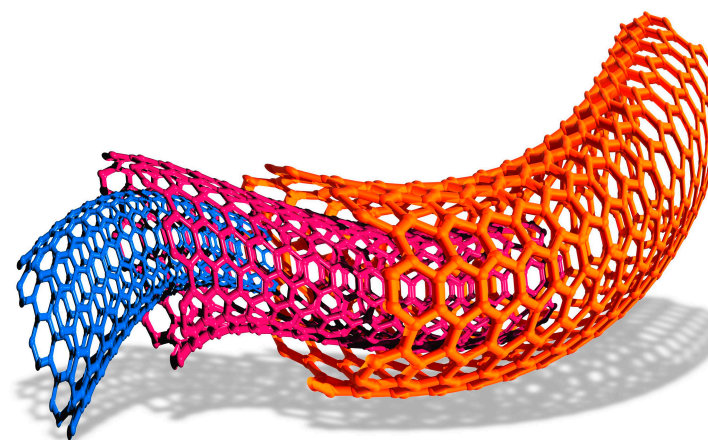


Interactive Example Candidate Responses

Paper 3 (May / June 2016), Question 7

Cambridge IGCSE™
Chemistry 0620



In order to help us develop the highest quality resources, we are undertaking a continuous programme of review; not only to measure the success of our resources but also to highlight areas for improvement and to identify new development needs.

We invite you to complete our survey by visiting the website below. Your comments on the quality and relevance of our resources are very important to us.

www.surveymonkey.co.uk/r/GL6ZNJB

Would you like to become a Cambridge International consultant and help us develop support materials?

Please follow the link below to register your interest.

www.cambridgeinternational.org/cambridge-for/teachers/teacherconsultants/

Copyright © UCLES 2017

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.

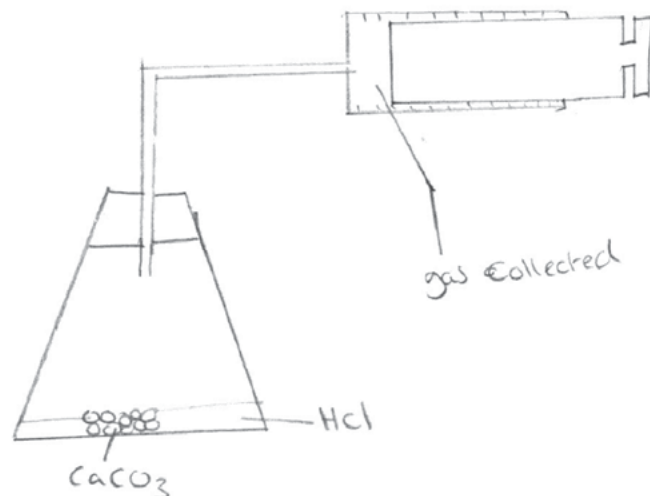
UCLES retains the copyright on all its publications. Registered Centres are permitted to copy material from this booklet for their own internal use. However, we cannot give permission to Centres to photocopy any material that is acknowledged to a third party, even for internal use within a Centre.

7 Calcium carbonate reacts with dilute hydrochloric acid.



A student investigated this reaction by measuring the volume of carbon dioxide released every minute at constant temperature.

(a) Draw a diagram of the apparatus that the student could use to investigate this reaction.



[2]

Select
page

Your
Mark

7(a)

7(b)(i)

7(b)(ii)

7(b)(iii)

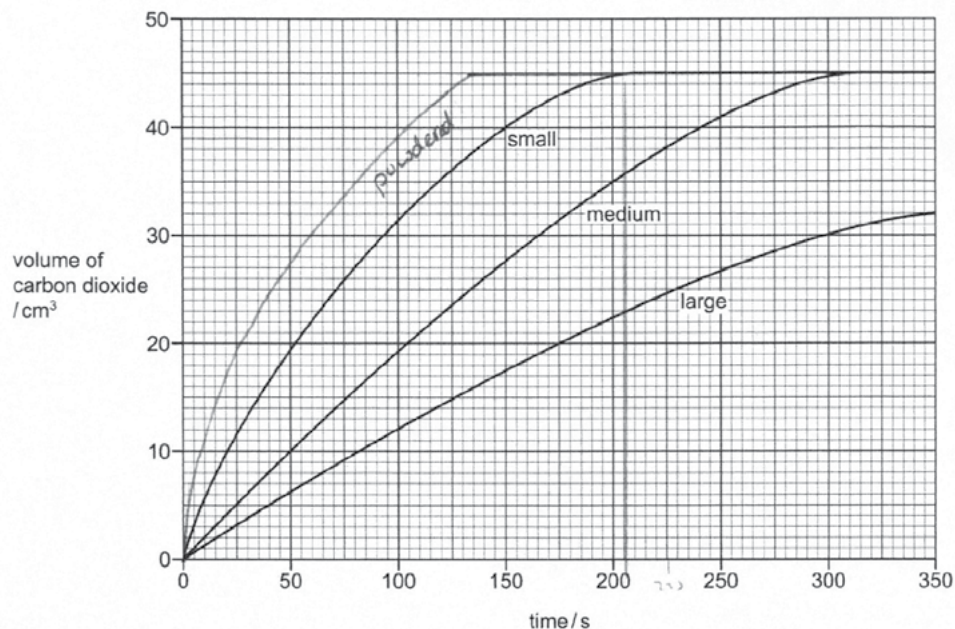
7(c)(i)

