

Write your name here

Surname

Other names

Centre Number

Candidate Number

Edexcel GCSE

Chemistry/Science

Unit C1: Chemistry in our World

Foundation Tier

Thursday 1 March 2012 – Morning

Time: 1 hour

Paper Reference

5CH1F/01

You must have:

Calculator, ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
– *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

P40197A

©2012 Pearson Education Ltd.

1/1/1/1/1/1/



PEARSON

The Periodic Table of the Elements

1	2	3	4	5	6	7	0										
7 Li lithium 3	9 Be beryllium 4	11 Na sodium 11	12 Mg magnesium 12	13 Al aluminium 13	14 Si silicon 14	15 P phosphorus 15	16 S sulfur 16	17 Cl chlorine 17	18 Ar argon 18								
19 K potassium 19	20 Ca calcium 20	21 Sc scandium 21	22 Ti titanium 22	23 V vanadium 23	24 Cr chromium 24	25 Mn manganese 25	26 Fe iron 26	27 Co cobalt 27	28 Ni nickel 28	29 Cu copper 29	30 Zn zinc 30	31 Ga gallium 31	32 Ge germanium 32	33 As arsenic 33	34 Se selenium 34	35 Br bromine 35	36 Kr krypton 36
37 Rb rubidium 37	38 Sr strontium 38	39 Y yttrium 39	40 Zr zirconium 40	41 Nb niobium 41	42 Mo molybdenum 42	43 Tc technetium [98]	44 Ru ruthenium 44	45 Rh rhodium 45	46 Pd palladium 46	47 Ag silver 47	48 Cd cadmium 48	49 In indium 49	50 Sn tin 50	51 Sb antimony 51	52 Te tellurium 52	53 I iodine 53	54 Xe xenon 54
55 Cs caesium 55	56 Ba barium 56	57 La* lanthanum 57	72 Hf hafnium 72	73 Ta tantalum 73	74 W tungsten 74	75 Re rhenium 75	76 Os osmium 76	77 Ir iridium 77	78 Pt platinum 78	79 Au gold 79	80 Hg mercury 80	81 Tl thallium 81	82 Pb lead 82	83 Bi bismuth 83	84 Po polonium [209]	85 At astatine [210]	86 Rn radon [222]
[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	Elements with atomic numbers 112-116 have been reported but not fully authenticated						

1
H
hydrogen
1

Key
relative atomic mass
atomic symbol
name
atomic (proton) number

* The lanthanoids (atomic numbers 58-71) and the actinoids (atomic numbers 90-103) have been omitted.

The relative atomic masses of copper and chlorine have not been rounded to the nearest whole number.



Answer ALL questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ~~☒~~ and then mark your new answer with a cross ☒.

Metals

- 1 Most metals occur as compounds found in rocks.
Metals can be extracted from some of these rocks.

(a) Complete the sentence by putting a cross (☒) in the box next to your answer.

Rocks from which metals can be extracted are called

(1)

- A sand
- B limestone
- C ores
- D elements

(b) Aluminium, copper and iron are metals.

Aluminium has a low density, copper is very unreactive and iron is strong when alloyed.

These metals have many uses.

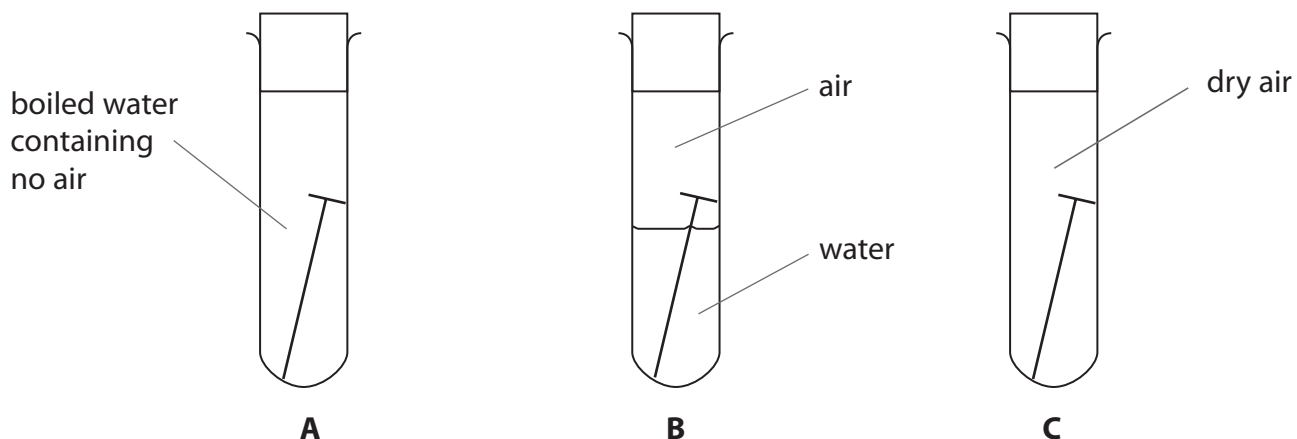
Draw **one** straight line from each metal to a use of the metal.

