

Candidate Name	Centre Number	Candidate Number
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**GCSE**

236/01

**SCIENCE  
FOUNDATION TIER  
CHEMISTRY 1**

A.M. WEDNESDAY, 16 June 2010

45 minutes

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	4	
2.	4	
3.	5	
4.	4	
5.	3	
6.	4	
7.	4	
8.	7	
9.	6	
10.	4	
11.	5	
<b>Total</b>	<b>50</b>	

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**ADDITIONAL MATERIALS**

In addition to this paper you may require a calculator and a ruler.

**INSTRUCTIONS TO CANDIDATES**

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

**INFORMATION FOR CANDIDATES**

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

The Periodic Table is printed on the back cover of the examination paper and the formulae for some common ions on the inside of the back cover.

*Answer all questions.*

1. The table below shows some information about four different elements.  
**A, B, C and D are not chemical symbols.**

Element	Metal or non-metal	Shiny	Conductor of electricity	Melting point
<b>A</b>	non-metal	no	no	low
<b>B</b>	metal	.....	yes	high
<b>C</b>	non-metal	no	.....	low
<b>D</b>	.....	yes	yes	high

- (i) Complete the above table. [3]
- (ii) Copper is a metal. Give **one** property of copper **not shown in the table** that shows it to be a metal. [1]

.....

.....

2. Use only words in the box below to answer this question.

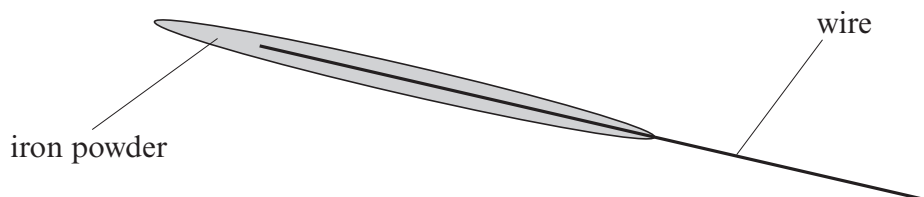
earthquakes	hurricanes	quickly	plates
slabs	slowly	thunderstorms	volcanoes

- (i) The Earth's crust (lithosphere) is made up of very large pieces called ..... [1]
- (ii) These pieces are moving very ..... [1]
- (iii) Give **two** geological events or features that may be observed near the boundaries of these very large pieces. [2]  
..... and .....

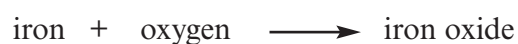
0 2 3 6 0 1 0 3

4

3. Fireworks were invented by the Chinese. There are many different types of fireworks including rockets and sparklers. Sparklers usually consist of a chemical mixture that is moulded onto a wire. One of the main substances in the mixture is iron powder.



The word equation for the main reaction that takes place during the burning is



- (i) Give the name of one **reactant** present in the above word equation. [1]  
.....
- (ii) Give the name of the **compound** present in the above word equation. [1]  
.....
- (iii) Give **one** reason why young children should be careful when handling sparklers. [1]  
.....  
.....

- (iv) In order to create a sparkler that gives off a colour, other substances are added to the mixture.

Substance added to the mixture	Colour of the burning sparkler
aluminium powder	silver
calcium chloride	orange
lithium carbonate	red
copper chloride	blue

You are required to create a sparkler that gives two different colours as it burns. It should burn with a red flame at first followed by a blue flame. State **briefly** how the sparkler could be made. [2]

.....

.....

.....

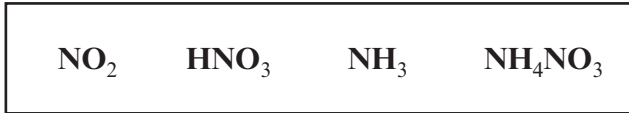
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4. (i) Nitric acid has the formula  $\text{HNO}_3$ .

Name the **two** elements other than nitrogen which are present in nitric acid. [2]

..... and .....

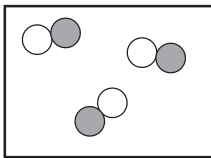
(ii)



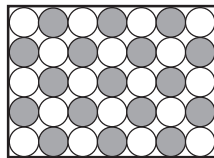
From the box above, choose the formula of the substance which contains the most nitrogen atoms. [1]

.....

