Surname	Centre Number	Candidate Number
Other Names		0



GCSE

236/01

SCIENCE FOUNDATION TIER CHEMISTRY 1

A.M. WEDNESDAY, 15 June 2011

45 minutes

For Examiner's use only				
Question	Maximum Mark	Mark Awarded		
1.	6			
2.	6			
3.	6			
4.	6			
5.	5			
6.	6			
7.	10			
8.	5			
Total	50			

ADDITIONAL MATERIALS

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

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

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.

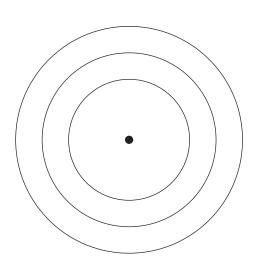
Answer all questions.

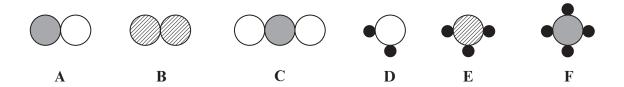
1. The diagram below shows part of the Periodic Table of Elements in which some elements are shown by letters. The letters are not chemical symbols.

	A									В
С	D						E	F	G	
		Н							I	

In this question each letter may be used once, more than once or not at all.

- (a) Give the **letter** which represents the element that
 - (i) has **four** electrons in its outer orbit (shell),[1]
 - (ii) has the electronic structure 2,8,7, [1]
 - (iii) is in the same group as element **D**, [1]
 - (iv) is in the same period as element I, [1]
 - (v) has the atomic number 11. [1]
- (b) Complete the following diagram to show the electronic structure of element \mathbf{D} . [1]





- represents an atom of carbon (symbol C)
- represents an atom of hydrogen (symbol H)
- represents an atom of nitrogen (symbol N)
- represents an atom of oxygen (symbol O)
- (i) Give the letter, A, B, C, D, E or F, of the diagram which represents
 - I. NH₃, [1]

 II. an element, [1]

 III. a compound containing **five** atoms. [1]

 Give the chemical formula for substance **D**. [1]
- (b) Sulphuric acid is a strong acid and is one of the acids responsible for acid rain. Each molecule of sulphuric acid contains two atoms of hydrogen, one atom of sulphur and four atoms of oxygen.

Use this information to give the chemical formula for sulphuric acid. [2]

(ii)

[1]

Br ⁻	CH ₄	CO ₂	Mg	Na ⁺	S
Each syml	ool/formula may be	used once, m	ore than once	or not at all.	
Give					
(i)	two atoms			and	
(ii)	two molecules			and	
(iii)	two ions			and	
(iv)	one metal atom				

Formula of compound

The Periodic Table of Elements shown on the back cover of this examination paper may be of use in answering this question.

Group 1
lithium
sodium
potassium
M
caesium
francium

Give the number of electrons in the outer orbit (shell) of an atom of potassium. (a)

(b) Name the missing element M. [1]

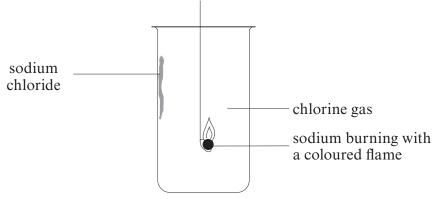
[1]

[1]

Choose from the list below the name by which Group 1 elements are also known. (c)

alkali metals	halogens	noble gases	transition metals
alkali metals	halogens	noble gases	transition metals

The diagram below shows sodium reacting with chlorine. (*d*)

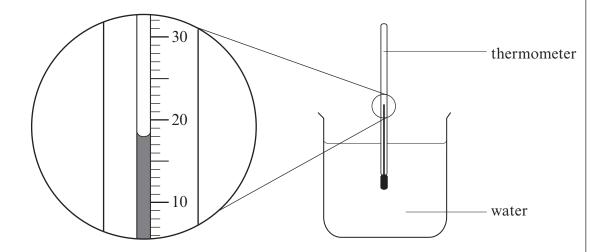


Give the colour of the flame seen during the reaction. [1] (i)

Give the word equation for the reaction that takes place. [2] (ii)

(0236-01)

5. (a) A thermometer was placed in some water. The diagram below shows part of that thermometer.



(i)	State the temperature shown on the thermometer.	[[]
	$^{\circ}\mathrm{C}$		

(ii) A solid was added to the water. An **endothermic** reaction took place and the temperature changed by 5.5 °C.

Place a tick (\mathcal{I}) in the box with the correct final reading on the thermometer. [1]

12.5 °C	
13 °C	
13.5 °C	
23 °C	
23.5 °C	

Natural gas is mainly methane, CH₄. The symbol equation for methane burning in air is *(b)* as follows.

