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 14 May 2015 – 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 ▶

P44681A

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

P 4 4 6 8 1 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.

BLANK PAGE

Questions begin on next page.

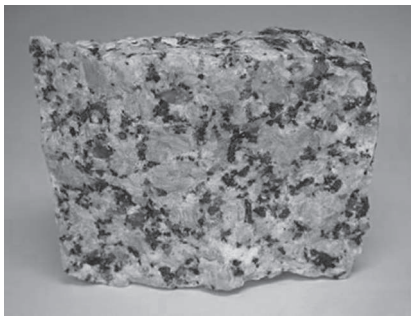
Answer ALL questions

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 ☒.

Rocks

1 Rocks can be described as igneous, metamorphic, or sedimentary.

(a) The photograph shows a sample of igneous rock.



© Geology.com

Describe how igneous rocks are formed.

(2)

.....

.....

.....

.....

(b) The table shows characteristics of three rocks, A, B and C.

rock	fossils	layers	easily eroded
A	no	no	no
B	yes	yes	yes
C	no	yes	no

Give the letter of the rock that is likely to be sedimentary.

(1)

.....

(c) Limestone is a naturally occurring form of calcium carbonate.

When calcium carbonate is heated strongly, it decomposes to form calcium oxide and carbon dioxide.

(i) Write the word equation for this reaction.

(2)

..... → ..... + ...

(ii) Water is added, a drop at a time, to a lump of cold calcium oxide.

Describe what is **seen** as the water is added.

(2)

.....

.....

.....

.....

(d) In the Earth's crust, limestone can change into a metamorphic rock by the action of heat and high pressure.

Give the name of the metamorphic rock formed.

(1)

.....

(Total for Question 1 = 8 marks)

Atmosphere

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

The Earth's earliest atmosphere is thought to have been formed by

(1)

☒ **A** animals breathing

☒ **B** photosynthesis in plants

☒ **C** the oceans cooling

☒ **D** gases from volcanoes

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

The Earth's earliest atmosphere contained large amounts of carbon dioxide.

The percentage of carbon dioxide in the Earth's atmosphere today is

(1)

☒ **A** less than 1%

☒ **B** 5%

☒ **C** 21%

☒ **D** 78%

(ii) Write the formula of a molecule of carbon dioxide.

(1)

.....

(iii) The percentage of carbon dioxide in the atmosphere has decreased since the Earth's earliest atmosphere.

Explain what has caused the amount of carbon dioxide in the atmosphere to decrease.

(2)

.....

.....

(iv) State one human activity that increases the amount of carbon dioxide in the atmosphere today.

(1)

.....

(v) Describe the test to show that a gas is carbon dioxide.

(2)

.....

.....

.....

(Total for Question 2 = 8 marks)

Hydrochloric acid

3 Hydrochloric acid is present in the stomach to help digestion.

(a) State another effect hydrochloric acid has in the stomach.

(1)

.....

.....

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

Indigestion can occur when excess acid is present in the stomach.
To relieve the pain caused by indigestion, people take indigestion tablets.

Indigestion tablets in the stomach

(1)

☒ **A** dilute the excess acid

☒ **B** neutralise the excess acid

☒ **C** polymerise the excess acid

☒ **D** oxidise the excess acid

(c) Some indigestion remedies contain magnesium hydroxide.

Which of the following substances is formed when magnesium hydroxide reacts with hydrochloric acid in the stomach?

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

(1)

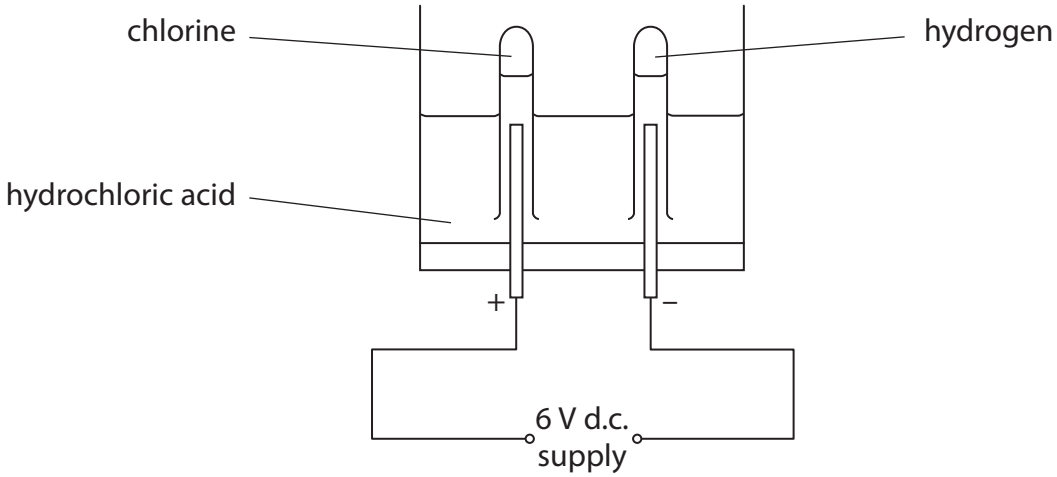
☒ **A** magnesium chloride

☒ **B** magnesium carbonate

☒ **C** magnesium nitrate

☒ **D** magnesium sulfate

(d) Hydrochloric acid can be used to make chlorine in the apparatus shown.



