

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 May 2017 – 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 ►

P48578A

©2017 Pearson Education Ltd.

1/2/1/1/1/



  
Pearson

# The Periodic Table of the Elements

1	2	3	4	5	6	7	0	
7 <b>Li</b> lithium 3	9 <b>Be</b> beryllium 4	11 <b>Na</b> sodium 11	12 <b>C</b> carbon 6	13 <b>Al</b> aluminium 13	14 <b>N</b> nitrogen 7	15 <b>O</b> oxygen 8	16 <b>F</b> fluorine 9	18 <b>Ne</b> neon 10
19 <b>K</b> potassium 19	20 <b>Ca</b> calcium 20	23 <b>Sc</b> scandium 21	24 <b>Ti</b> titanium 22	27 <b>V</b> vanadium 23	28 <b>Cr</b> chromium 24	29 <b>Mn</b> manganese 25	30 <b>Fe</b> iron 26	35.5 <b>Co</b> cobalt 27
37 <b>Rb</b> rubidium 37	38 <b>Sr</b> strontium 38	39 <b>Y</b> yttrium 39	40 <b>Zr</b> zirconium 40	41 <b>Nb</b> niobium 41	42 <b>Mo</b> molybdenum 42	43 <b>Tc</b> technetium 43	44 <b>Ru</b> ruthenium 44	45 <b>Rh</b> rhodium 45
55 <b>Cs</b> caesium 55	56 <b>Ba</b> barium 56	57 <b>La*</b> lanthanum 57	72 <b>Hf</b> hafnium 72	73 <b>Ta</b> tantalum 73	74 <b>W</b> tungsten 74	75 <b>Re</b> rhenium 75	76 <b>Os</b> osmium 76	77 <b>Ir</b> iridium 77
87 <b>Fr</b> francium 87	88 <b>Ra</b> radium 88	89 <b>Ac*</b> actinium 89	104 <b>Rf</b> rutherfordium 104	105 <b>Db</b> dubnium 105	106 <b>Sg</b> seaborgium 106	107 <b>Bh</b> bohrium 107	108 <b>Hs</b> hassium 108	109 <b>Mt</b> meitnerium 109
			133 <b>Sn</b> tin 50	134 <b>Pb</b> lead 82	135 <b>Bi</b> bismuth 83	136 <b>Po</b> polonium 84	137 <b>At</b> astatine 85	138 <b>Rn</b> radon 86
			119 <b>In</b> indium 49	120 <b>Cd</b> cadmium 48	121 <b>Hg</b> mercury 80	122 <b>Tl</b> thallium 81	123 <b>Pb</b> lead 82	124 <b>Bi</b> bismuth 83
			70 <b>Ga</b> gallium 31	71 <b>Zn</b> zinc 30	72 <b>Cu</b> copper 29	73 <b>Ni</b> nickel 28	74 <b>Pd</b> palladium 46	75 <b>Ag</b> silver 47
			115 <b>Sb</b> antimony 51	116 <b>Te</b> tellurium 52	117 <b>I</b> iodine 53	118 <b>Xe</b> xenon 54	119 <b>At</b> astatine 85	120 <b>Rn</b> radon 86
			122 <b>As</b> arsenic 33	123 <b>Se</b> selenium 34	124 <b>Br</b> bromine 35	125 <b>Kr</b> krypton 36	126 <b>Br</b> bromine 35	127 <b>Kr</b> krypton 36
			27 <b>Al</b> aluminium 13	28 <b>Si</b> silicon 14	29 <b>P</b> phosphorus 15	30 <b>S</b> sulfur 16	31 <b>Cl</b> chlorine 17	32 <b>Ar</b> argon 18
			11 <b>B</b> boron 5	12 <b>C</b> carbon 6	13 <b>N</b> nitrogen 7	14 <b>O</b> oxygen 8	15 <b>F</b> fluorine 9	16 <b>Ne</b> neon 10
			4 <b>He</b> helium 2					
<p>Key</p> <p>relative atomic mass atomic symbol name atomic (proton) number</p>								
<p>Elements with atomic numbers 112-116 have been reported but not fully authenticated</p>								

\* 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.



