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 15 May 2014 – 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 ▶

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P 4 3 4 2 6 R A 0 1 2 0

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 ☒.

Changes in the atmosphere

1 (a) The Earth's earliest atmosphere was very different from the Earth's atmosphere today.

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

The Earth's earliest atmosphere was formed by

(1)

☒ **A** animals breathing

☒ **B** global warming

☒ **C** plants decaying

☒ **D** volcanic activity

(b) Use words from the box to complete the sentences.

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

argon	carbon dioxide	carbonates	neon	nitrogen

(3)

(i) The Earth's earliest atmosphere is thought to have contained

mainly .....

(ii) Over the years, carbon dioxide dissolved in the oceans and was absorbed by marine organisms.

The marine organisms eventually formed rocks which

are .....

(iii) The Earth's atmosphere today contains approximately 79%

of .....

(c) There is much less water vapour in the Earth's atmosphere today than in the Earth's earliest atmosphere.

Explain how the amount of water vapour decreased.

(2)

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.....

(d) When plants first started to grow on the Earth they caused the composition of the atmosphere to change.

Describe how the composition of the atmosphere changed as a result of plants growing.

(2)

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(Total for Question 1 = 8 marks)

Metals

2 (a) Metals are extracted from rocks found in the Earth's crust.

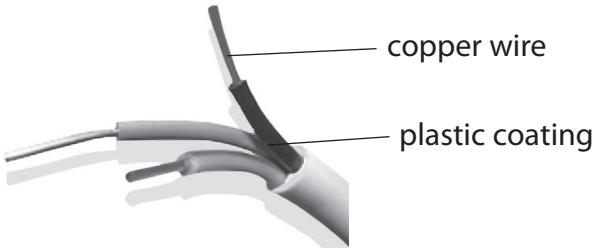
Complete the sentence by putting a cross (☒) in the box next to your answer.

Rocks from which metals are extracted are called

(1)

- ☒ **A** alloys
- ☒ **B** elements
- ☒ **C** ores
- ☒ **D** polymers

(b) Copper is used as the wire in electric cables.



State **two** reasons why copper is used as the wire in electric cables.

(2)

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.....

.....

(c) Iron is formed by heating a mixture of iron oxide and carbon.

(i) Complete the word equation for this reaction.

(2)

iron oxide + carbon → ..... + ...

(ii) In this reaction iron oxide is reduced to iron.

Describe what is meant by the term **reduced**.

(1)

.....

.....

(d) Metals in waste products are often recycled.

Describe the benefits of recycling metals.

(2)

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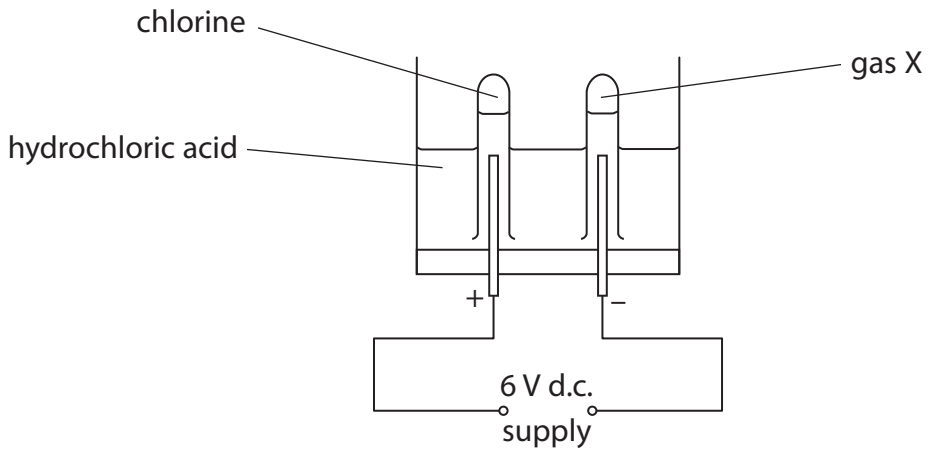
(Total for Question 2 = 8 marks)

Hydrochloric acid and chlorine

3 Hydrochloric acid can be electrolysed to form two gases, using the apparatus shown in the diagram.



(a) Chlorine is one of the gases formed.

Give the name of gas X.

(1)

.....

(b) (i) Write the formula for a molecule of chlorine gas.

(1)

.....

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

Chlorine is used on a large scale to

(1)

☒ **A** neutralise soil acidity

☒ **B** neutralise acidic gases in power stations

☒ **C** manufacture bleach

☒ **D** manufacture poly(ethene)

(iii) Describe a test to show a gas is chlorine.

(2)

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(c) Hydrochloric acid is present in the stomach.

Describe what hydrochloric acid does in the stomach.

(2)

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(d) Magnesium carbonate reacts with dilute hydrochloric acid.

Complete the word equation for this reaction

magnesium carbonate + hydrochloric acid → ..... + ... + ...

(3)

(Total for Question 3 = 10 marks)

Crude oil fractions

4 Crude oil can be separated into useful products.

(a) Crude oil is non-renewable.

State what is meant by the term **non-renewable**.

