



General Certificate of Secondary Education
2019

Centre Number

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Candidate Number

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Double Award Science: Chemistry

Unit 7 Practical Skills
Booklet B
Foundation Tier



[GDW73]

GDW73

WEDNESDAY 12 JUNE, MORNING

TIME

30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete in black ink only. **Do not write with a gel pen.**

Answer **all four** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 35.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

A Data Leaflet including a Periodic Table of the Elements is provided.

Quality of written communication will be assessed in Question **4(a)**.

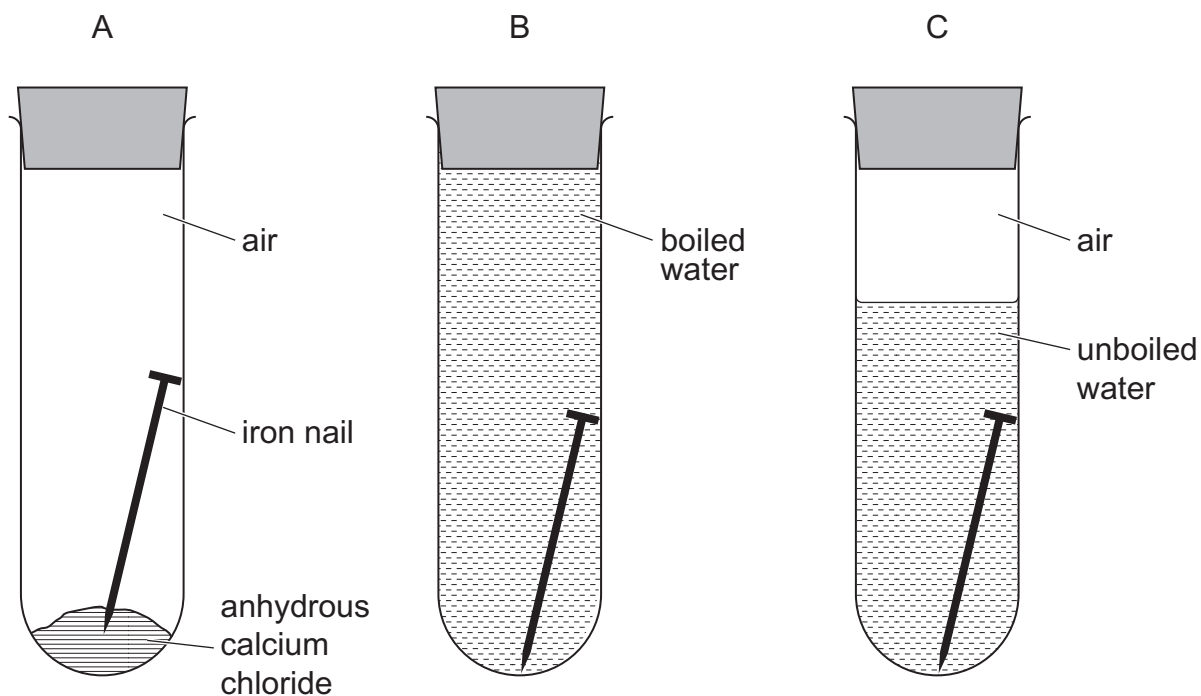
12295.05RR



12GDW7301

1 This question is about rusting.

- (a) The experiment shown below was carried out to investigate the conditions needed for iron nails to rust.
The test tubes were left for one week.



- (i) Explain why test tube A has a bung.

_____ [1]

- (ii) Why has the water been boiled in test tube B?

_____ [1]



(iii) In which test tube (A, B or C) would you expect the iron nail to rust most quickly?

Explain why you chose this test tube.

Test Tube _____

Explanation _____

[2]

(iv) What is the full chemical name for rust?

[2]

(b) The rusting of iron can be prevented by a number of methods. Suggest one method which may be used to prevent an iron bridge from rusting.

[1]

[Turn over

12295.05RR



12GDW7303

- 2 Mixtures can be separated in the laboratory using different techniques.
The technique used depends upon the composition of the mixture.

(a) Draw a **labelled** diagram of the assembled apparatus used to carry out **filtration**.