(3)

metal	use
aluminium	● for water pipes
copper	● making aircraft bodies
iron	● making steel
	● to surface roads



(c) An experiment was carried out to investigate the conditions necessary for iron to corrode. Three test tubes, A, B and C, had identical iron nails placed in them as shown.



After two weeks,

- the nail in tube A had not rusted
- the nail in tube B had rusted
- the nail in tube C had not rusted.

Explain why the iron nail in test tube B rusted and the iron nails in test tubes A and C did not.

(2)

.....

.....

.....

.....

(d) Scrap iron can be recycled.

Explain an advantage of recycling scrap iron rather than extracting iron from iron compounds found in the Earth.

(2)

.....

.....

.....

.....

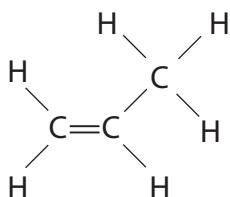
(Total for Question 1 = 8 marks)



Hydrocarbons

- 2 (a) Propene is a hydrocarbon.

The diagram shows the structure of a molecule of propene.



- (i) Give the names of the **two** elements combined together in propene.

(2)

- (ii) Propene is an alkene.
Alkenes are unsaturated.

State what you would **see** when orange bromine water is shaken with propene.

(1)

- (b) Propene can be made into a polymer.

- (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The name of this polymer made from propene is

(1)

- A plastic
- B poly(propane)
- C poly(propene)
- D poly(ethene)



(ii) Describe what is meant by the term **polymer**.

(2)

.....

.....

.....

.....

(iii) Many items made from polymers have a symbol like this.



This symbol shows that the polymer can be recycled.

Explain why it is an advantage to recycle polymers.

(2)

.....

.....

.....

.....

(Total for Question 2 = 8 marks)



Carbonates

3 The photograph shows a sedimentary rock.



(a) State what evidence in the photograph shows that the rock is a sedimentary rock.

(1)

(b) Limestone is a sedimentary rock.
Limestone is mainly calcium carbonate.

Complete the sentences by putting a cross (☒) in the box next to your answer.

(i) The formula of calcium carbonate is

(1)

- A CaO
- B CaC
- C CaCO
- D CaCO₃



(ii) Another rock that is mainly calcium carbonate is

(1)

- A cement
- B chalk
- C granite
- D magma

(c) When metal carbonates are heated some of them decompose giving carbon dioxide.

In an experiment to investigate how fast three metal carbonates decompose, equal masses of the carbonates are heated.

The table shows the changes observed and the time for carbon dioxide to be detected.

	changes observed	time for carbon dioxide to be detected / s
calcium carbonate	none	none detected
zinc carbonate	white powder turns yellow when hot	236
copper carbonate	green powder turns black	40

(i) Explain what evidence in the table shows that a chemical reaction occurs when copper carbonate is heated.

(2)

.....

.....

.....

.....



(ii) Use the information in the table to explain which of the carbonates is the easiest to decompose.

(2)

.....

.....

.....

.....

(iii) Describe an experiment in which copper carbonate is heated and the gas evolved is tested to show that the gas is carbon dioxide.

(3)

.....

.....

.....

.....

.....

.....

.....

(Total for Question 3 = 10 marks)

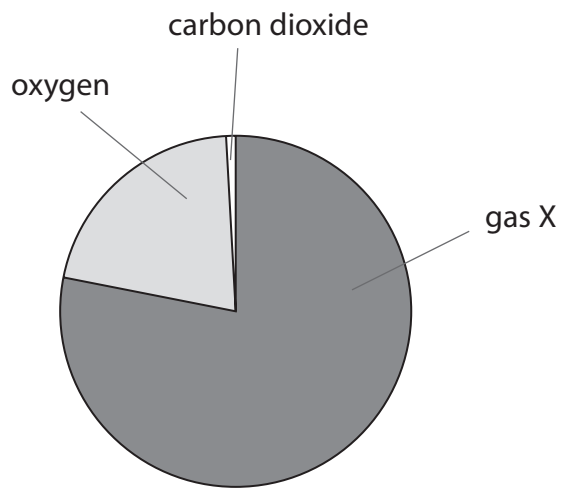
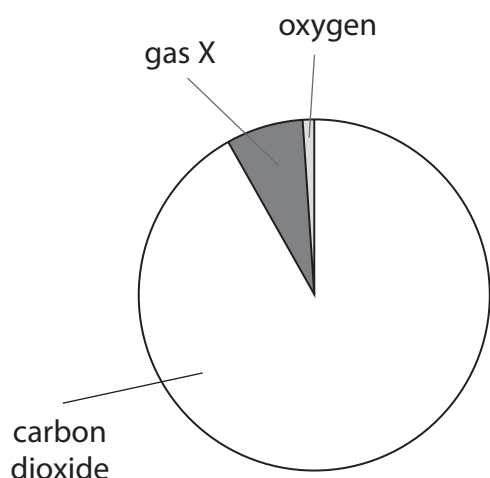