7(c)(ii)

Q7 Mark scheme

(a)	(gas) syringe leading to flask/beaker/test tube OR flask and tube leading to upturned measuring cylinder over trough of water; closed apparatus with no air gaps;
(b)(i)	small pieces; line/curve/graph steepest;
(b)(ii)	line to the left of the small pieces starting at (0,0); finishing at 45 cm ³ and before the other lines;
(b)(iii)	Any value between 205 s and 215 s (inclusive);
(c)(i)	Neutralising (acidic) soils/neutralising (acidic) waste/ steelmaking/self-heating cans/making concrete/making glass/water treatment/making plaster/making paper/ flue-gas desulfurisation/neutralising acids/making limewater;
(c)(ii)	basic oxide; because it is a metal oxide/because it would react with acid/neutralises acids/calcium is on the left of the Periodic Table;

- (b) The graph shows the results of this reaction using three samples of calcium carbonate of the same mass: large pieces, medium-sized pieces and small pieces.



- (i) Which sample, large, medium or small pieces, gave the fastest initial rate of reaction?

Use the graph to explain your answer.

Small is the fastest then medium then large, because it is faster because it has a larger surface area. [2]

- (ii) The experiment was repeated using powdered calcium carbonate of the same mass. Draw a line on the grid above to show how the volume of carbon dioxide changes with time for this experiment. [2]

- (iii) At what time was the reaction just complete when small pieces of calcium carbonate were used?

200 205 s [1]

Your
Mark

7(a)

7(b)(i)

7(b)(ii)

7(b)(iii)

7(c)(i)

7(c)(ii)

Q7 Mark scheme

(a)	(gas) syringe leading to flask/beaker/test tube OR flask and tube leading to upturned measuring cylinder over trough of water; closed apparatus with no air gaps;
(b)(i)	small pieces; line/curve/graph steepest;
(b)(ii)	line to the left of the small pieces starting at (0,0); finishing at 45 cm ³ and before the other lines;
(b)(iii)	Any value between 205 s and 215 s (inclusive);
(c)(i)	Neutralising (acidic) soils/neutralising (acidic) waste/ steelmaking/self-heating cans/making concrete/making glass/water treatment/making plaster/making paper/ flue-gas desulfurisation/neutralising acids/making limewater;
(c)(ii)	basic oxide; because it is a metal oxide/because it would react with acid/neutralises acids/calcium is on the left of the Periodic Table;

(c) When calcium carbonate is heated strongly, calcium oxide is formed.

(i) Give **one** use of calcium oxide.

neutralise acidic lakes [1]

(ii) What type of oxide is calcium oxide?

Explain your answer.

Calcium oxide is lime, it is one
type of oxide [2]

[Total: 10]

Your
Mark

7(a)

7(b)(i)

7(b)(ii)

7(b)(iii)

7(c)(i)

7(c)(ii)

