Write your name here

Surname	Other names

Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Chemistry/Science

Unit C1: Chemistry in Our World

Foundation Tier

Thursday 19 May 2016 – 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.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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P 4 5 9 2 7 A 0 1 2 4

PEARSON

The Periodic Table of the Elements

1	2											3	4	5	6	7	0
							1 **H** hydrogen 1										4 **He** helium 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	63.5 **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	[209] **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	Elements with atomic numbers 112-116 have been reported but not fully authenticated						

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.

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Questions begin on next page.

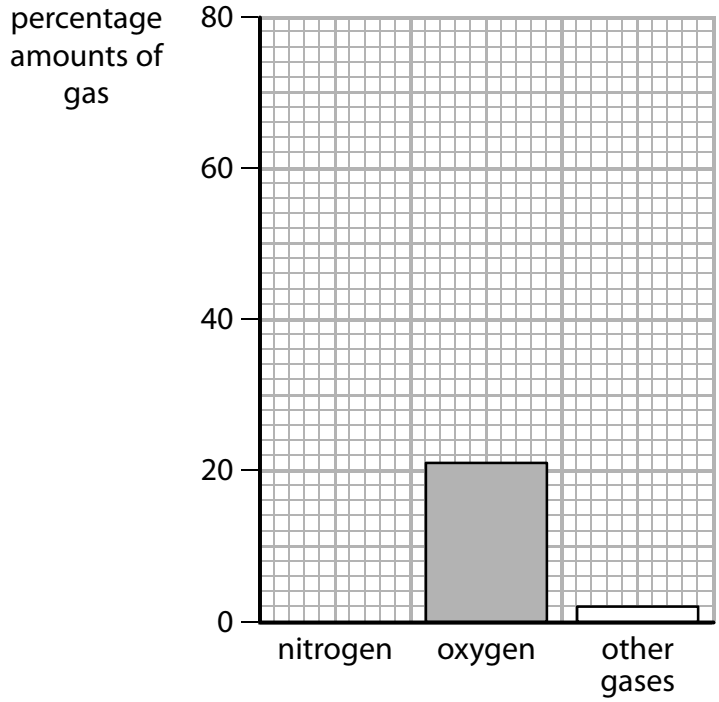
Answer ALL questions

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 ☒.

The atmosphere

1 (a) The bar chart shows the percentages of some gases in a sample of dry air from today's atmosphere.

The bar for the percentage of nitrogen is missing.



(i) The percentage of nitrogen is 78.

Add the bar to the chart to show this.

(1)

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

(1)

The bar chart shows the percentage of oxygen in this dry air is

☒ **A** 1

☒ **B** 11

☒ **C** 21

☒ **D** 31

(b) In the Earth's early atmosphere there was little or no oxygen.

Explain what caused the percentage of oxygen in the atmosphere to increase.

(2)

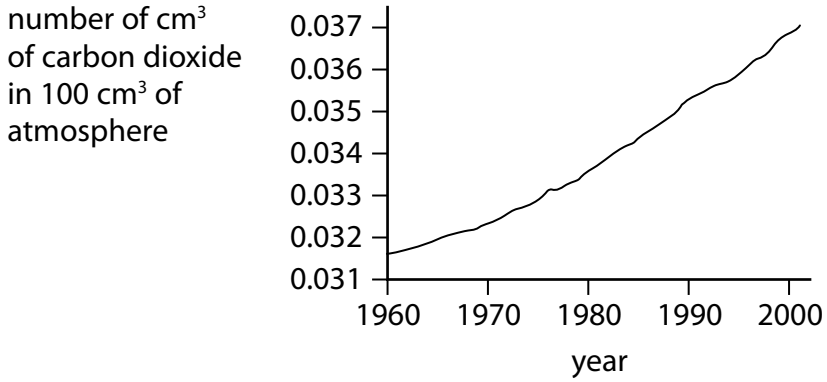
(c) Carbon dioxide is one of the other gases in the atmosphere.

(i) The formula of carbon dioxide is CO_2.

Describe what atoms are present in carbon dioxide.

(2)

(ii) The graph below shows the volume of carbon dioxide in the atmosphere between the years 1960 and 2000.



Explain one reason why the volume of carbon dioxide increased between the years 1960 and 2000.

(2)

(Total for Question 1 = 8 marks)

Acids and electrolysis

2 (a) Acids can be neutralised.

Which of the following compounds will neutralise sulfuric acid?

Put a cross (☒) in the box next to your answer.

(1)

☒ **A** sodium chloride

☒ **B** sodium hydroxide

☒ **C** sodium nitrate

☒ **D** sodium sulfate

(b) Indigestion is caused by excess hydrochloric acid in the stomach.