(i) The experiment shown is an example of electrolysis.

Explain the meaning of **electrolysis**.

(2)

.....

.....

.....

(ii) Describe the test to show a gas is chlorine.

(2)

.....

.....

.....

(iii) Great care has to be taken when chlorine is manufactured on a large scale.

Explain the potential hazards of storing large volumes of chlorine.

(2)

.....

.....

.....

(iv) State a large-scale use of chlorine.

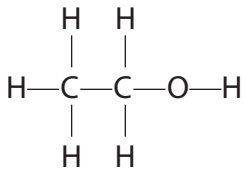
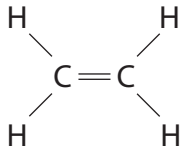
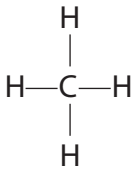
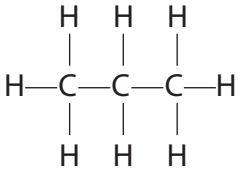
(1)

.....

(Total for Question 3 = 10 marks)

Hydrocarbons

4 (a) The table shows the name and structure of four different organic molecules.

name	structure
ethanol	
ethene	
methane	
propane	

Use the information in the table to answer the following questions.
Each of the molecules can be used once, more than once, or not at all.

(i) Give the name of the molecule that is **not** a hydrocarbon.

(1)

.....

(ii) Give the name of the molecule that is unsaturated.

(1)

.....

(iii) Give the name of the molecule that is used as a monomer in a polymerisation reaction.

(1)

.....

(b) Bromine water is used to distinguish between alkenes and alkanes.

Describe what would be **seen** when an alkene and an alkane are shaken with separate samples of bromine water.

(3)

alkene .....

.....

alkane .....

.....

(c) PTFE (poly(tetrafluoroethene)) is a polymer used to coat some frying pans.

Give **two** reasons why PTFE is used as a coating for frying pans.

(2)

reason 1 .....

.....

reason 2 .....

.....

(d) The disposal of items made of polymers can cause problems.

Explain **one** of the problems associated with the disposal of these items.

(2)

.....

.....

.....

.....

(Total for Question 4 = 10 marks)

Renewable fuels

5 Bioethanol and hydrogen are fuels that can be used instead of fossil fuels.

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

All fuels **must**

(1)

☒ **A** be liquid at room temperature

☒ **B** burn slowly

☒ **C** produce heat energy when they burn

☒ **D** produce no waste gases when they burn

(b) Hydrogen is used as a fuel in the engines of some vehicles.

In these engines hydrogen reacts with oxygen to form water.

(i) Write the word equation for this reaction.

(2)

.....

(ii) State one advantage of using hydrogen, rather than petrol, as a fuel for vehicles.

(1)

.....

.....

(iii) Explain one disadvantage of using hydrogen as a fuel for vehicles.

(2)

.....

.....

.....

*(c) Bioethanol is a biofuel which is produced from plant material.

Petrol is a fossil fuel which is obtained from crude oil.

Describe the advantages and disadvantages of using bioethanol, rather than petrol, as a fuel for vehicles.

(6)

(Total for Question 5 = 12 marks)

Iron and steel

6 (a) Iron can be extracted from a naturally occurring substance called haematite.

State the name given to the naturally occurring substances from which metals are extracted.

(1)

.....

(b) In the extraction of iron, iron oxide is heated with carbon to form iron.
A gas is also formed.

Write the word equation for this reaction.

(2)

.....

.....

(c) The table shows information about iron and two alloy steels.

metallic substance	density / kg m^{-3}	relative cost per tonne	relative strength	resistance to rusting
iron	7850	low	low	low
high speed steel	7850	high	very high	high
stainless steel	7480 – 8000	high	very high	high

Use the information from the table to suggest reasons why iron is converted to these alloy steels.

(2)

.....

.....

.....

.....

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

When iron nails are left exposed to air and water, the iron reacts to form rust.

In this reaction, iron is

(1)

☒ **A** oxidised

☒ **B** crystallised

☒ **C** neutralised

☒ **D** reduced

*(e) Metals are extracted by different methods which are linked to their position in the reactivity series of metals.

Iron is extracted from iron oxide by heating with carbon.
Gold is found uncombined in the Earth's crust.
Aluminium is extracted from aluminium oxide using electrolysis.

The list shows part of the reactivity series with iron, gold and aluminium missing.

calcium
magnesium

.....

zinc

.....

tin
lead

.....

Use the information given about the methods of extracting these metals to explain where in this reactivity series iron, gold and aluminium are placed.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

BLANK PAGE

BLANK PAGE

BLANK PAGE