Q7 Mark scheme

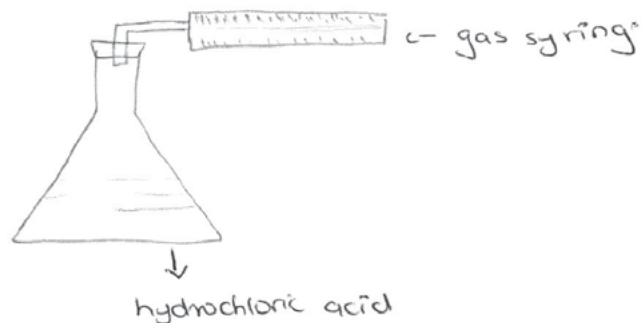
(a)	(gas) syringe leading to flask/beaker/test tube OR flask and tube leading to upturned measuring cylinder over trough of water; closed apparatus with no air gaps;
(b)(i)	small pieces; line/curve/graph steepest;
(b)(ii)	line to the left of the small pieces starting at (0,0); finishing at 45 cm ³ and before the other lines;
(b)(iii)	Any value between 205 s and 215 s (inclusive);
(c)(i)	Neutralising (acidic) soils/neutralising (acidic) waste/ steelmaking/self-heating cans/making concrete/making glass/water treatment/making plaster/making paper/ flue-gas desulfurisation/neutralising acids/making limewater;
(c)(ii)	basic oxide; because it is a metal oxide/because it would react with acid/neutralises acids/calcium is on the left of the Periodic Table;

7 Calcium carbonate reacts with dilute hydrochloric acid.



A student investigated this reaction by measuring the volume of carbon dioxide released every minute at constant temperature.

(a) Draw a diagram of the apparatus that the student could use to investigate this reaction.



[2]

Select
page

Your
Mark

7(a)

7(b)(i)

7(b)(ii)

7(b)(iii)

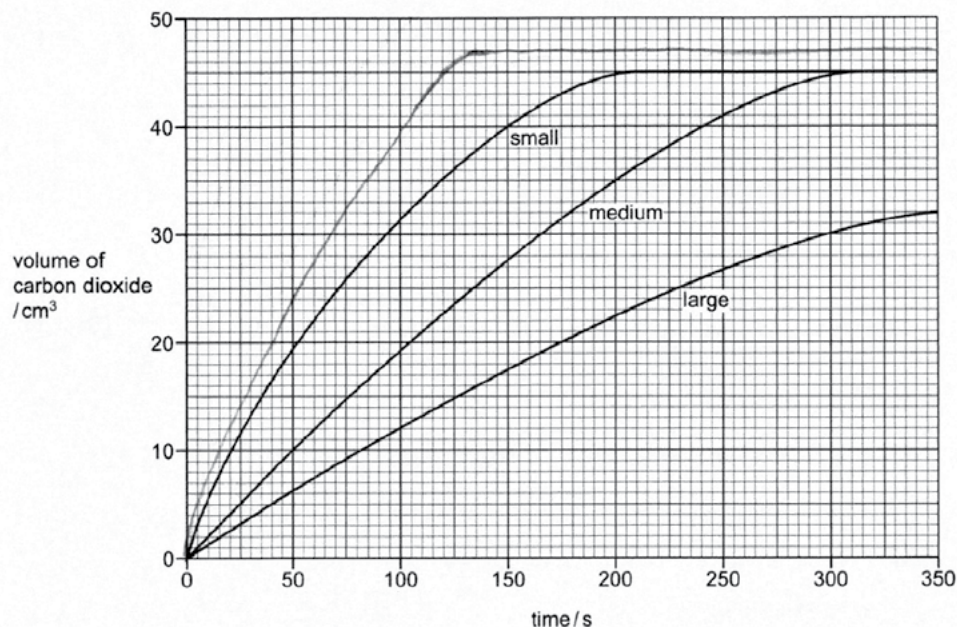
7(c)(i)

7(c)(ii)

Q7 Mark scheme

(a)	(gas) syringe leading to flask/beaker/test tube OR flask and tube leading to upturned measuring cylinder over trough of water; closed apparatus with no air gaps;
(b)(i)	small pieces; line/curve/graph steepest;
(b)(ii)	line to the left of the small pieces starting at (0,0); finishing at 45 cm ³ and before the other lines;
(b)(iii)	Any value between 205 s and 215 s (inclusive);
(c)(i)	Neutralising (acidic) soils/neutralising (acidic) waste/ steelmaking/self-heating cans/making concrete/making glass/water treatment/making plaster/making paper/ flue-gas desulfurisation/neutralising acids/making limewater;
(c)(ii)	basic oxide; because it is a metal oxide/because it would react with acid/neutralises acids/calcium is on the left of the Periodic Table;

- (b) The graph shows the results of this reaction using three samples of calcium carbonate of the same mass: large pieces, medium-sized pieces and small pieces.



- (i) Which sample, large, medium or small pieces, gave the fastest initial rate of reaction?

Use the graph to explain your answer.