Calcium carbonate neutralises the excess hydrochloric acid, producing calcium chloride, a gas and water.

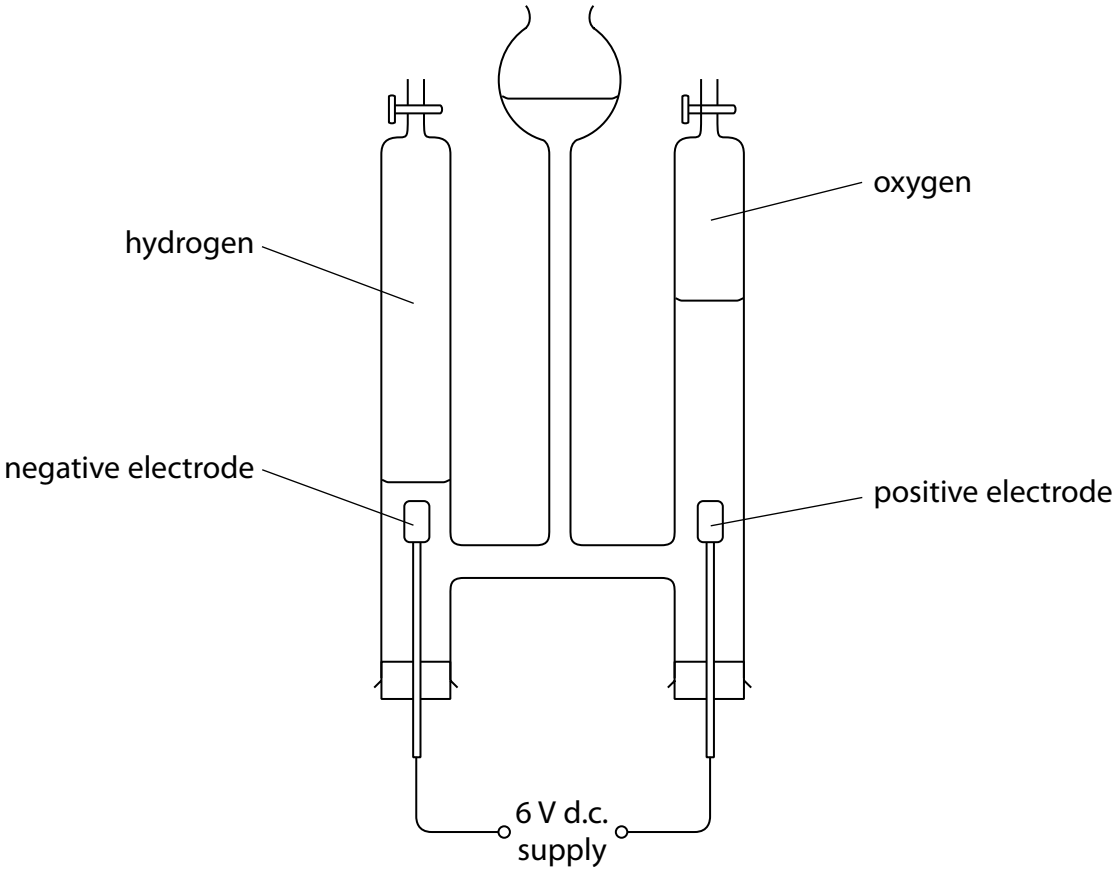
Use words from the box to complete the word equation for this reaction.

(2)

calcium hydroxide	calcium oxide	carbon dioxide
chlorine	hydrochloric acid	hydrogen

calcium carbonate + → calcium chloride + + water

(c) Water is electrolysed in the apparatus shown.
The water decomposes to produce hydrogen and oxygen.



(i) Describe the test to show that one of the gases evolved is oxygen.

(2)

.....

.....

.....

.....

(ii) After the experiment has started, the volumes of hydrogen and oxygen collected are measured after 2, 4 and 6 minutes.

The results are shown in the table.

time / minutes	volume of hydrogen / cm^3	volume of oxygen / cm^3
0	0.0	0.0
2	8.0	4.0
4	16.0	8.0
6	24.0	12.0

Describe what the results show about the volumes of hydrogen and oxygen produced during the experiment.

(2)

.....

.....

.....

.....

(d) When hydrochloric acid is electrolysed a gas is produced which bleaches damp blue litmus paper.

Give the name of this gas.

(1)

.....

(Total for Question 2 = 8 marks)

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Hydrocarbons

3 (a) Which of these is the formula of a hydrocarbon?

Put a cross (☒) in the box next to your answer.

(1)

☒ **A** C_2H_5Cl

☒ **B** C_2H_6

☒ **C** C_2H_6O

☒ **D** $NaHCO_3$

(b) Crude oil is a complex mixture of hydrocarbons.

