Write your name here

Surname	Other names

Edexcel GCSE

Centre Number	Candidate Number

Chemistry/Science

Unit C1: Chemistry in Our World

Foundation Tier

Thursday 23 May 2013 – 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 ▶

P41936A

1/1/1/1/C2

P 4 1 9 3 6 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.

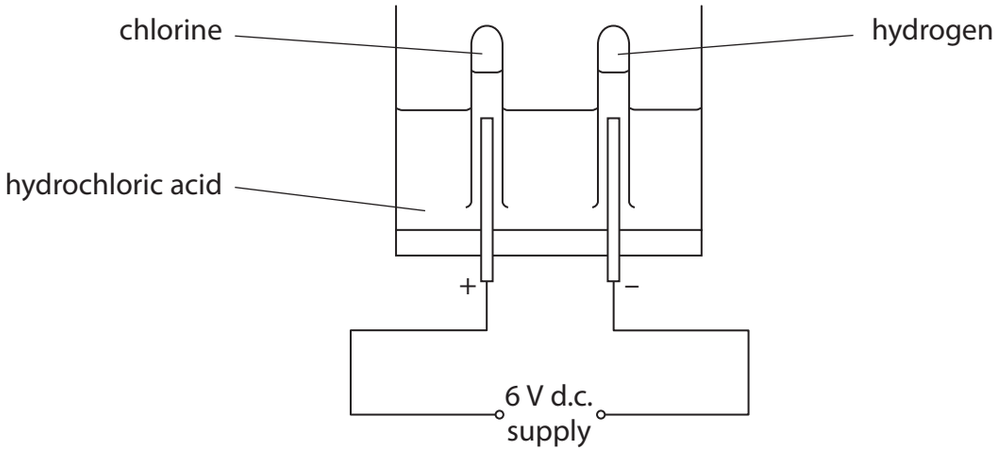
Answer ALL questions.

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 ☒.

Acids and indigestion

1 (a) In this apparatus hydrochloric acid is decomposed by passing a direct electric current through it.

Chlorine and hydrogen are formed.



(i) Give the name of this process in which substances, such as hydrochloric acid, are decomposed by a direct electric current.

(1)

.....

(ii) Describe what happens when a burning splint is applied to a mixture of hydrogen and air in a test tube.

(2)

.....

.....

.....

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

An acid is present in the stomach of humans.

This acid is

(1)

☒ **A** ethanoic acid

☒ **B** hydrochloric acid

☒ **C** nitric acid

☒ **D** sulfuric acid

(ii) Some people suffer from indigestion and take indigestion remedies.

Which of these could cure indigestion caused by excess acid?

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

(1)

☒ **A** sodium chloride

☒ **B** carbon dioxide

☒ **C** calcium carbonate

☒ **D** hydrogen chloride

(iii) Explain how an indigestion remedy works when it cures acid indigestion.

(2)

.....

.....

.....

.....

(c) Metal oxides react with acids to form a salt and water.

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

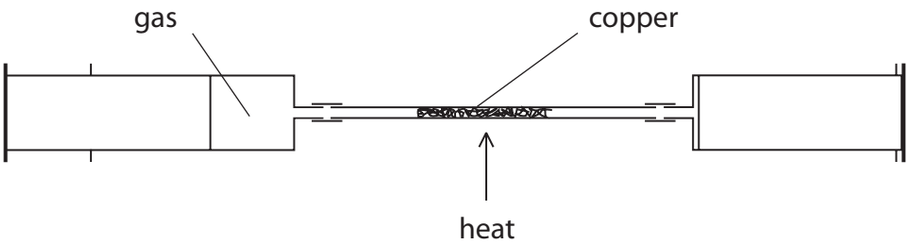
(2)

magnesium oxide + nitric acid → ..... + ...

(Total for Question 1 = 9 marks)

The Earth's atmosphere

2 (a) This apparatus was used to find the percentage of oxygen in a sample of air.