Small
- because it becomes constant in 200s ~~other~~ [2]
than the others two

- (ii) The experiment was repeated using powdered calcium carbonate of the same mass. Draw a line on the grid above to show how the volume of carbon dioxide changes with time for this experiment. [2]

- (iii) At what time was the reaction just complete when small pieces of calcium carbonate were used?

200 seconds [1]

Your
Mark

7(a)

7(b)(i)

7(b)(ii)

7(b)(iii)

7(c)(i)

7(c)(ii)

Q7 Mark scheme

(a)	(gas) syringe leading to flask/beaker/test tube OR flask and tube leading to upturned measuring cylinder over trough of water; closed apparatus with no air gaps;
(b)(i)	small pieces; line/curve/graph steepest;
(b)(ii)	line to the left of the small pieces starting at (0,0); finishing at 45 cm ³ and before the other lines;
(b)(iii)	Any value between 205 s and 215 s (inclusive);
(c)(i)	Neutralising (acidic) soils/neutralising (acidic) waste/ steelmaking/self-heating cans/making concrete/making glass/water treatment/making plaster/making paper/ flue-gas desulfurisation/neutralising acids/making limewater;
(c)(ii)	basic oxide; because it is a metal oxide/because it would react with acid/neutralises acids/calcium is on the left of the Periodic Table;

(c) When calcium carbonate is heated strongly, calcium oxide is formed.

(i) Give one use of calcium oxide,

as an ore [1]

(ii) What type of oxide is calcium oxide?

Explain your answer.

basic [2]

[Total: 10]

Select
page

Your
Mark

7(a)

7(b)(i)

7(b)(ii)

7(b)(iii)

7(c)(i)

7(c)(ii)

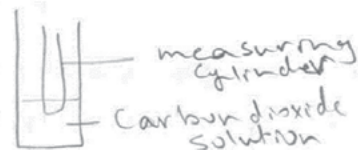
Q7	Mark scheme
(a)	(gas) syringe leading to flask/beaker/test tube OR flask and tube leading to upturned measuring cylinder over trough of water; closed apparatus with no air gaps;
(b)(i)	small pieces; line/curve/graph steepest;
(b)(ii)	line to the left of the small pieces starting at (0,0); finishing at 45 cm ³ and before the other lines;
(b)(iii)	Any value between 205 s and 215 s (inclusive);
(c)(i)	Neutralising (acidic) soils/neutralising (acidic) waste/ steelmaking/self-heating cans/making concrete/making glass/water treatment/making plaster/making paper/ flue-gas desulfurisation/neutralising acids/making limewater;
(c)(ii)	basic oxide; because it is a metal oxide/because it would react with acid/neutralises acids/calcium is on the left of the Periodic Table;

7 Calcium carbonate reacts with dilute hydrochloric acid.



A student investigated this reaction by measuring the volume of carbon dioxide released every minute at constant temperature.

(a) Draw a diagram of the apparatus that the student could use to investigate this reaction.



[2]

Select
page

Your
Mark

7(a)

7(b)(i)

7(b)(ii)

7(b)(iii)

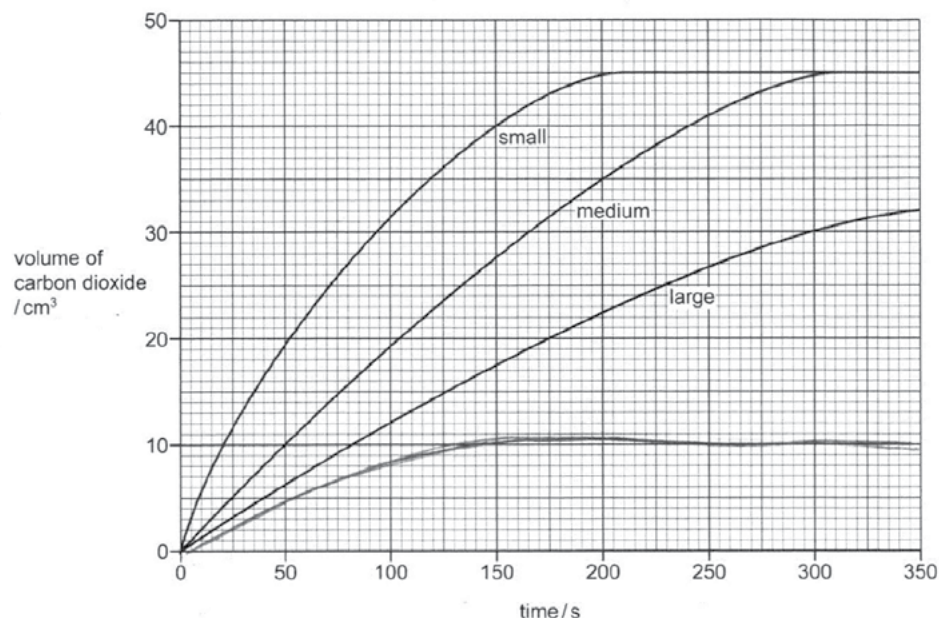
7(c)(i)

