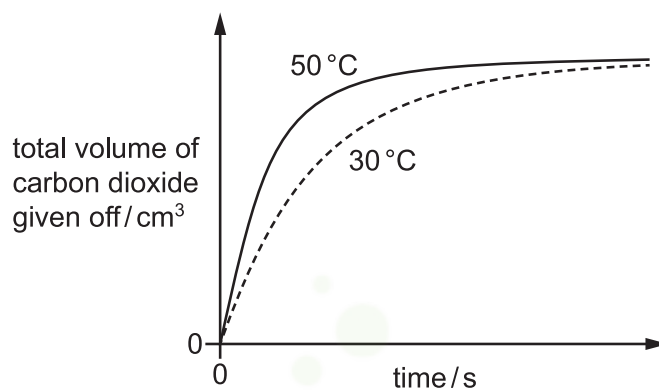
- A 0 s
- B 4 s
- C 6 s
- D 10 s

Q27

0620/21/M/J/25/Q15

Graph questions - Easy

- 15 The graph shows the results of adding excess calcium carbonate to hydrochloric acid at 50 °C and at 30 °C. Only the temperature is changed.



Which row describes the reacting particles at 30 °C compared to those at 50 °C?

	frequency of collisions between particles	average kinetic energy of particles
A	higher	higher
B	higher	lower
C	lower	higher
D	lower	lower

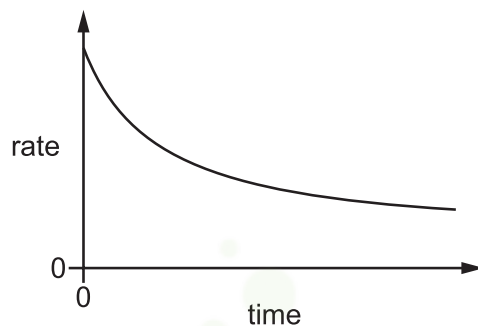
Q28

0620/22/F/M/23/Q14

Graph questions - Hard

14 The reaction between two aqueous compounds, X and Y, is slow and exothermic.

The graph shows how the rate of this reaction changes with time.



A student suggests that the rate of reaction decreases with time because:

- 1 the activation energy decreases
- 2 the speed of the molecules of X and Y decreases
- 3 the concentration of both X and Y decreases with time.

Which suggestions are correct?

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

Q29

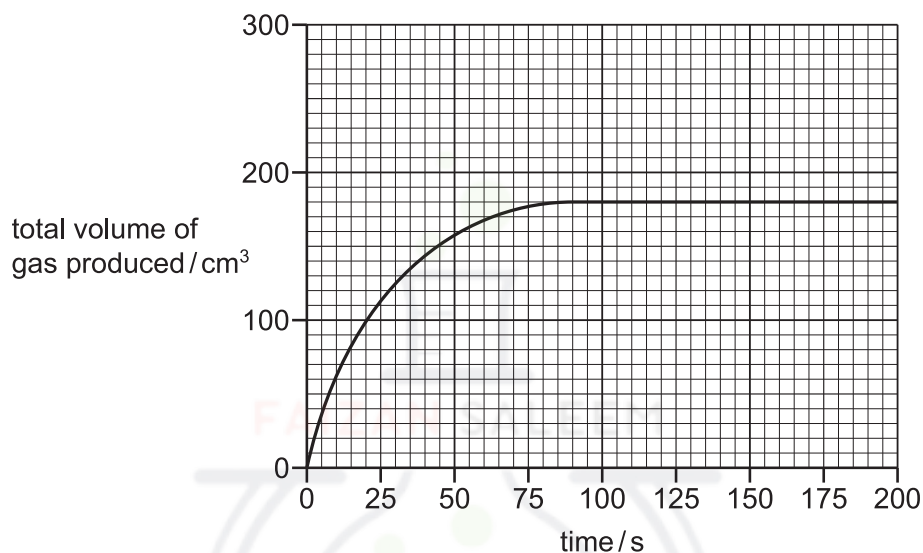
0620/21/M/J/24/Q18

Graph questions - Hard

18 Powdered magnesium carbonate is added to excess dilute hydrochloric acid.

The total volume of gas produced is measured over time.

A graph of the results is shown.



The experiment is repeated but the concentration of the hydrochloric acid is doubled.

All other conditions are kept the same.

Which statements about the second experiment are correct?

- 1 The final volume of gas is 360 cm^3 .
- 2 The reaction finishes before 90 seconds.
- 3 The activation energy of the reaction is lower.