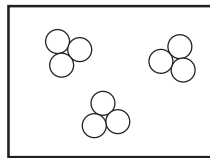
- (iii) Give the letter of the box A, B, C, D or E that represents the gas ammonia,  $\text{NH}_3$ .



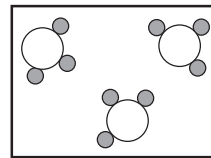
A



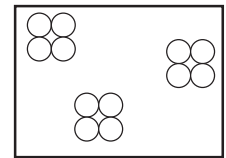
B



C



D



E

[1]

.....

5. Nanoscience involves the study of very small particles.

- (i) Choose **from the box below** the size which falls within the nanoparticle range.

75 nm	150 nm	200 nm	250 nm
-------	--------	--------	--------

..... nm

[1]

- (ii) Place a **tick (✓)** in the box next to the **two** correct answers.

Nano-sized silver particles have antibacterial, antiviral and antifungal properties so they are used [2]

to coat self cleaning windows,

to coat the inner surface of refrigerators,

in suncreams,

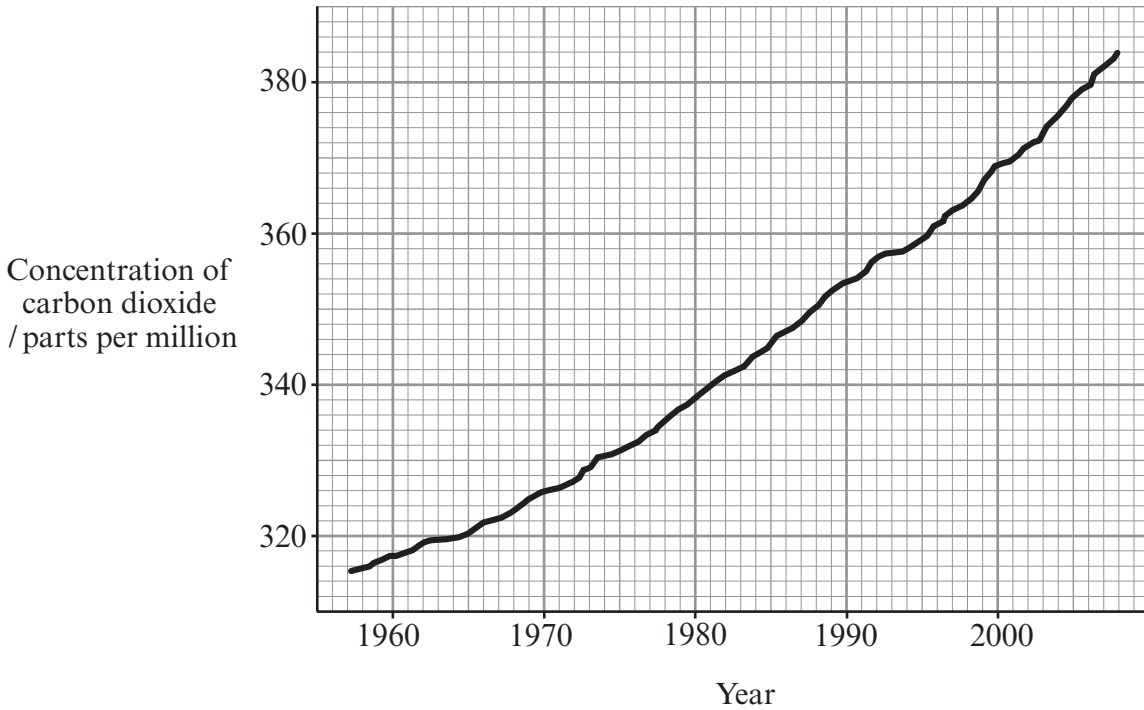
in sterilizing sprays to clean operating theatres in hospitals,

to wash test tubes in a chemistry laboratory.

3

6. The concentration of carbon dioxide in the atmosphere has been measured at the top of Mauna Loa, in Hawaii, since 1957.