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

**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 ☒.

**Carbon dioxide**

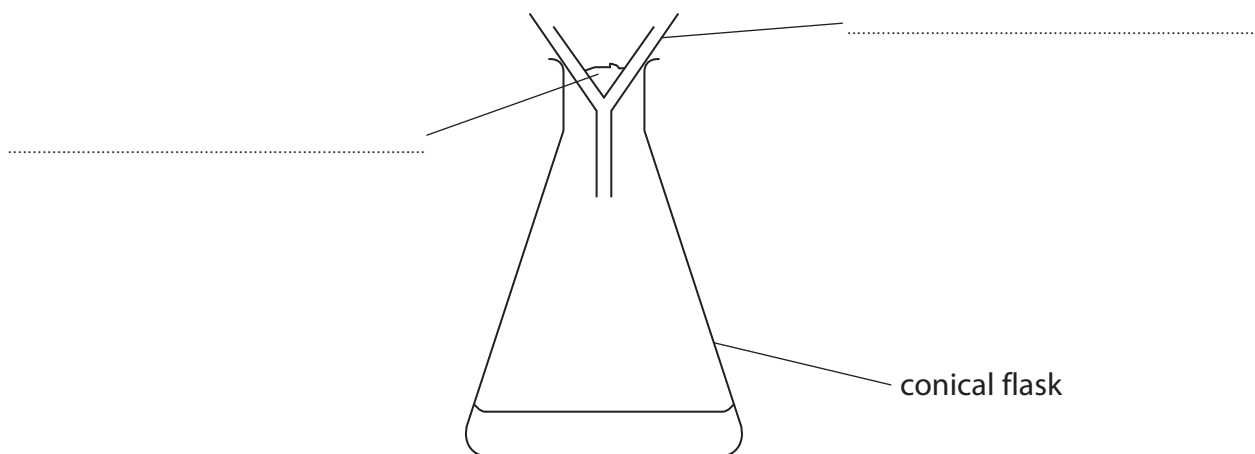
- 1 One of the gases in today's atmosphere is carbon dioxide.
- (a) Carbon dioxide is detected by bubbling it through limewater.  
A white precipitate forms in the test tube showing that the gas is carbon dioxide.
- (i) Complete the sentence by putting a cross (☒) in the box next to your answer. (1)

Limewater is a solution of

- A hydrochloric acid
- B calcium hydroxide
- C sodium chloride
- D sodium hydroxide

- (ii) The white precipitate formed is filtered off.

The diagram shows the results of the filtration.



Complete the two labels on the diagram.

(2)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



(b) The amount of carbon dioxide in today's atmosphere is different from that in the Earth's early atmosphere.

(i) State a way in which carbon dioxide is removed from the atmosphere. (1)

(ii) State a way in which carbon dioxide was added to the atmosphere before humans were on the Earth. (1)

(c) Methane is a hydrocarbon.

When methane burns completely, it reacts with oxygen to form carbon dioxide and one other product.

(i) Write the word equation for this reaction. (2)

(ii) Which of these is used in the largest amount as a fuel?

Put a cross (☒) in the box next to your answer. (1)

- A bitumen
- B diesel oil
- C hydrogen
- D oxygen

**(Total for Question 1 = 8 marks)**



## Metals

2 Metals are found in the Earth's crust.

(a) Unreactive metals are found as uncombined metals.

Which of these metals is usually found uncombined in the Earth's crust?

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

(1)

- A gold
- B iron
- C potassium
- D zinc

(b) (i) Lead can be produced by heating lead oxide with carbon.

Complete the word equation for this reaction.

(2)

lead oxide + ..... → lead + .....

(ii) In this reaction, lead oxide is reduced.

Complete the sentence.

(1)

Lead oxide has been reduced because it has lost .....

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



- (c) Aluminium is extracted from aluminium oxide by electrolysis.  
Heating with carbon is not used to extract aluminium from aluminium oxide.

Explain why aluminium is not extracted by heating with carbon.