Dry air was passed backwards and forwards over the hot copper.
The copper turned black.
The apparatus was allowed to cool.
The volume of gas in the apparatus had decreased.

(i) Explain why the volume of gas had decreased.

(2)

.....

.....

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

The percentage of oxygen in dry air is

(1)

☒ **A** 0.1

☒ **B** 1.0

☒ **C** 21

☒ **D** 79

(b) The composition of the Earth's earliest atmosphere was different to that of the present atmosphere.

(i) Which of these gases was present in large amounts in the Earth's earliest atmosphere?

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

(1)

☒ **A** oxygen

☒ **B** carbon dioxide

☒ **C** ammonia

☒ **D** nitrogen

(ii) The Earth's early atmosphere contained a larger percentage of water vapour than the Earth's atmosphere today.

Explain what happened to cause the percentage of water vapour in the Earth's atmosphere to decrease.

(3)

.....

.....

.....

.....

(Total for Question 2 = 7 marks)

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Metals

3 (a) Use words from the box to complete the sentences.

electricity	copper	carbon	methane	water

(2)

(i) Iron is extracted from its ore by heating the ore with ..... .

(ii) It is difficult to reduce aluminium ore to aluminium metal. Therefore,

to produce aluminium from its ore, it is necessary to use ..... .

(b) Lead oxide can be converted into lead by heating it with carbon.

The word equation for the reaction is

lead oxide + carbon → lead + carbon dioxide

Explain how this equation shows that lead oxide is reduced and carbon is oxidised.

(2)

.....

.....

(c) The table shows some information about the metals copper and aluminium

metal	ability to conduct electricity	density / g cm^{-3}
copper	good	8.9
aluminium	good	2.7

Overhead power cables, supported by pylons, are used to carry electricity around the country.

Use the information from the table to explain why aluminium, rather than copper, is used for overhead power cables.

(2)

.....

.....

.....

.....

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

Stainless steel is an alloy containing iron and chromium.
Stainless steel is used instead of pure iron because it is

(1)

