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 18 January 2018 – 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 5 7 5 7 9 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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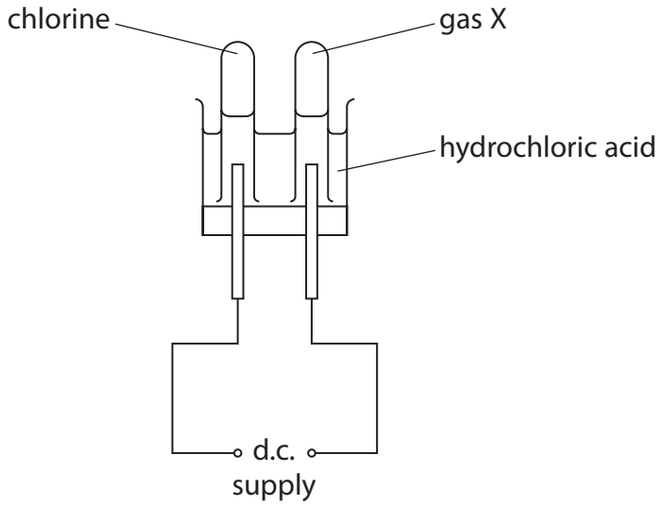
Questions begin on next page.

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 ☒.

Hydrochloric acid

1 (a) Dilute hydrochloric acid can be decomposed by passing a direct electric current through it using the apparatus shown in the diagram.



(i) Give the name of the process in which a substance is decomposed by a direct electric current.

(1)

.....

(ii) The experiment is carried out in a fume cupboard because chlorine gas is formed.

Explain why a fume cupboard is used.

(2)

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.....

(iii) Gas **X** is tested.
A burning splint is applied to a mixture of gas **X** and air in a test tube.
A squeaky pop is heard as the gas burns.

Give the name of gas **X**.

(1)

.....

(b) Hydrochloric acid is produced in the stomach.

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

Hydrochloric acid in the stomach helps to break down food.
Hydrochloric acid in the stomach also

(1)

☒ **A** improves the flavour of the food

☒ **B** kills bacteria

☒ **C** neutralises acid

☒ **D** releases energy

(ii) Acid indigestion is caused by excess hydrochloric acid in the stomach.

Which of these could help to cure acid indigestion safely?

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

(1)

☒ **A** sodium chloride

☒ **B** sodium hydroxide

☒ **C** calcium carbonate

☒ **D** calcium chloride

(c) Hydrochloric acid reacts with metal oxides to form a salt and water.

Complete the word equation for the reaction of magnesium oxide with hydrochloric acid.

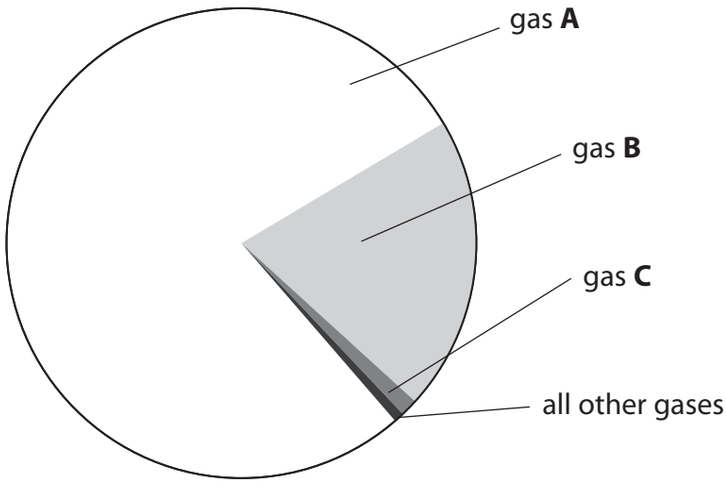
(2)

magnesium oxide + hydrochloric acid → .....