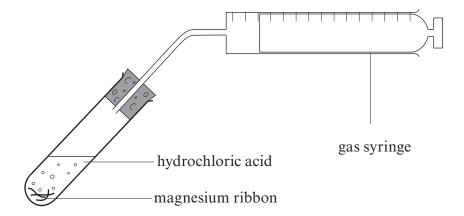
> $CH_4 + 2O_2 \longrightarrow CO_2 +$ $2H_2O$

- Give one product of this reaction. (i) [1]
- Give the word equation for the burning of methane. [2] (ii)

.....+

(0236-01)

6. The following apparatus was used to investigate the effect of particle size on the speed of a chemical reaction.

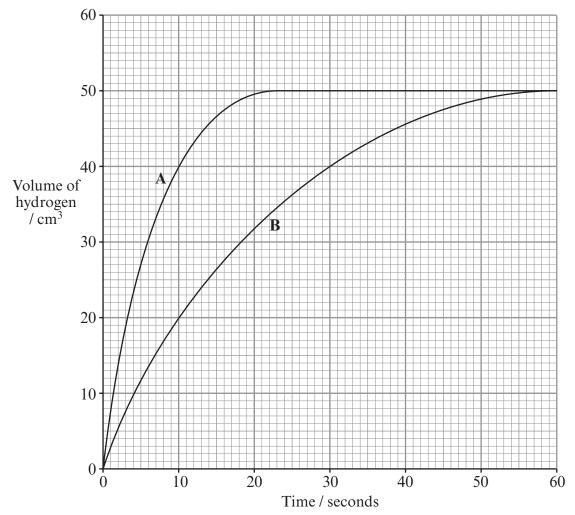


Two experiments were carried out.

In the first experiment 0.05 g of magnesium **powder** was added to 20 cm³ of dilute hydrochloric acid at 20 °C. The volume of hydrogen produced was recorded at regular intervals and the results were plotted on the grid below. The line was labelled **A**.

In the second experiment 0.05 g of magnesium **ribbon** was added to 20 cm³ of hydrochloric acid of the same concentration at 20 °C. The results were again plotted and this line was labelled **B**.

In both experiments the acid used was in excess.

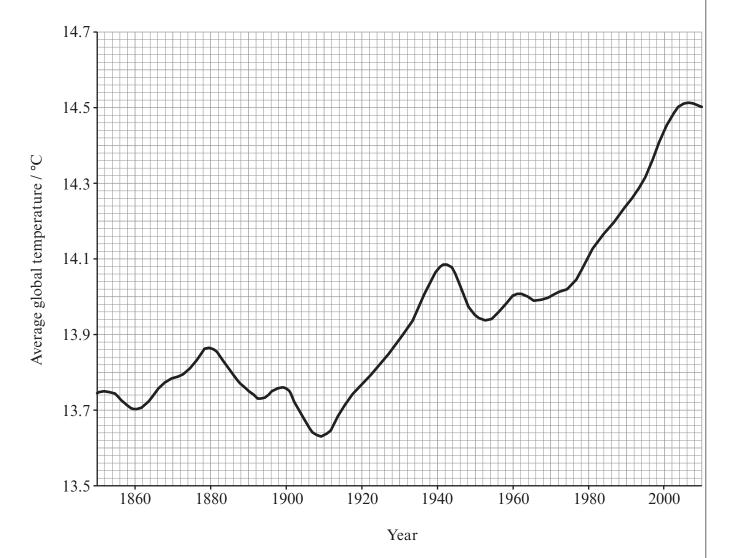


(0236-01)

(a)	State	e the purpose of the gas syringe.	[1]
(b)	Use	the graph to find	
	(i)	the volume of hydrogen produced after 30 seconds when magnesium ribbon used,	was [1]
		cm ³	
	(ii)	the time taken for the reaction to stop when magnesium powder was used.	[1]
		seconds	
(c)	State	e which of the above reactions was the faster and explain how the graph shows	this. [1]
	Fast	er reaction was experiment	
	Exp	lanation	
(d)	Give	e two ways in which this experiment was made a fair test.	[2]
	1		
	2		

7. (a) Global temperature records go back about 160 years, which allows us to draw conclusions about how our climate has changed over this period of time.

The graph below shows the average global temperature during the last 160 years.



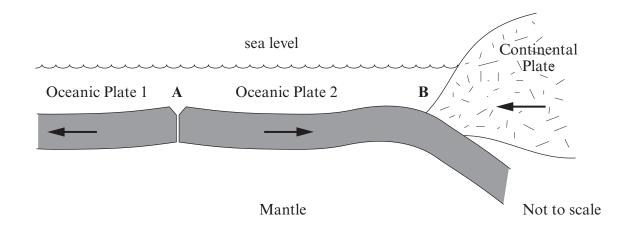
Use the graph to answer parts (i)-(iii).