The results obtained are shown in the graph below.



- (i) Using the above graph, state the concentration of carbon dioxide at Mauna Loa in 1985. [1]

..... parts per million

- (ii) I. Give the general trend in the concentration of carbon dioxide in the atmosphere at Mauna Loa since 1957. [1]

.....  
 .....

- II. What effect does this change have on the temperature of the Earth's atmosphere? [1]

.....

- III. What is the term used to describe this change in temperature? [1]

.....

7. (i) Cola drinks contain a substance called phosphoric acid. Each molecule of phosphoric acid contains three atoms of hydrogen, one atom of phosphorus and four atoms of oxygen.

Give the formula for phosphoric acid. .... [2]

- (ii) Use the table of '*Formulae for some common ions*' on the **inside of the back cover of this examination paper** to give the formula of

I. magnesium oxide, ..... [1]

II. calcium bromide. .... [1]

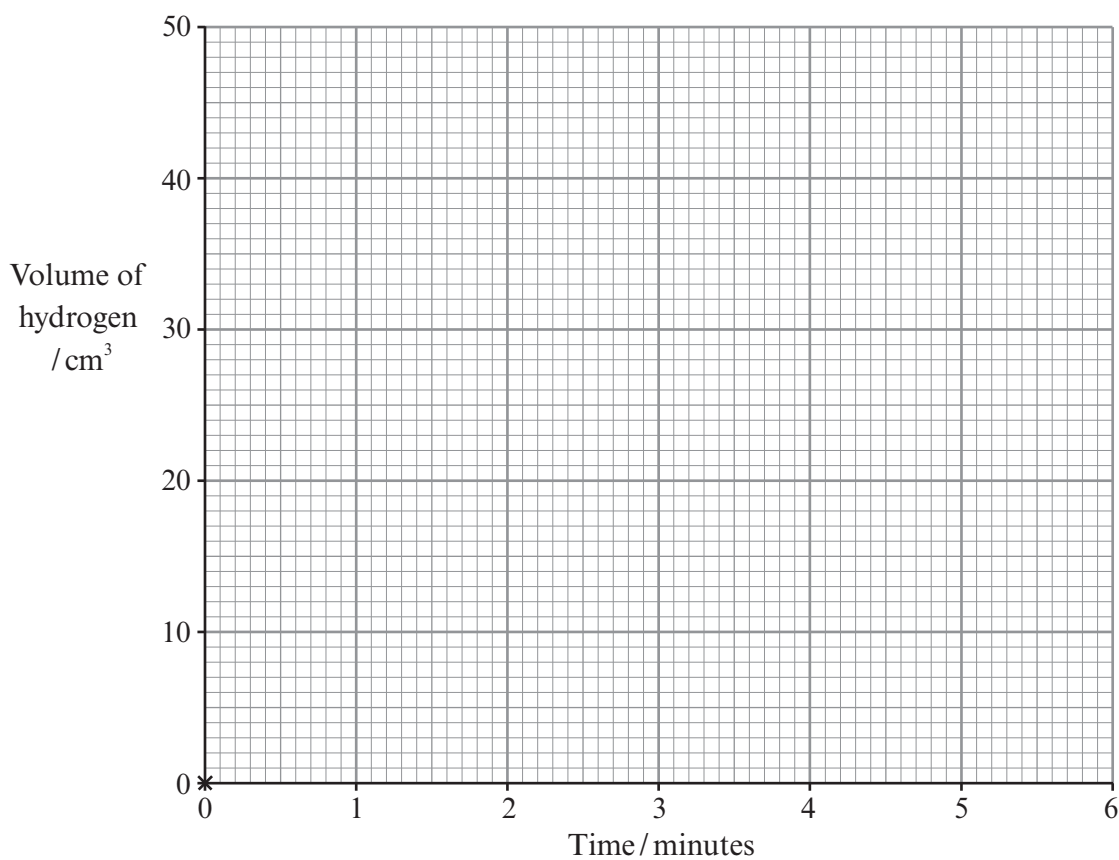
8. Magnesium reacts with dilute hydrochloric acid to produce hydrogen gas.