(Total for Question 1 = 8 marks)

The atmosphere

2 (a) The pie chart shows the percentages by volume of gases in dry air.



(i) State the name of gas **A**.

(1)

.....

(ii) Gas **B** is released by photosynthesis.

State the name of gas **B** and state the percentage of gas **B** in dry air.

(2)

name .....

percentage = ...

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

Gas **C** is

(1)

☒ **A** ammonia

☒ **B** argon

☒ **C** carbon dioxide

☒ **D** water vapour

(iv) Gas **A** makes up the largest percentage of dry air.
All the other gases make up 22% of dry air.

Calculate the percentage of gas **A** in dry air.

(1)

.....

percentage of gas **A** = ...

(b) The Earth's early atmosphere contained a large amount of water vapour.

(i) State how this water vapour entered the early atmosphere.

(1)

.....

.....

.....

(ii) Today's atmosphere contains a very different amount of water vapour.

Explain why the amount of water vapour in the atmosphere has changed.

(2)

.....

.....

.....

(Total for Question 2 = 8 marks)

Metals

3 Iron and aluminium are metals.

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

Most metals are extracted from rocks found in the Earth's crust.

Rocks from which metals can be extracted are called

(1)

☒ **A** elements

☒ **B** igneous

☒ **C** ores

☒ **D** sand

(b) Iron is extracted by heating a mixture of iron oxide and carbon.

Complete the word equation for this reaction.

(2)

iron oxide + ... → iron + ...

(c) Aluminium, rather than iron, is used as the main metal in the production of aeroplanes.

Give **two** reasons why aluminium is used as the main metal in the production of aeroplanes.

(2)

reason 1 .....

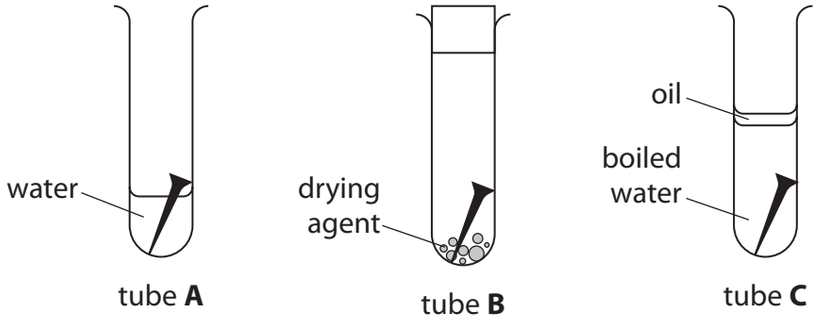
.....

reason 2 .....

.....

(d) An experiment was carried out to investigate the conditions needed for iron to rust.

Three test tubes, **A**, **B** and **C**, had identical iron nails placed in them, under different conditions.



The tubes were left for two weeks.
The observations are recorded in the table.

test tube	conditions	observations
A	air and water	rusted
B	dry air	not rusted
C	boiled water containing no air	not rusted

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

(2)

.....

.....

.....

.....

.....

(e) Stainless steel is an alloy containing iron and chromium.

(i) State what is meant by an **alloy**.

(2)

.....

.....

(ii) Cutlery is made of stainless steel.

Give a reason why cutlery is not made of pure iron.

(1)

.....

.....

.....

(Total for Question 3 = 10 marks)

Plastics

4 (a) Molecules of plastics are long chains of repeating units.

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

A substance that contains molecules that are long chains of repeating units is

(1)

☒ **A** an alkene

☒ **B** a biofuel

☒ **C** a polymer

☒ **D** a salt

(ii) Describe how ethene molecules can form molecules that are long chains of repeating units.

(2)

.....

.....

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.....

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(b) An experiment was carried out to see if different plastics, **A**, **B** and **C**, were biodegradable.

In the experiment, 100 g of each plastic was buried in identical samples of soil under identical conditions.

After 100 days and 200 days the mass of each plastic remaining was measured.