(1)

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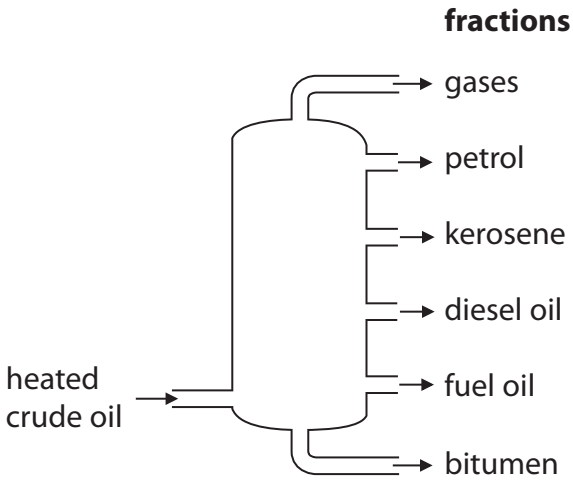
(b) Crude oil is separated into fractions by fractional distillation.

The diagram shows a fractional distillation column and the fractions produced.



(i) Draw one straight line from each fraction to a use of that fraction.

(2)

fraction	use of fraction
kerosene	surfacing roads
fuel oil	fuel for large ships
bitumen	fuel for planes
	fuel for trains

(ii) The petrol fraction and the diesel oil fraction have different physical properties.

Choose one property, describing the difference between the fractions.

(2)

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(c) The petrol fraction contains octane, C_8H_{18}.

Octane is a hydrocarbon.

Describe what is meant by the term **hydrocarbon**.

(2)

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(d) The oil industry uses a process to break down longer chain hydrocarbon molecules into shorter chain hydrocarbon molecules.

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

(1)

This process is called

☒ **A** cracking

☒ **B** extraction

☒ **C** polymerisation

☒ **D** recycling

(ii) The shorter chain hydrocarbon molecules produced are alkanes and alkenes.

Bromine can be used to distinguish between alkanes and alkenes.

Describe what is **seen** when bromine water, which is orange-coloured, is shaken with an alkane and with an alkene.

(2)

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.....

.....

(Total for Question 4 = 10 marks)

Fuels

5 (a) Petrol is a flammable liquid.

Which hazard symbol is used on containers to show that the liquid in the container is flammable?

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

(1)

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(b) Some people suggest that hydrogen, rather than petrol, should be used as a fuel in cars but there are disadvantages in the widespread use of hydrogen.

Describe the disadvantages of hydrogen, rather than petrol, being used as a fuel in cars.

(3)

(c) Sulfur is an impurity in many fuels.

When fuels containing sulfur impurities are burnt, sulfur dioxide is released into the atmosphere.

Describe some problems this sulfur dioxide can cause.

(2)

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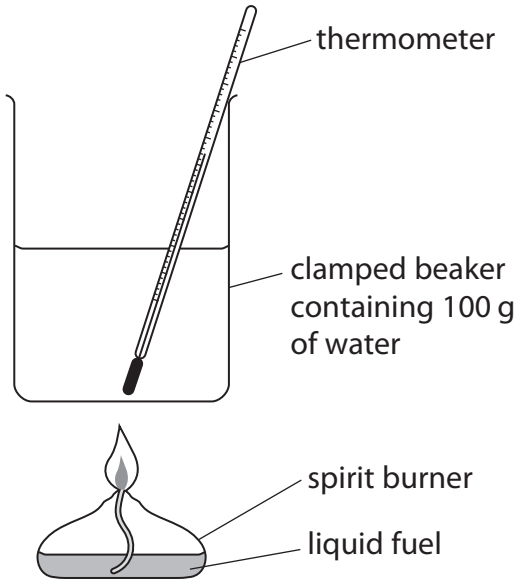
*(d) Experiments were carried out to measure the heat energy given out when three liquid fuels, **A**, **B** and **C**, were burned.

In each experiment the same mass of fuel was used to heat the same volume of water, using the apparatus shown.



Here are the results, together with the cost of the mass of fuel burnt in each experiment.

fuel	initial temperature of water (°C)	final temperature of water (°C)	cost of fuel burnt (pence)	observations of the way the fuel burns
A	15	51	3.0	burns with a blue flame – no smoke
B	16	21	0.5	burns with a yellow flame – black smoke
C	15	39	2.0	burns with a yellow flame – no smoke

A student considered these results and decided that fuel **B** was the best fuel.

Considering all the evidence for the fuels, **A**, **B**, and **C**, explain whether this is a good choice or not.

(6)

(Total for Question 5 = 12 marks)

Limestone

6 (a) Limestone occurs naturally as calcium carbonate.

When calcium carbonate, $CaCO_3$, is heated strongly, calcium oxide and carbon dioxide, CO_2, are formed.

(i) State the formula of calcium oxide.

(1)

.....

(ii) What type of reaction is this?

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

(1)

☒ **A** incomplete combustion

☒ **B** oxidation

☒ **C** precipitation

☒ **D** thermal decomposition

(iii) Write the word equation for this reaction.

(2)

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(b) Limestone is a sedimentary rock.

Describe how sedimentary rocks are formed.

(2)

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*(c) The photograph shows a limestone quarry.

There is a proposal to open a limestone quarry near a village in a popular tourist area.

Evaluate the advantages and disadvantages to the local area of opening this quarry.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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