BLANK PAGE



The atmosphere

4 The pie charts show the likely composition of the atmosphere 2.5 billion years ago and what its composition is today.



(a) Complete the sentence by putting a cross (☒) in the box next to your answer.

Gas X is

- A chlorine
- B hydrogen
- C nitrogen
- D radon

(1)

(b) State what produced the gases in the Earth's early atmosphere.

(1)



(c) Describe how carbon dioxide from the atmosphere becomes calcium carbonate in rocks.

(2)

.....

.....

.....

.....

(d) When primitive plants appeared on Earth, the amount of oxygen in the atmosphere changed.

Explain why.

(2)

.....

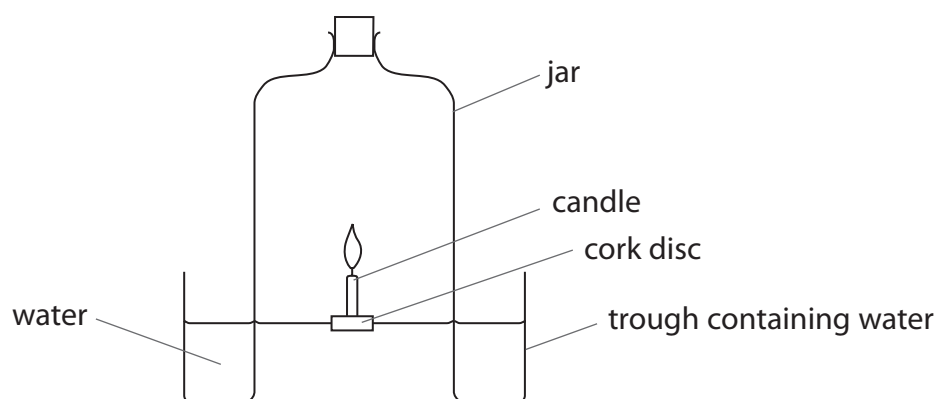
.....

.....

.....



- (e) The diagram shows a candle floating in a trough of water. A jar was placed over the candle after the candle was lit.



After the candle flame went out, the apparatus was left to cool to room temperature.

Explain how the water level inside the jar at the end of the experiment will have changed compared with the water level inside the jar at the start of the experiment.

(3)

.....

.....

.....

.....

.....

.....

.....

- (f) Candles are made of wax which contains octadecane. Octadecane burns in air to form carbon dioxide and water only.

Write the word equation for this reaction.

(2)

..... + → +

.....

(Total for Question 4 = 11 marks)



Fuels

5 When fuels are burnt, various gases can be given off including carbon monoxide, carbon dioxide, water vapour and sulfur dioxide.

(a) Give the name of the element that burns, in oxygen, to form sulfur dioxide.

(1)