The results are shown in the table.

	mass remaining / g	
plastic	**after 100 days**	**after 200 days**
A	46	14
B	32	2
C	100	100

(i) Give the meaning of the term **biodegradable**.

(2)

.....

.....

.....

(ii) Explain, using evidence from the table, which plastic is non-biodegradable.

(2)

.....

.....

.....

.....

(iii) Give one advantage of disposing of waste plastic by burning.

(1)

.....

.....

.....

(c) Poly(chloroethene) is used as a plastic.
A molecule of poly(chloroethene) can be shown as $(CH_2CHCl)_n$.

Give the names of the **three** elements present in poly(chloroethene).

(1)

.....

(Total for Question 4 = 9 marks)

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Rocks

5 (a) Limestone is a sedimentary rock.
Limestone is a form of calcium carbonate.

(i) A sample of limestone has a layered structure and contains fossils.

Explain how this limestone has formed.

(2)

(ii) When calcium carbonate is heated strongly, it is converted into calcium oxide.

This is a thermal decomposition reaction.

Explain what is meant by **thermal decomposition**.

(2)

(iii) When a given mass of solid calcium carbonate is completely decomposed, the solid calcium oxide formed has a lower mass.

Explain why the mass of calcium oxide at the end of the reaction is less than the original mass of calcium carbonate.

(2)

*(b) Limestone is an important raw material and has many uses.
Large quantities of limestone are extracted from quarries.

A decision is made to close a limestone quarry.

Describe large scale uses of limestone and discuss the advantages and disadvantages for a local community if the limestone quarry in the area is closed.

(6)

(Total for Question 5 = 12 marks)

Fuels

6 Petrol is a fuel used in cars.

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

Petrol is obtained from crude oil.
The process used to separate petrol from crude oil is

(1)

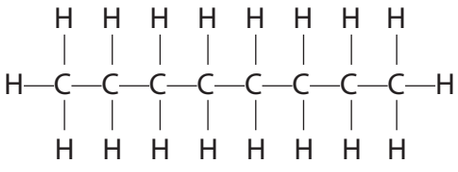
☒ **A** dissolving

☒ **B** electrolysis

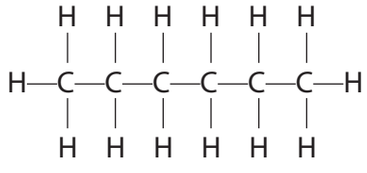
☒ **C** filtration

☒ **D** fractional distillation

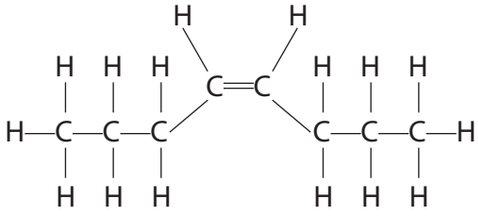
(b) A molecule of each of three substances, **P**, **Q** and **R**, is shown below.



substance **P**



substance **Q**



substance **R**

(i) One of the substances found in petrol is octane, C_8H_{18}.

Explain which of the substances, **P**, **Q** or **R**, is octane.

(2)

.....

.....

.....

(ii) A small amount of bromine water is shaken with separate samples of **P**, **Q** and **R**.
One mixture changes colour from orange to colourless.
The other two mixtures remain orange.

Explain which two of the mixtures remain orange.

(2)

.....

.....

.....

(iii) Substances **P**, **Q** and **R** are all hydrocarbons.

Explain how the formulae of substances **P**, **Q** and **R** show that they are all hydrocarbons.

(2)

.....

.....

.....

*(c) Petrol and hydrogen are both fuels that can be burnt in the engines of cars.

Identify the products formed when each of these fuels burns and give the advantages and disadvantages of using hydrogen rather than petrol as a fuel in cars.

(6)

(Total for Question 6 = 13 marks)

TOTAL FOR PAPER = 60 MARKS

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