(2)

.....

.....

.....

.....

- (d) There are many uses of aluminium. These uses are related to its properties.

The table shows information about the properties of aluminium and steel.

metallic substance	density / kg m <sup>-3</sup>	cost per tonne / £	relative strength	relative ability to conduct electricity	relative resistance to corrosion
aluminium	2700	1000	high	good	good
steel	7820	100	very high	good	poor

Use the information in the table to explain which properties of aluminium make it more suitable than steel for use in overhead power cables.

(2)

.....

.....

.....

.....

.....

.....

**(Total for Question 2 = 8 marks)**



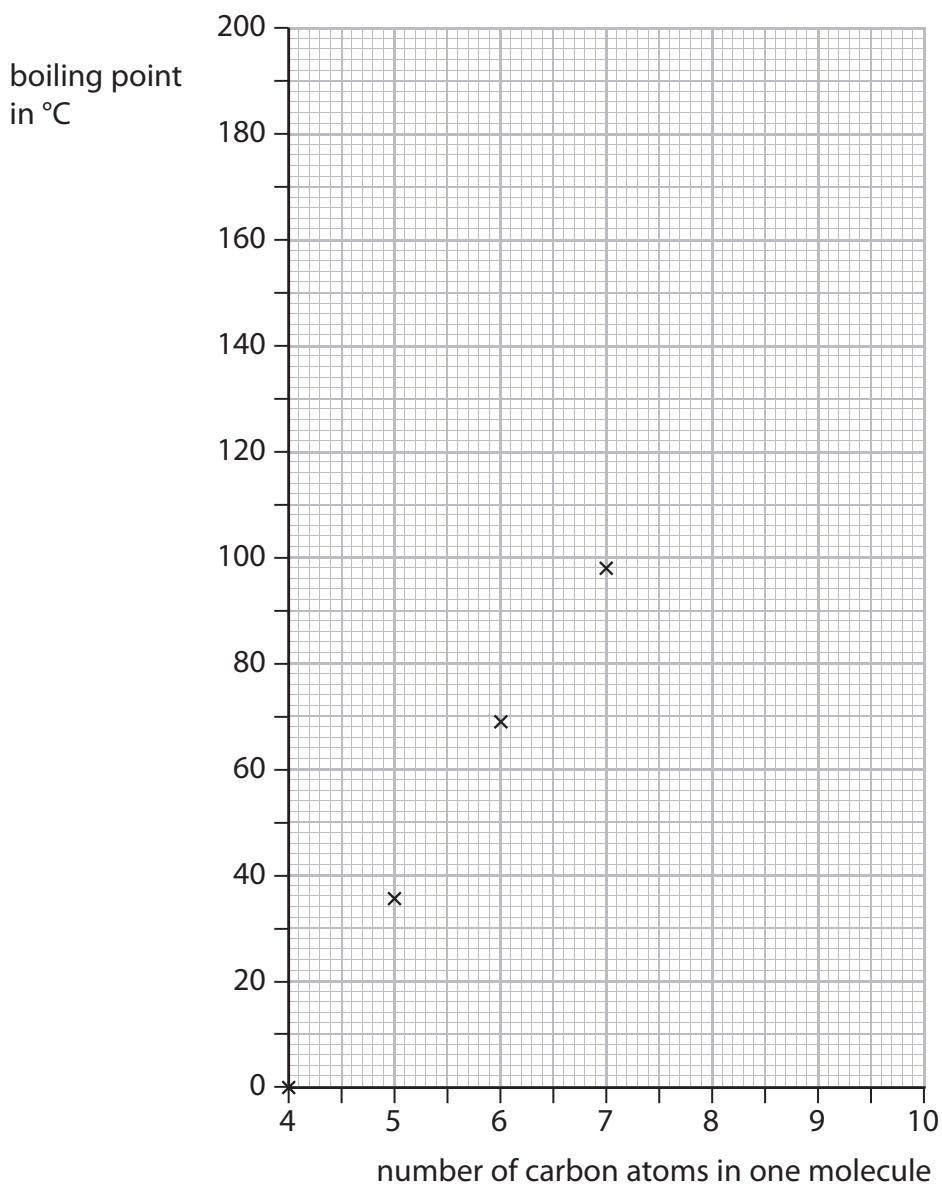
## Alkanes

- 3 (a) The alkanes are hydrocarbons.