☒ **A** more reactive

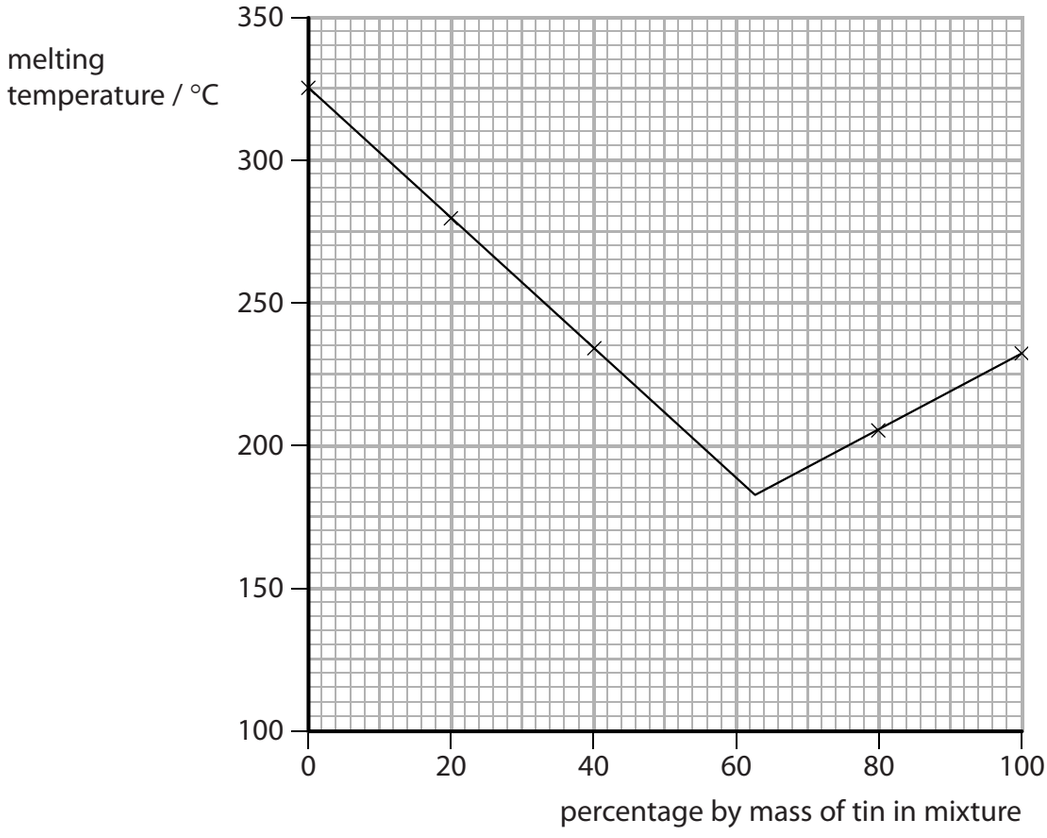
☒ **B** weaker

☒ **C** more flexible

☒ **D** more resistant to corrosion

(e) Alloys are made by melting mixtures of metals and then leaving them to solidify.
Tin and lead form an alloy called solder.
Samples of solder containing different amounts of tin and lead were prepared.
The temperature at which each sample started to melt was recorded as the melting temperature.

The results are shown on the graph.



(i) Use the graph to find the percentage of tin in the mixture that has the lowest melting temperature.

(1)

..... %

(ii) Describe how the melting temperature changes as the percentage by mass of tin in the mixture increases from 0% to 100%.

(2)

.....

.....

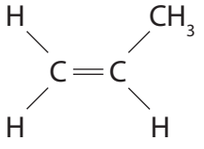
(Total for Question 3 = 10 marks)

Alkenes

4 (a) The table shows information about two alkenes.

Complete the table to show the names and structures of these alkenes.

(2)

name	structure of a molecule
ethene	
	

(b) (i) Ethene is an unsaturated compound.

State what is meant by **unsaturated**.

(1)

.....

(ii) Describe what is **seen** when ethene is passed into bromine water.

(2)

.....

.....

.....

(c) Alkenes can be obtained by cracking some fractions obtained from crude oil.

Explain what is meant by **cracking**.

(2)

.....

.....

.....

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

Molecules of ethene are reacted together to form poly(ethene).
The reaction taking place is

(1)

☒ **A** combustion

☒ **B** photosynthesis

☒ **C** decomposition

☒ **D** polymerisation

(ii) Poly(ethene) is used to make plastic carrier bags.
Many of these bags are put into landfill sites.

Explain why the presence of waste plastic in landfill sites causes problems.

(2)

.....

.....

.....

.....

.....

(Total for Question 4 = 10 marks)

Fuels

5 The photograph shows a Bunsen burner.

The burner uses methane as a fuel.

(a) Methane is a hydrocarbon.
The formula of a molecule of methane is CH_4.

Explain what is meant by a **hydrocarbon**.

(2)

.....

.....

.....

.....

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

Methane is a useful fuel because, when it burns, it produces

(1)

☒ **A** carbon dioxide

☒ **B** carbon monoxide

☒ **C** heat energy

☒ **D** a yellow flame

(c) Crude oil is a mixture of hydrocarbons.
It is separated into useful fractions.

Give the name of the process used to separate crude oil into fractions.