A piece of magnesium ribbon was placed in *excess* dilute hydrochloric acid. The volume of hydrogen produced was recorded every minute. The experiment was carried out at room temperature. The results obtained are shown in the table below.

Time / minutes	0	1	2	3	4	5	6
Volume of hydrogen / cm <sup>3</sup>	0	20	30	36	39	40	40

- (i) Plot the results from the table on the grid below and draw a smooth curve through the points. [3]

The first point has been plotted for you.



- (ii) Give the volume of hydrogen given off during the first 3.5 minutes. [1]

.....  $\text{cm}^3$

- (iii) Place a **tick** (✓) in the box next to the correct answer. [1]

The reaction is proceeding at its fastest rate between

0 - 1 minute,

3 - 4 minutes,

5 - 6 minutes.

- (iv) If the reaction had been repeated using the **same amount** of magnesium ribbon but twice the volume of the original acid, give the final volume of hydrogen you would expect to be produced and explain your answer. [2]

*Final volume of hydrogen* .....  $\text{cm}^3$

*Explanation* .....

.....

9. The electronic structure of seven different elements **A**, **B**, **C**, **D**, **E**, **F** and **G** are given in the following table.

**These letters are not chemical symbols.**

Element	Electronic structure
<b>A</b>	2,6
<b>B</b>	2,8,1
<b>C</b>	2,8,4
<b>D</b>	2,8,7
<b>E</b>	2,8,8
<b>F</b>	2,8,8,1
<b>G</b>	2,8,8,2

Choose a **letter** from the table above to answer parts (i), (ii) and (iii) I.

**Each letter may be used once, more than once or not at all.**

- (i) Give the **letters** of the **two** elements which are found in the **same** group of the Periodic Table. Explain your answer. [2]

*Elements* ..... and .....

*Explanation* .....

.....

- (ii) Give the **letter** of the element which is found in Period 2 of the Periodic Table. Explain your answer. [2]

*Element* .....

*Explanation* .....

.....

The Periodic Table of Elements shown on the **back cover of this examination paper** may be of use in answering part (iii).

- (iii) I. Give the **letter** of the element which represents sodium, Na. [1]

.....

- II. Give the **name** of an element in the same group as element **D**. [1]

.....

6

10. The following table shows the results of experiments **A**, **B**, **C**, **D** and **E**.

The table includes the appearance of the two substances before addition, the temperature of the substances before and after addition, and the observations made during each experiment.

Use the table to answer the questions that follow.

Experiment	Appearance of the <b>two</b> substances before addition	Starting temperature / °C	Temperature after addition / °C	Observation after addition
<b>A</b>	a shiny grey solid <b>and</b> a colourless solution	21	27	bubbles with colourless gas being given off
<b>B</b>	a white solid <b>and</b> a colourless solution	22	16	a colourless solution
<b>C</b>	<b>two</b> colourless solutions	20	21	a white precipitate / solid formed
<b>D</b>	a white solid <b>and</b> a colourless solution	19	19	a colourless solution
<b>E</b>	a grey solid <b>and</b> a blue solution	17	19	some brown solid formed

- (i) State which experiment is the **most** exothermic and explain your answer. [2]

*Experiment* .....

*Explanation* .....

.....

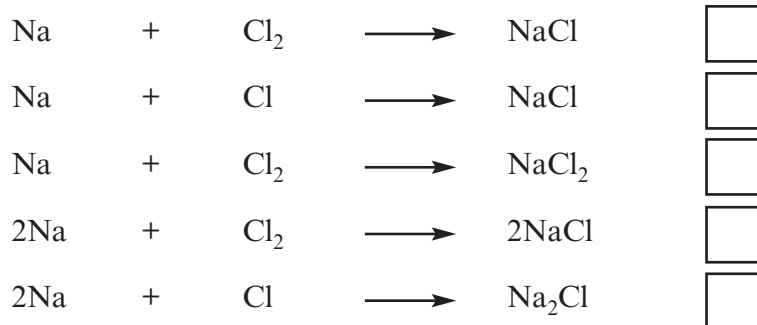
- (ii) Apart from a change in temperature, give **two** observations which could show that a chemical reaction has taken place. [2]

*Observation 1* .....