(i) Give the name of the process used to separate crude oil into simpler mixtures.

(2)

.....

(ii) Petrol and kerosene are obtained from crude oil.
They are used as fuels.

Which line in the table shows the correct use of each fuel?

Put a cross (☒) in the box next to your answer.

(1)

	petrol used as fuel for	kerosene used as fuel for
☒ **A**	aircraft	cars
☒ **B**	cars	aircraft
☒ **C**	aircraft	ships
☒ **D**	cars	ships

(c) Propane reacts with oxygen to form carbon dioxide and water.

(i) Write the word equation for this reaction.

(2)

.....

(ii) Propane is an alkane.

Give the formula of a molecule of propane.

(2)

.....

(d) Explain a problem caused by incomplete combustion of hydrocarbons.

(2)

.....

.....

.....

.....

(Total for Question 3 = 10 marks)

DO NOT WRITE IN THIS AREA

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Metals

4 (a) Metals are extracted from ores found in the Earth's crust.

Draw a straight line from each metal to the method used to extract the metal from its ore.

(3)

metal	method of extraction from ore
aluminium	fractional distillation
gold	separating the uncombined metal
iron	heating with carbon
	electrolysis

(b) When a mixture of zinc oxide and carbon is heated, zinc metal is formed.

(i) Complete the word equation for this reaction.

(2)

zinc oxide + ... → zinc + ...

(ii) In this reaction zinc oxide has lost oxygen to form zinc.

State the name of the change that occurs when a compound loses oxygen.

(1)

.....

(c) Copper is used in electric wires.

State **two** properties of copper that make it suitable for this use.

(2)

property 1 .....

.....

property 2 .....

.....

(d) Gold jewellery is made of alloys containing gold and copper.
These alloys are stronger than pure gold.

Gold atoms are bigger than copper atoms.

Use this information to explain why these gold alloys are stronger than pure gold.

(2)

.....

.....

.....

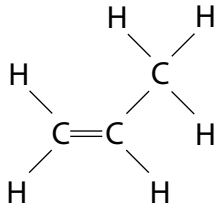
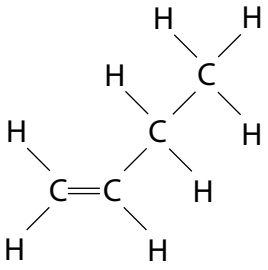
(Total for Question 4 = 10 marks)

Alkenes and polymers

5 (a) This table showing the names, molecular formulae and structures of the three alkenes is incomplete.

Complete the table.

(3)

name of alkene	molecular formula	structure
ethene	C_2H_4	
	C_3H_6	
butene		

(b) Describe what is **seen** when bromine water is added to a sample of a liquid alkene and the mixture is shaken.

(2)

.....

.....

.....

.....

(c) In industry alkenes are formed when large alkane molecules are broken down into smaller alkane molecules and alkenes.

What is the name of this process?

Put a cross (☒) in the box next to your answer.

(1)

☒ **A** combustion

☒ **B** cracking

☒ **C** neutralisation

☒ **D** precipitation

*(d) The uses of polymers are related to their properties.

The uses of some common polymers are shown in the table.

polymer	uses
poly(ethene)	plastic bags, plastic bottles, insulation for electrical wires
poly(chloroethene) (PVC)	window frames, gutters, insulation for electrical wires
poly(tetrafluoroethene) (PTFE)	coating for pans and skis, stain-proofing fabrics and carpets, containers for corrosive substances

A problem with polymers is that it is difficult to dispose of them after use.

Describe how the uses of these polymers are related to their properties, explaining the problems of disposing of these polymers.

(6)

DO NOT WRITE IN THIS AREA

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DO NOT WRITE IN THIS AREA

(Total for Question 5 = 12 marks)

Limestone

6 (a) The photograph shows a sample of limestone.

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

(1)

.....

.....

.....

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

(1)

Limestone is an important raw material.

In industry limestone is **not** used as a raw material to make

☒ **A** cement

☒ **B** concrete

☒ **C** glass

☒ **D** marble

(c) (i) When limestone is heated it breaks down to form calcium oxide and carbon dioxide.

Give the name of the process in which a substance is broken down by heating.

(2)

.....

(ii) Calcium hydroxide is formed when water is added to calcium oxide.

Write the word equation for this reaction.

(2)

.....

.....

*(d) Sulfur impurity can be present in the coal used in coal-fired power stations.
As a result of the presence of the sulfur impurity, the gases from the chimneys of these power stations can produce acid rain.
Limestone can be used to reduce the emission of these harmful gases from the chimneys of coal-fired power stations.

Explain how acid rain is formed, the environmental problems caused by acid rain and how the use of limestone in the chimneys of coal-fired power stations reduces these problems.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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