(i)	State the average global temperature in 1990.	[1]
	°C	
(ii)	Describe the general trend in global temperature since 1910.	[1]
(iii)	Describe the general trend in global temperature between 1850 and 1910.	[1]

(b)		When fossil fuels such as petrol are burned, a gas is released. This is the main gar responsible for the change in global temperature since 1910.							
	(i)	Name this gas.	[1]						
	(ii)	Apart from the increase in the amount of fossil fuels burned each year since 1 give one reason for the increased amount of this gas in the atmosphere.	910, [1]						
(c)		ol is a mixture of different hydrocarbon compounds. e what is meant by a <i>hydrocarbon</i> .	[1]						
(d)	Som	ne fossil fuels contain sulphur.							
	(i)	Give the word equation for the reaction that takes place when sulphur is burn air.	nt in [2]						
	(ii)	State which environmental problem is caused by the product of this reaction.	 [1]						
	(iii)	Give one effect of this environmental problem.	[1]						

8. The Earth's crust (lithosphere) is broken up into huge plates.

The diagram below shows two plate boundaries A and B.



(a)	Describe what occurs at plate boundary A.	[2]		

(b) The two types of plate have different densities as shown in the following table.

Type of plate	Density/g cm ⁻³
continental	2.7
oceanic	3.0

Describe and explain what occurs at plate boundary B .	[3]

BLANK PAGE

FORMULAE FOR SOME COMMON IONS

POSITIV	VE IONS	NEGATI	VE IONS
Name	Formula	Name	Formula
Aluminium	Al ³⁺	Bromide	Br ⁻
Ammonium	NH_4^+	Carbonate	CO_3^{2-}
Barium	Ba^{2+}	Chloride	\mathbf{Cl}^-
Calcium	Ca ²⁺	Fluoride	${f F}^{-}$
Copper(II)	Cu ²⁺	Hydroxide	OH^-
Hydrogen	H^{+}	Iodide	I -
Iron(II)	Fe^{2+}	Nitrate	NO_3^-
Iron(III)	Fe ³⁺	Oxide	O^{2-}
Lithium	Li^{+}	Sulphate	SO_4^{2-}
Magnesium	Mg^{2+} Ni^{2+}		•
Nickel	Ni^{2+}		
Potassium	K ⁺		
Silver	$\mathbf{Ag}^{\boldsymbol{+}}$		
Sodium	Na ⁺		

(0236-01) **Turn over.**

PERIODIC TABLE OF ELEMENTS

	7					Gro	Group					8	4	w	9	7	0
								H ^I									⁴ He
								Hydrogen									Helium
7 Li	⁹ ₄ Be	<u> </u>					•					11 B	12 C	\mathbf{N}_{r}^{41}	O 8 0	19 F	$^{20}_{10}\mathrm{Ne}$
Lithium	Beryllium											Boron	Carbon	Nitrogen	Oxygen	Fluorine	Neon
23 Na	24 Mg	T.										27 A1	28 Si	31 P	32 S 16 S	35 CI	40 Ar
Sodium	Magnesium											Aluminium	Silicon	Phosphorus	Sulphur	Chlorine	Argon
39 K	40 Ca	45 Sc	48 Ti	51 V 23 V	⁵² ₂₄ Cr	55 Mn	56 Fe	⁵⁹ Co	59 Ni 28 Ni	64 Cu	65 Zn	⁷⁰ Ga	73 Ge	75 AS	79 Se	80 Br	84 Kr
Potassium	Calcium	Scandium	Titanium	Vanadium	Chromium	Manganese	Iron	Cobalt	Nickel	Copper	Zinc	Gallium	Germanium	Arsenic	Selenium	Bromine	Krypton
86 Rb	88 38 Sr	$^{89}_{39}\mathrm{Y}$	$^{91}_{40}\mathrm{Zr}$	93 Nb	⁹⁶ Mo	99 Tc	¹⁰¹ Ru	¹⁰³ Rh	106 Pd 46 Pd	108 Ag	112 Cd	115 In	119 Sn	122 Sb	128 Te	127 I 53	¹³¹ Xe
Rubidium	Strontium	Yttrium	Zirconium	Niobium	Molybdenum	Technetium	Ruthenium	Rhodium	Palladium	Silver	Cadmium	Indium	Tin	Antimony	Tellurium	Iodine	Xenon
133 Cs 55 Cs	137 Ba	¹³⁹ La	179 Hf	¹⁸¹ Ta	184 W	¹⁸⁶ Re	190 OS	¹⁹² ₇₇ Ir	195 Pt	¹⁹⁷ Au	$^{201}_{80}\mathrm{Hg}$	$^{204}_{81} \mathrm{Tl}$	²⁰⁷ ₈₂ Pb	²⁰⁹ ₈₃ Bi	²¹⁰ ₈₄ Po	$^{210}_{85}{ m At}$	²²² ₈₆ Rn
Caesium	Barium	Lanthanum	Hafnium	Tantalum	Tungsten	Rhenium	Osmium	Iridium	Platinum	Gold	Mercury	Thallium	Lead	Bismuth	Polonium	Astatine	Radon
$^{223}_{87}\mathrm{Fr}$	$\frac{226}{88}$ Ra	$^{227}_{89}\mathrm{Ac}$															
Francium	Radium	Actinium			Key:												
					Mass	Mass number		_ <									
								×	<u> </u>	– Eleme	Element Symbol	lool					
					Aton	Atomic number)er —	<u>Z</u>									