[4]

- (b) Four mixtures are given below.
Circle the mixture that can be separated by filtration.

sodium nitrate & water

aluminium powder & water

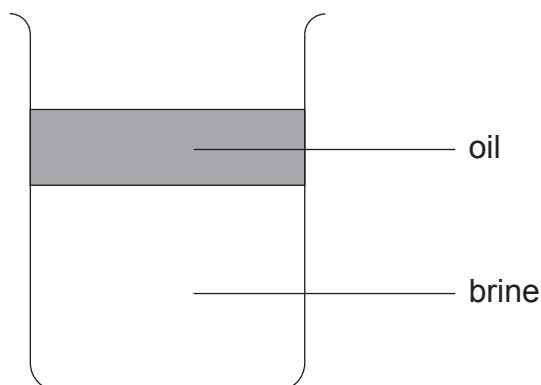
ethanol & water

copper(II) sulfate & water

[1]



- (c) The diagram below shows a beaker containing a mixture of oil and brine*.
*Brine is a solution of sodium chloride and water.



- (i) What name is given to two liquids which do not mix?

_____ [1]

The oil layer was removed.

- (ii) Describe how you could experimentally separate the sodium chloride from the water in brine to obtain pure sodium chloride and pure water.

_____ [3]

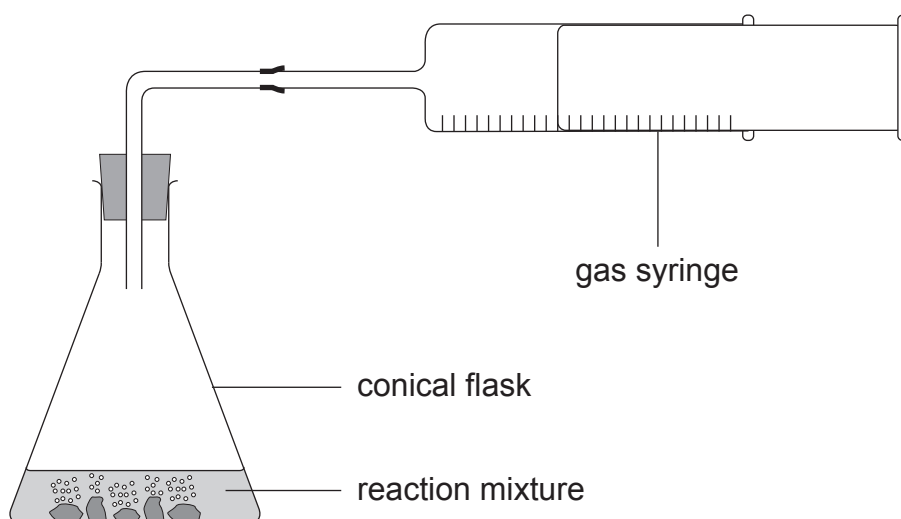
[Turn over]



3 When calcium carbonate reacts with hydrochloric acid the following reaction occurs:



A group of students wanted to measure the rate of reaction between calcium carbonate and hydrochloric acid. They set up the apparatus shown below and measured the volume of gas produced over a period of time.



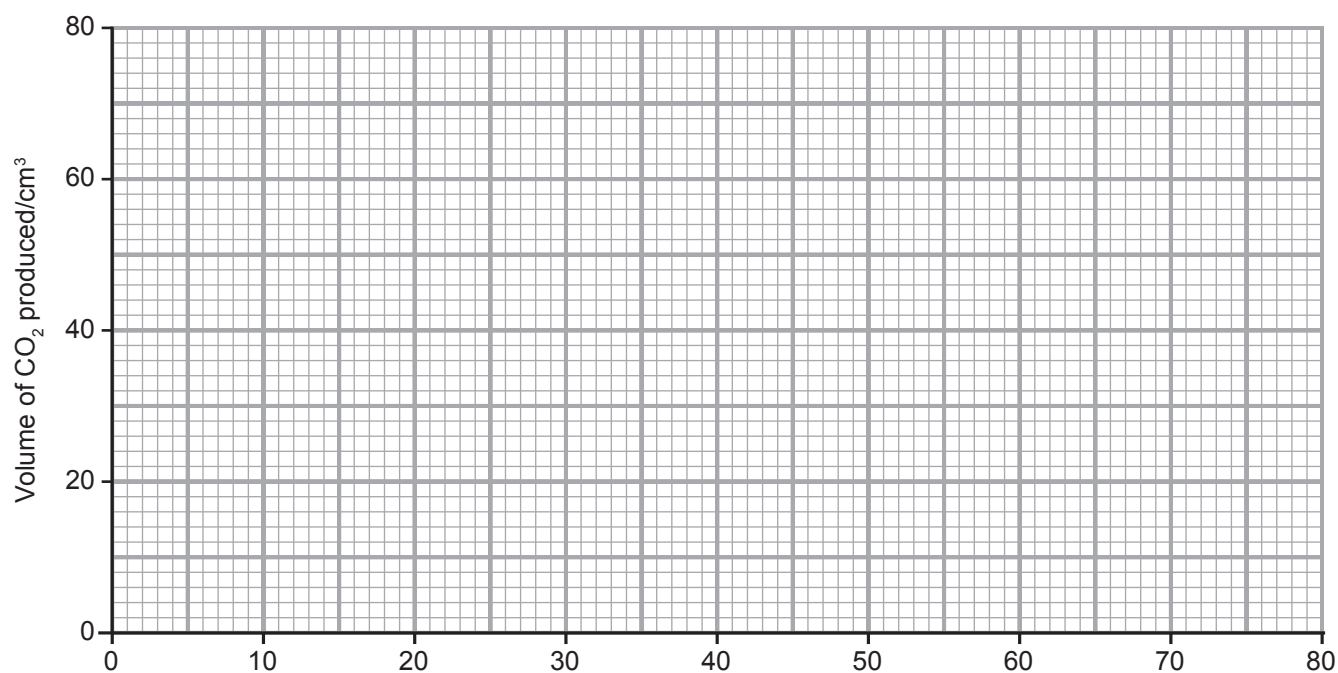
The following results for the experiment were obtained:

Time/s	0	10	20	30	40	50	60	70	80
Volume of CO ₂ produced/cm ³	0	22	41	53	61	63	64	65	65



(a) On the grid below:

- label the x-axis;
- plot a graph to show how the volume of carbon dioxide gas produced changes with time when calcium carbonate reacts with hydrochloric acid.



[4]

(b) From your graph, how long did it take to produce 48 cm³ of the gas?

_____ s [1]

[Turn over

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12GDW7307

(c) During what period of time (A, B, C or D) was the reaction rate the fastest?

- A 0–20 seconds
- B 21–40 seconds
- C 41–60 seconds
- D 61–80 seconds

_____ [1]

The average rate of this reaction can be calculated using the following equation:

$$\text{Average rate} = \frac{\text{Volume of gas produced}}{\text{Time}}$$

(d) Calculate the average rate of the reaction for the first 20 seconds.

_____ cm³/s [2]



[illegible]

12295.05RR



- 4** Hydrogen gas can be prepared in the laboratory by reacting zinc metal and dilute hydrochloric acid. This gas can be collected over water.
- (a)** Describe how you would set up and use the apparatus needed to prepare and collect hydrogen gas over water using zinc and hydrochloric acid. Describe how you would test the gas to show that it is hydrogen.

In this question you will be assessed on your written communication skills including the use of specialist scientific terms.

Preparation and collection of hydrogen gas:

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Test for hydrogen gas:

[6]

[6]



- (b) Identify a precaution, other than wearing safety goggles, which you would take to ensure that the reaction between zinc and hydrochloric acid was carried out safely and explain why you would take this precaution.

Precaution: _____

Explanation: _____

_____ [2]

- (c) The reaction of zinc with hydrochloric acid can also be carried out with the addition of a catalyst. What is meant by the term catalyst?

_____ [2]

- (d) Name one metal, other than zinc, which could be used with hydrochloric acid to safely prepare hydrogen.

_____ [1]

THIS IS THE END OF THE QUESTION PAPER



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For Examiner's
use only

Question Number	Marks
1	
2	
3	
4	

Total Marks	
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Examiner Number

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12GDW7312

SYMBOLS OF SELECTED IONS

Positive ions

Name	Symbol
Ammonium	NH_4^+
Chromium(III)	Cr^{3+}
Copper(II)	Cu^{2+}
Iron(II)	Fe^{2+}
Iron(III)	Fe^{3+}
Lead(II)	Pb^{2+}
Silver	Ag^+
Zinc	Zn^{2+}

Negative ions

Name	Symbol
Butanoate	$\text{C}_3\text{H}_7\text{COO}^-$
Carbonate	CO_3^{2-}
Dichromate	$\text{Cr}_2\text{O}_7^{2-}$
Ethanoate	CH_3COO^-
Hydrogencarbonate	HCO_3^-
Hydroxide	OH^-
Methanoate	HCOO^-
Nitrate	NO_3^-
Propanoate	$\text{C}_2\text{H}_5\text{COO}^-$
Sulfate	SO_4^{2-}
Sulfite	SO_3^{2-}