A 1 and 2

B 1 and 3

C 2 and 3

D 2 only

Q30

0620/21/O/N/22/Q14

Graph questions - Hard

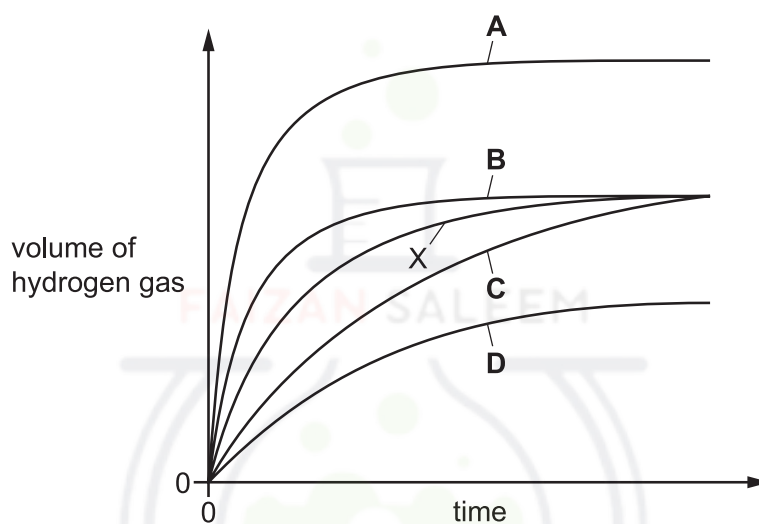
14 A student adds excess zinc to dilute hydrochloric acid at 25 °C.

The hydrogen gas produced is collected and measured at room temperature and pressure.

The results are plotted and labelled as curve X on the graph.

The experiment is repeated at 50 °C with all other conditions remaining the same.

Which graph shows the results at 50 °C?



Q31

0620/23/O/N/22/Q14

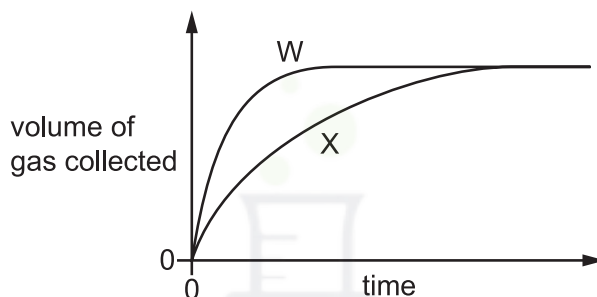
Graph questions - Hard

- 14 Dilute hydrochloric acid is reacted with excess calcium carbonate and the total volume of gas is measured at regular intervals.

The results are shown by line W on the graph.

The experiment is repeated but with one change.

The results of the second experiment are shown by line X on the graph.



Which change is made in the second experiment?

- A A catalyst is added.
- B The calcium carbonate is broken into smaller pieces.
- C The concentration of the dilute hydrochloric acid is increased.
- D The temperature of the dilute hydrochloric acid is decreased.

MARKING SCHEME

Q	Ans	Paper reference
Q1	A	0620/22/F/M/21/Q16
Q2	A	0620/22/F/M/24/Q14
Q3	C	0620/22/M/J/24/Q12
Q4	A	0620/23/O/N/25/Q18
Q5	A	0620/22/F/M/25/Q19
Q6	B	0620/21/M/J/23/Q12
Q7	C	0620/21/O/N/21/Q13
Q8	C	0620/21/M/J/21/Q15
Q9	C	0620/21/M/J/24/Q19
Q10	A	0620/22/O/N/25/Q16
Q11	A	0620/22/F/M/22/Q19
Q12	C	0620/23/M/J/22/Q14
Q13	B	0620/22/M/J/22/Q13
Q14	B	0620/23/M/J/25/Q15
Q15	C	0620/23/M/J/23/Q14
Q16	C	0620/22/F/M/23/Q13
Q17	D	0620/22/F/M/23/Q15
Q18	C	0620/11/O/N/18/Q2
Q19	A	0620/22/M/J/23/Q12
Q20	B	0620/22/M/J/25/Q15
Q21	C	0620/23/M/J/24/Q17
Q22	C	0620/23/M/J/24/Q14
Q23	B	0620/22/F/M/16 /Q15
Q24	C	0620/21/O/N/25/Q16
Q25	B	0620/21/O/N/23/Q13
Q26	C	0620/22/O/N/22/Q15

MARKING SCHEME - CONTINUED

Q	Ans	Paper reference
Q27	D	0620/21/M/J/25/Q15
Q28	D	0620/22/F/M/23/Q14
Q29	D	0620/21/M/J/24/Q18
Q30	B	0620/21/O/N/22/Q14
Q31	D	0620/23/O/N/22/Q14