(1)

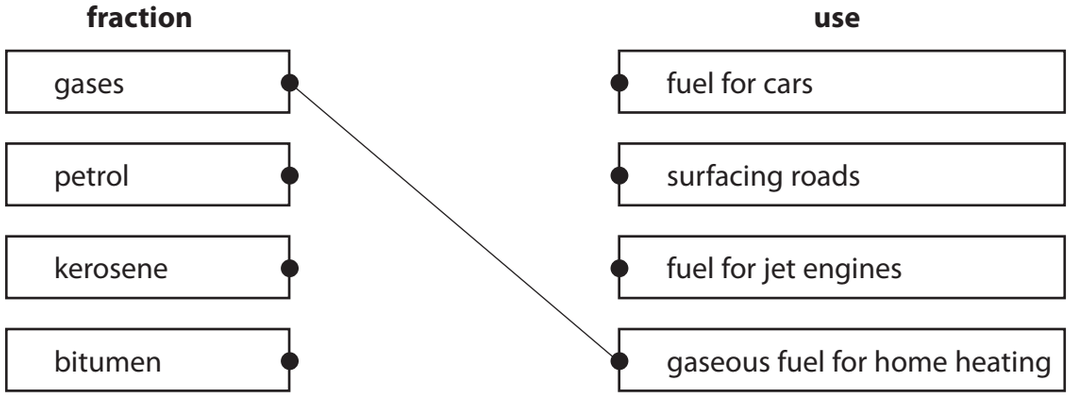
.....

(d) The table shows some crude oil fractions and some uses.

Draw one straight line from each fraction to its correct use.

One has been completed for you.

(2)



*(e) When hydrocarbon fuels burn in a plentiful supply of air they undergo complete combustion, forming carbon dioxide and water vapour.

If the air supply is limited incomplete combustion occurs and carbon monoxide and carbon may be formed.

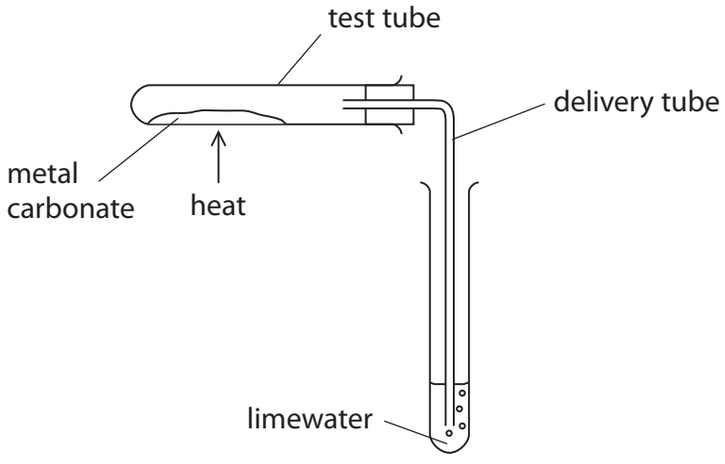
Describe the problems that can be caused by these products of complete and incomplete combustion.

(6)

(Total for Question 5 = 12 marks)

Metal carbonates

6 A student investigated the effect of heat on four metal carbonates.
Equal amounts of each carbonate were heated strongly, in the same way, in this apparatus.



The time it took for the limewater to turn milky was measured.

The table shows the student's results.

metal carbonate	time for limewater to turn milky /s
calcium carbonate	150
copper carbonate	20
lead carbonate	31
sodium carbonate	no change after 300 s

(a) At the end of each experiment, the delivery tube was removed from the limewater before removing the heat from the tube.

Explain why it was important not to remove the heat from the test tube while the delivery tube was still in the limewater.

(2)

.....

.....

(b) Suggest why the limewater did not turn milky when sodium carbonate was heated.

(1)

.....

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

The reaction that takes place when copper carbonate is heated is an example of

(1)

☒ **A** neutralisation

☒ **B** oxidation

☒ **C** thermal decomposition

☒ **D** dissolving

(d) Write the word equation for the reaction that takes place when copper carbonate is heated.

(2)

*(e) Calcium carbonate occurs naturally as limestone, which is an important raw material.
Calcium carbonate has many uses and can be converted into calcium oxide and calcium hydroxide.

By describing uses of these three calcium compounds, explain why limestone is such an important raw material.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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