*Observation 2* .....

11. (i) Sodium and chlorine are both very reactive elements. When hot sodium is lowered into a gas jar of chlorine, the metal ignites and sodium chloride is formed.

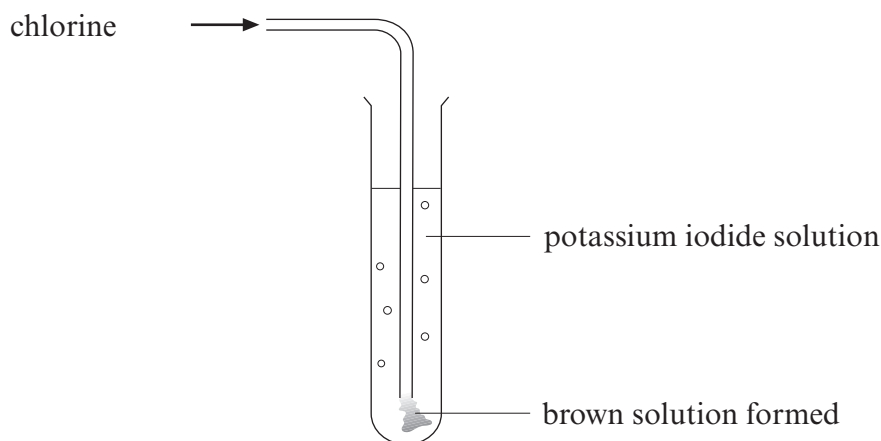
I. Place a **tick (✓)** in the box next to the correct balanced symbol equation which represents the reaction. [1]



II. State the colour of the flame seen when sodium burns in chlorine. [1]

.....

- (ii) Chlorine gas was bubbled into a colourless solution of potassium iodide. The result is shown in the diagram below.



I. Give the **word equation** for the chemical reaction taking place between chlorine and potassium iodide. [2]

..... + ..... → ..... + .....

II. State why the above reaction should be carried out in a fume cupboard. [1]

.....

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**FORMULAE FOR SOME COMMON IONS**

<b>POSITIVE IONS</b>		<b>NEGATIVE IONS</b>	
<b>Name</b>	<b>Formula</b>	<b>Name</b>	<b>Formula</b>
<b>Aluminium</b>	<b>Al<sup>3+</sup></b>	<b>Bromide</b>	<b>Br<sup>-</sup></b>
<b>Ammonium</b>	<b>NH<sub>4</sub><sup>+</sup></b>	<b>Carbonate</b>	<b>CO<sub>3</sub><sup>2-</sup></b>
<b>Barium</b>	<b>Ba<sup>2+</sup></b>	<b>Chloride</b>	<b>Cl<sup>-</sup></b>
<b>Calcium</b>	<b>Ca<sup>2+</sup></b>	<b>Fluoride</b>	<b>F<sup>-</sup></b>
<b>Copper(II)</b>	<b>Cu<sup>2+</sup></b>	<b>Hydroxide</b>	<b>OH<sup>-</sup></b>
<b>Hydrogen</b>	<b>H<sup>+</sup></b>	<b>Iodide</b>	<b>I<sup>-</sup></b>
<b>Iron(II)</b>	<b>Fe<sup>2+</sup></b>	<b>Nitrate</b>	<b>NO<sub>3</sub><sup>-</sup></b>
<b>Iron(III)</b>	<b>Fe<sup>3+</sup></b>	<b>Oxide</b>	<b>O<sup>2-</sup></b>
<b>Lithium</b>	<b>Li<sup>+</sup></b>	<b>Sulphate</b>	<b>SO<sub>4</sub><sup>2-</sup></b>
<b>Magnesium</b>	<b>Mg<sup>2+</sup></b>		
<b>Nickel</b>	<b>Ni<sup>2+</sup></b>		
<b>Potassium</b>	<b>K<sup>+</sup></b>		
<b>Silver</b>	<b>Ag<sup>+</sup></b>		
<b>Sodium</b>	<b>Na<sup>+</sup></b>		

