



Rewarding Learning

General Certificate of Secondary Education
2022

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]
MONDAY 20 JUNE, MORNING

GDW73

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)**.



1 The reactivity series is a list of metals arranged in order of their decreasing reactivity.

(a) A list of some metals is given below:

aluminium

copper

iron

magnesium

potassium

sodium

zinc

(i) Which one of the metals in the list above reacts most vigorously with water or steam? Circle the correct answer. [1]

(ii) Metal X reacts slowly with cold water. Which metal, from the list above, would be placed immediately above X in the reactivity series?

_____ [1]

(b) (i) When calcium is added to cold water a vigorous reaction occurs. A number of observations can be made, one being that heat is given off. State three other observations.

1. _____

2. _____

3. _____ [3]

(ii) Write a word equation for the reaction between calcium and water.

_____ [2]



(c) In Chemistry, there are times when we observe different colours.

Draw a straight line from each colour to an example of when that colour would be seen.

colour

example

white

the flame test for sodium ions

purple / violet

the precipitate formed in the test
for carbon dioxide

orange

solid copper(II) carbonate

green

solid zinc metal

iodine vapour when
iodine sublimes

[4]

[Turn over]



- 2** A student was provided with two gas jars. One contained ethene gas and the other ethane gas. The student was asked to identify which gas jar contained ethene and which contained ethane. The student was provided with reagent A to assist with identification. The student was told to add reagent A to each of the gas samples and note the observations.

(a) Name reagent A and state its colour.

name _____ [1]

colour _____ [1]

(b) Describe what would be observed when reagent A is added to the gas jar containing ethene.

_____ [1]

(c) Describe what would be observed when reagent A is added to the gas jar containing ethane.

_____ [1]





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(Questions continue overleaf)

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[Turn over



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- 3 Hydrogen peroxide solution slowly decomposes at room temperature to form water and oxygen according to the equation:



A student investigated the rate of this reaction by measuring out 50 cm^3 of hydrogen peroxide solution and adding manganese(IV) oxide catalyst. The total volume of gas produced was measured at 20 second intervals and recorded in the table below.

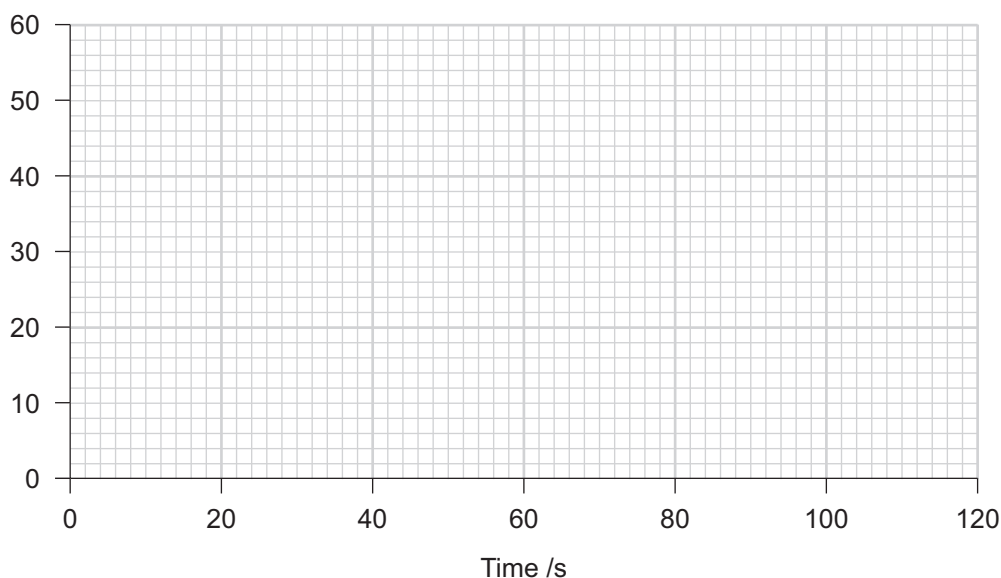
Time /s	0	20	40	60	80	100	120
Total volume of O_2 produced / cm^3	0	35	48	53	55	55	55

- (a) Name a piece of apparatus that the student could use to measure the volume of gas produced.

_____ [1]

- (b) (i) On the grid below:

- label the y-axis;
- plot a graph to show how the volume of oxygen gas formed changes with time when hydrogen peroxide decomposes.



[4]



(ii) What was the total volume of gas produced by this reaction?

_____ [1]

(iii) At what time did the reaction stop?

_____ [1]

(iv) From your graph, how long did it take for 40 cm³ of oxygen to be produced?

_____ [1]

(c) The decomposition of hydrogen peroxide involves the use of a catalyst.
Complete the sentence below to explain what is meant by the term **catalyst**.

A catalyst is a substance which _____

_____ [2]

(d) Describe how the student would test the gas to show that it was oxygen.

_____ [2]

[Turn over]



- 4 (a) You are provided with three beakers labelled A, B and C.
Each beaker contains a colourless solution.
One is sodium carbonate solution, one is dilute hydrochloric acid and one is calcium hydroxide solution **but the labels don't tell you which solution is in which beaker.**

Magnesium was added to some of the solution in beaker C, fizzing was observed and the magnesium disappeared.

- Describe what observations you would expect if dilute hydrochloric acid and sodium carbonate solution were mixed.
- Describe what observations you would expect if dilute hydrochloric acid and calcium hydroxide solution were mixed.
- Which of the three solutions must beaker C contain? Explain your answer.

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

If I mixed dilute hydrochloric acid and sodium carbonate solution I would expect to observe:

If I mixed dilute hydrochloric acid and calcium hydroxide solution I would expect to observe:



Which of the three solutions must beaker C contain? Explain your answer.

[6]

(b) Write a **word** equation for the reaction between hydrochloric acid and calcium hydroxide.

[2]

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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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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

[illegible]

* 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