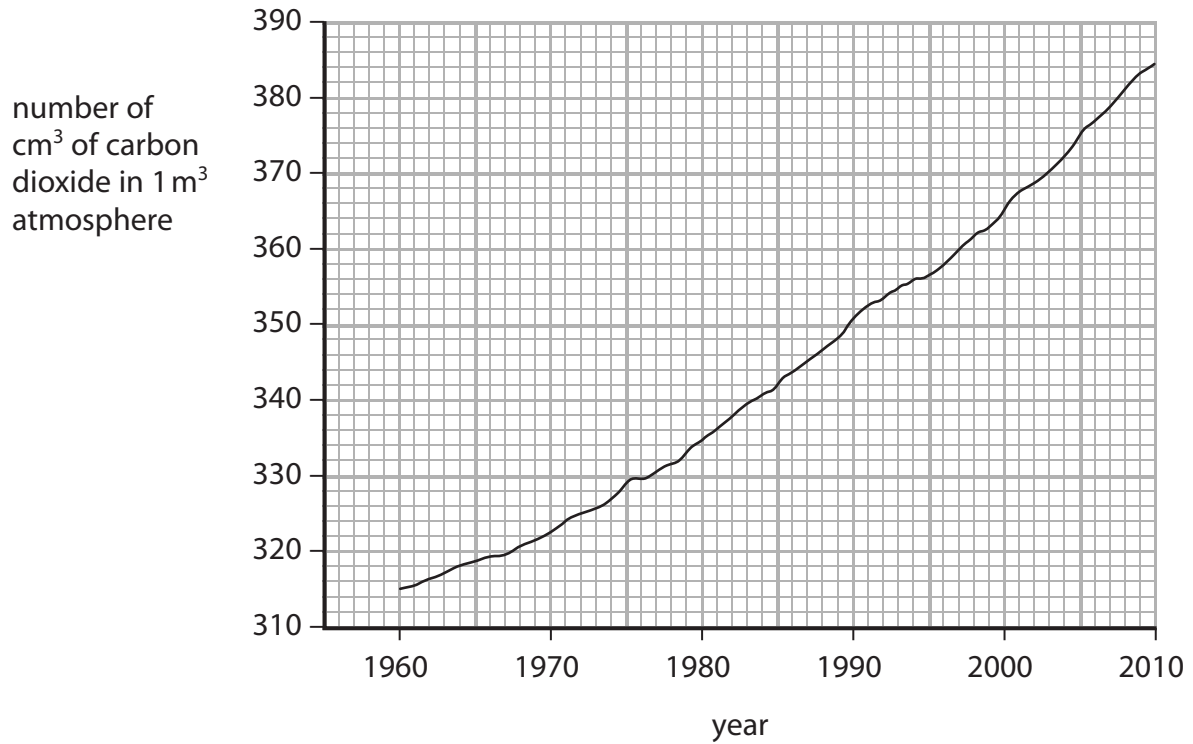
(b) Sulfur dioxide dissolves in water in the atmosphere to form acid rain.

State **two** problems caused by acid rain.

(2)



(c) The graph shows the concentration of carbon dioxide in the atmosphere above Hawaii from 1960 to 2010.



During this time, the average temperature on the Earth has increased by about 0.5 °C. Some people think that a change in the amount of carbon dioxide in the atmosphere has caused this change in temperature.

Explain how the data might or might not provide evidence for this idea.

(2)

.....

.....

.....

.....

(d) Complete the sentence by putting a cross (☒) in the box next to your answer.

Biofuels made from plants can be used instead of fossil fuels.
One advantage of using biofuels instead of fossil fuels is that they

(1)

- A are renewable
- B do not produce carbon dioxide when burnt
- C do not contain carbon
- D do not need land for their production



*(e) An experiment was carried out to determine the amount of heat energy released when different fuels were burned.
Equal masses of four different fuels, A, B, C and D, were burned and the heat energy released was used to raise the temperature of 100 g of water.

The table shows information about each fuel and the results of the experiment.

fuel	state of fuel at room temperature	ease of lighting fuel	relative amount of smoke produced	temperature rise of water/ °C
A	gas	very easy	none	12
B	liquid	very easy	none	20
C	liquid	easy	very little	38
D	liquid	easy	very little	45

Give the advantages and disadvantages of each fuel, explaining which of the four fuels would be best for use in a domestic heater.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(Total for Question 5 = 12 marks)



Acids

6 Hydrochloric acid is produced in the stomach.

(a) Complete the sentence by putting a cross (☒) in the box next to your answer.

A reason why hydrochloric acid is produced in the stomach is to

(1)

- A break down food
- B improve the taste of the food
- C neutralise acids
- D produce gases

(b) Too much hydrochloric acid in the stomach can cause indigestion. Indigestion tablets work by neutralising the excess hydrochloric acid in the stomach.

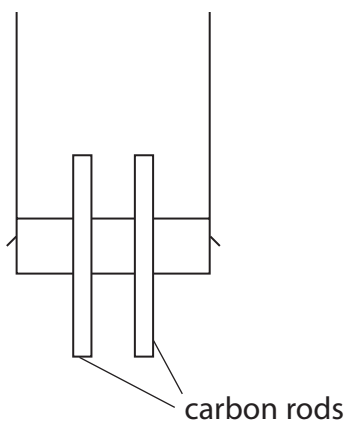
Some indigestion tablets contain calcium carbonate. The calcium carbonate reacts with the excess hydrochloric acid to form calcium chloride, water and carbon dioxide gas.

Write the word equation for this reaction.

(1)



*(c) Electrolysis can be used to decompose hydrochloric acid, HCl, into its elements.
Part of the apparatus that can be used is shown.



Explain how you would use this apparatus to carry out the electrolysis of hydrochloric acid in the laboratory, naming the products formed.
You may add to the diagram to help with your answer.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....



(d) A student is given a test tube of oxygen and a test tube of hydrogen.
The test tubes are unlabelled.

Explain how the student could test the gases to identify which test tube contains which gas.

(3)

.....

.....

.....

.....

.....

.....

.....

(Total for Question 6 = 11 marks)

TOTAL FOR PAPER = 60 MARKS



BLANK PAGE