The table shows the number of carbon atoms per molecule and the boiling point for some alkanes.

alkane	number of carbon atoms in one molecule	boiling point (°C)
butane	4	0
pentane	5	36
hexane	6	69
heptane	7	98
octane	8	126
nonane	9	151

The boiling points for butane, pentane, hexane and heptane are plotted on the graph.



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA





(i) Plot the boiling points for octane and nonane and draw the line of best fit. (2)

(ii) Describe the trend shown by the line of best fit on the graph. (2)

(iii) Extend the line on your graph to estimate the boiling point of the alkane with ten carbon atoms in one of its molecules. (2)

boiling point = .....

(iv) Complete the sentence by putting a cross (☒) in the box next to your answer. (1)

All alkanes

- A have molecules containing oxygen atoms
- B form a colourless mixture when shaken with bromine water
- C can burn in a limited supply of air to form carbon monoxide
- D have molecules that each have a C=C bond

(b) When propane is heated it can form propene and one other product.

Complete the word equation and then draw the structure of propene, showing all bonds, in the empty box.

(3)

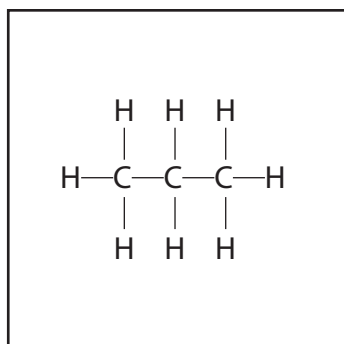
propane

→

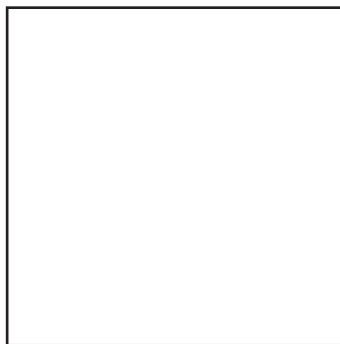
propene

+

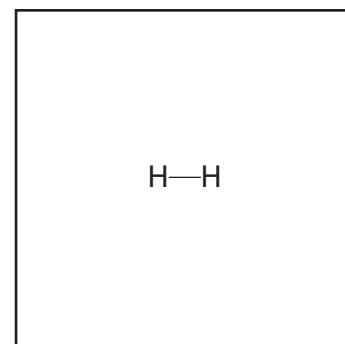
.....



→



+



(Total for Question 3 = 10 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



P 4 8 5 7 8 A 0 9 2 0

## Limestone

4 (a) Limestone is a rock which often occurs as layers and contains fossils.

Which type of rock is limestone?

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

(1)

- A igneous
- B magma
- C metamorphic
- D sedimentary

(b) Give a large-scale use of limestone.

(1)

(c) Limestone is extracted in large quantities from quarries.

Explain why some people might object to the opening of a limestone quarry near to where they live.

(2)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

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

Calcium carbonate can be broken down by heating to form calcium oxide and carbon dioxide.

(i) Write the word equation for this reaction. (2)

(ii) When 5.0 g of calcium carbonate was completely decomposed, 2.8 g of calcium oxide was formed.

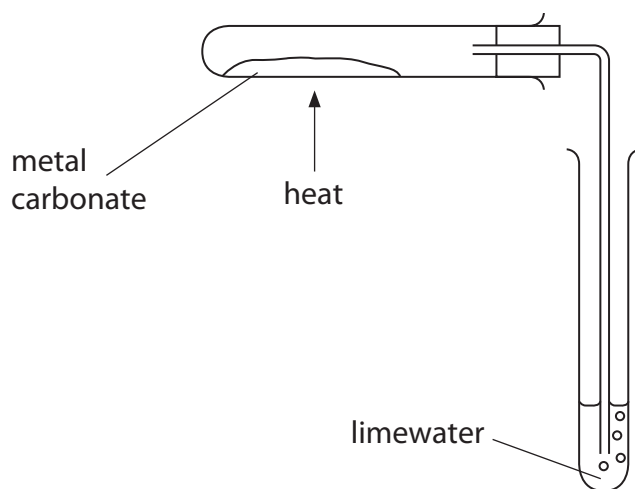
Calculate the mass of carbon dioxide gas given off in this reaction. (1)