Data Leaflet

Including the Periodic Table of the Elements

For the use of candidates taking
Science: Chemistry,
Science: Double Award
or Science: Single Award

Copies must be free from notes or additions of any
kind. No other type of data booklet or information
sheet is authorised for use in the examinations

SOLUBILITY IN COLD WATER OF COMMON SALTS, HYDROXIDES AND OXIDES

Soluble
All sodium, potassium and ammonium salts
All nitrates
Most chlorides, bromides and iodides EXCEPT silver and lead chlorides, bromides and iodides
Most sulfates EXCEPT lead and barium sulfates Calcium sulfate is slightly soluble
Insoluble
Most carbonates EXCEPT sodium, potassium and ammonium carbonates
Most hydroxides EXCEPT sodium, potassium and ammonium hydroxides
Most oxides EXCEPT sodium, potassium and calcium oxides which react with water

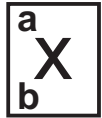
gcse examinations chemistry

THE PERIODIC TABLE OF ELEMENTS

Group

																						0													
1		2																																	
7 Li Lithium 3		9 Be Beryllium 4																		11 B Boron 5		12 C Carbon 6		14 N Nitrogen 7		16 O Oxygen 8		19 F Fluorine 9		20 Ne Neon 10					
23 Na Sodium 11		24 Mg Magnesium 12																		27 Al Aluminium 13		28 Si Silicon 14		31 P Phosphorus 15		32 S Sulfur 16		35.5 Cl Chlorine 17		40 Ar Argon 18					
39 K Potassium 19		40 Ca Calcium 20		45 Sc Scandium 21		48 Ti Titanium 22		51 V Vanadium 23		52 Cr Chromium 24		55 Mn Manganese 25		56 Fe Iron 26		59 Co Cobalt 27		59 Ni Nickel 28		64 Cu Copper 29		65 Zn Zinc 30		70 Ga Gallium 31		73 Ge Germanium 32		75 As Arsenic 33		79 Se Selenium 34		80 Br Bromine 35		84 Kr Krypton 36	
85 Rb Rubidium 37		88 Sr Strontium 38		89 Y Yttrium 39		91 Zr Zirconium 40		93 Nb Niobium 41		96 Mo Molybdenum 42		98 Tc Technetium 43		101 Ru Ruthenium 44		103 Rh Rhodium 45		106 Pd Palladium 46		108 Ag Silver 47		112 Cd Cadmium 48		115 In Indium 49		119 Sn Tin 50		122 Sb Antimony 51		128 Te Tellurium 52		127 I Iodine 53		131 Xe Xenon 54	
133 Cs Caesium 55		137 Ba Barium 56		139 La [*] Lanthanum 57		178 Hf Hafnium 72		181 Ta Tantalum 73		184 W Tungsten 74		186 Re Rhenium 75		190 Os Osmium 76		192 Ir Iridium 77		195 Pt Platinum 78		197 Au Gold 79		201 Hg Mercury 80		204 Tl Thallium 81		207 Pb Lead 82		209 Bi Bismuth 83		210 Po Polonium 84		210 At Astatine 85		222 Rn Radon 86	
223 Fr Francium 87		226 Ra Radium 88		227 Ac [†] Actinium 89		261 Rf Rutherfordium 104		262 Db Dubnium 105		266 Sg Seaborgium 106		264 Bh Bohrium 107		277 Hs Hassium 108		268 Mt Meitnerium 109		271 Ds Darmstadtium 110		272 Rg Roentgenium 111		285 Cn Copernicium 112													

* 58 – 71 Lanthanum series
† 90 – 103 Actinium series



a = relative atomic mass (approx)
x = atomic symbol
b = atomic number

140	Ce Cerium 58	141	Pr Praseodymium 59	144	Nd Neodymium 60	145	Pm Promethium 61	150	Sm Samarium 62	152	Eu Europium 63	157	Gd Gadolinium 64	159	Tb Terbium 65	162	Dy Dysprosium 66	165	Ho Holmium 67	167	Er Erbium 68	169	Tm Thulium 69	173	Yb Ytterbium 70	175	Lu Lutetium 71
232	Th Thorium 90	231	Pa Protactinium 91	238	U Uranium 92	237	Np Neptunium 93	242	Pu Plutonium 94	243	Am Americium 95	247	Cm Curium 96	245	Bk Berkelium 97	251	Cf Californium 98	254	Es Einsteinium 99	253	Fm Fermium 100	256	Md Mendelevium 101	254	No Nobelium 102	257	Lr Lawrencium 103