7(c)(ii)

Q7 Mark scheme

(a)	(gas) syringe leading to flask/beaker/test tube OR flask and tube leading to upturned measuring cylinder over trough of water; closed apparatus with no air gaps;
(b)(i)	small pieces; line/curve/graph steepest;
(b)(ii)	line to the left of the small pieces starting at (0,0); finishing at 45 cm ³ and before the other lines;
(b)(iii)	Any value between 205 s and 215 s (inclusive);
(c)(i)	Neutralising (acidic) soils/neutralising (acidic) waste/ steelmaking/self-heating cans/making concrete/making glass/water treatment/making plaster/making paper/ flue-gas desulfurisation/neutralising acids/making limewater;
(c)(ii)	basic oxide; because it is a metal oxide/because it would react with acid/neutralises acids/calcium is on the left of the Periodic Table;

- (b) The graph shows the results of this reaction using three samples of calcium carbonate of the same mass: large pieces, medium-sized pieces and small pieces.



- (i) Which sample, large, medium or small pieces, gave the fastest initial rate of reaction?

Use the graph to explain your answer.

small, because as volume increases, the time taken for the reaction to complete increases. Therefore, the small pieces react faster. [2]

- (ii) The experiment was repeated using powdered calcium carbonate of the same mass. Draw a line **on the grid above** to show how the volume of carbon dioxide changes with time for this experiment. [2]

- (iii) At what time was the reaction just complete when small pieces of calcium carbonate were used?

350 s [1]

Your
Mark

7(a)

7(b)(i)

7(b)(ii)

7(b)(iii)

7(c)(i)

7(c)(ii)

Q7 Mark scheme

(a)	(gas) syringe leading to flask/beaker/test tube OR flask and tube leading to upturned measuring cylinder over trough of water; closed apparatus with no air gaps;
(b)(i)	small pieces; line/curve/graph steepest;
(b)(ii)	line to the left of the small pieces starting at (0,0); finishing at 45 cm ³ and before the other lines;
(b)(iii)	Any value between 205 s and 215 s (inclusive);
(c)(i)	Neutralising (acidic) soils/neutralising (acidic) waste/ steelmaking/self-heating cans/making concrete/making glass/water treatment/making plaster/making paper/ flue-gas desulfurisation/neutralising acids/making limewater;
(c)(ii)	basic oxide; because it is a metal oxide/because it would react with acid/neutralises acids/calcium is on the left of the Periodic Table;

(c) When calcium carbonate is heated strongly, calcium oxide is formed.

(i) Give **one** use of calcium oxide.

..... Inductor [1]

(ii) What type of oxide is calcium oxide?

Explain your answer.

..... oxygen
..... becaus it
..... Form calcium oxide [2]

[Total: 10]

Select
page

Your
Mark

7(a)

7(b)(i)

7(b)(ii)

7(b)(iii)

7(c)(i)

7(c)(ii)

Q7	Mark scheme
(a)	(gas) syringe leading to flask/beaker/test tube OR flask and tube leading to upturned measuring cylinder over trough of water; closed apparatus with no air gaps;
(b)(i)	small pieces; line/curve/graph steepest;
(b)(ii)	line to the left of the small pieces starting at (0,0); finishing at 45 cm ³ and before the other lines;
(b)(iii)	Any value between 205 s and 215 s (inclusive);
(c)(i)	Neutralising (acidic) soils/neutralising (acidic) waste/ steelmaking/self-heating cans/making concrete/making glass/water treatment/making plaster/making paper/ flue-gas desulfurisation/neutralising acids/making limewater;
(c)(ii)	basic oxide; because it is a metal oxide/because it would react with acid/neutralises acids/calcium is on the left of the Periodic Table;

Cambridge Assessment International Education
The Triangle Building, Shaftesbury Road, Cambridge, CB2 8EA, United Kingdom
t: +44 1223 553554
e: info@cambridgeinternational.org www.cambridgeinternational.org

Copyright © UCLES September 2017