mass of carbon dioxide = ..... g



- (e) A student investigated the ease of decomposition of three metal carbonates. Equal masses of each metal carbonate were heated. The time taken for carbon dioxide to be detected was measured.

The following apparatus was used.



The table shows the observations and the time taken for carbon dioxide to be detected.

metal carbonate	observations	time taken for carbon dioxide to be detected / s
calcium carbonate	powder remains white	180
zinc carbonate	white powder turns yellow when hot but is white when cold	105
copper carbonate	green powder turns black	36

- (i) All the carbonates have undergone a reaction.

Give the evidence that shows that all three carbonates have reacted.

(1)



(ii) Explain how the results show the order of the ease of decomposition of these three metal carbonates.

(2)

.....

.....

.....

.....

.....

.....

.....

**(Total for Question 4 = 10 marks)**

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



## Polymers and fuels

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

(1)

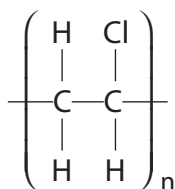
Methods used to dispose of polymers are recycling, burning and putting in a landfill site.

When waste polymers are burned, most of the products are gases.

An advantage of disposing of polymers by burning is

- A carbon dioxide is released
- B toxic gases are released
- C the mass of solid waste is reduced
- D the solid waste is recycled

- (b) The formula of the polymer poly(chloroethene) is shown.



- (i) Give the name of the monomer used to make poly(chloroethene).

(1)

- (ii) Describe how monomer molecules form polymer molecules.

(2)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

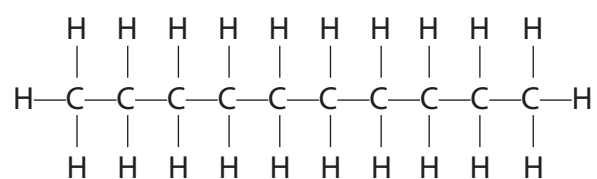


DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(c) The structure of a molecule of a substance found in a fuel is



Explain why this substance is described as a **saturated hydrocarbon**.

(2)

.....

.....

.....

.....



\*(d) Many different substances are used as fuels.

Several factors contribute to making a substance a good fuel.

Examples of good fuels are ethanol, methane and petrol.

Describe some of the factors that make a substance a good fuel, explaining the advantages and disadvantages of **one** of the fuels listed above.

(6)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA





DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Handwriting practice area with 25 horizontal dotted lines.

(Total for Question 5 = 12 marks)



P 4 8 5 7 8 A 0 1 7 2 0

### Hydrochloric acid

- 6 (a) Dilute hydrochloric acid can be used to make salts.  
These salts are called chlorides.

Which of the following will **not** react with dilute hydrochloric acid to produce zinc chloride?

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

(1)

- A zinc carbonate
- B zinc hydroxide
- C zinc oxide
- D zinc sulfate

- (b) Hydrochloric acid is present in the stomach.

(i) Describe the purpose of hydrochloric acid in the stomach.

(2)

.....

.....

.....

.....

(ii) Indigestion tablets can be used to neutralise excess hydrochloric acid in the stomach.

Some indigestion tablets contain aluminium hydroxide.

Write the word equation for the reaction of aluminium hydroxide with hydrochloric acid.

(2)

.....

.....

- (c) Electrolysis can be used to decompose hydrochloric acid.  
The products of electrolysis are hydrogen and chlorine.

Complete the balanced equation for this reaction.

(1)



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA





DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

---

**(Total for Question 6 = 12 marks)**

---

**TOTAL FOR PAPER = 60 MARKS**

