

Write your name here					
Surname			Other names		
Centre Number			Candidate Number		
Edexcel GCSE					
Chemistry/Science					
Unit C1: Chemistry in Our World					
					Higher Tier
Wednesday 9 November 2011 – Morning				Paper Reference	
Time: 1 hour				5CH1H/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.

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The Periodic Table of the Elements

	1	2	3	4	5	6	7	0																								
	7 Li lithium 3	9 Be beryllium 4	11 Na sodium 11	12 C carbon 6	13 Al aluminium 13	14 N nitrogen 7	15 P phosphorus 15	16 O oxygen 8	17 Cl chlorine 17	18 Ar argon 18																						
	19 K potassium 19	20 Ca calcium 20	21 Sc scandium 21	22 Ti titanium 22	23 V vanadium 23	24 Cr chromium 24	25 Mn manganese 25	26 Fe iron 26	27 Co cobalt 27	28 Ni nickel 28	29 Cu copper 29	30 Zn zinc 30	31 Ga gallium 31	32 Ge germanium 32	33 As arsenic 33	34 Se selenium 34	35 Br bromine 35	36 Kr krypton 36														
	37 Rb rubidium 37	38 Sr strontium 38	39 Y yttrium 39	40 Zr zirconium 40	41 Nb niobium 41	42 Mo molybdenum 42	43 Tc technetium 43	44 Ru ruthenium 44	45 Rh rhodium 45	46 Pd palladium 46	47 Ag silver 47	48 Cd cadmium 48	49 In indium 49	50 Sn tin 50	51 Sb antimony 51	52 Te tellurium 52	53 I iodine 53	54 Xe xenon 54														
	55 Cs caesium 55	56 Ba barium 56	57 La* lanthanum 57	58 Hf hafnium 58	59 Ta tantalum 59	60 W tungsten 60	61 Re rhenium 61	62 Os osmium 62	63 Ir iridium 63	64 Pt platinum 64	65 Au gold 65	66 Hg mercury 66	67 Tl thallium 67	68 Pb lead 68	69 Bi bismuth 69	70 Po polonium 70	71 At astatine 71	72 Rn radon 72														
	87 Fr francium 87	88 Ra radium 88	89 Ac* actinium 89	90 Rf rutherfordium 90	91 Db dubnium 91	92 Sg seaborgium 92	93 Bh bohrium 93	94 Hs hassium 94	95 Mt meitnerium 95	96 Ds darmstadtium 96	97 Rg roentgenium 97	98 Cn copernicium 98	99 Fl flerovium 99	100 Og oganesson 100	101 Uu ununium 101	102 Uub ununbium 102	103 Uut ununtrium 103	104 Uuq ununquadium 104	105 Uup ununpentium 105	106 Uuq ununhexium 106	107 Uuh ununheptium 107	108 Uuo ununoctium 108	109 Uuh ununenneium 109	110 Uuq unundecium 110	111 Uuq unundundium 111	112 Cn copernicium 112	113 Nh nihonium 113	114 Fl flerovium 114	115 Mc moscovium 115	116 Lv livermorium 116	117 Ts tennessine 117	118 Og oganesson 118
	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	210 Po polonium 84	211 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	[285] Cn copernicium 112	[286] Nh nihonium 113	[288] Fl flerovium 114	[289] Mc moscovium 115	[290] Lv livermorium 116	[291] Ts tennessine 117	[294] Og oganesson 118														
	[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	[285] Cn copernicium 112	[286] Nh nihonium 113	[288] Fl flerovium 114	[289] Mc moscovium 115	[290] Lv livermorium 116	[291] Ts tennessine 117	[294] Og oganesson 118														

1
H
hydrogen
1

Key
relative atomic mass
atomic symbol
name
atomic (proton) number

Elements with atomic numbers 112-116 have been reported but not fully authenticated

* 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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3
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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 ☒.

Coins

- 1 Modern European coins contain mixtures of metals.
The 1 cent and 1 euro coins are shown.



- (a) (i) Suggest why the 1 cent coin is coated with copper.

(1)

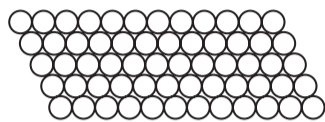
- (ii) The 1 euro coin has a silver-coloured centre and a gold-coloured rim.

Compare the compositions of the two parts of the coin to suggest which metal causes the alloy to become gold-coloured.

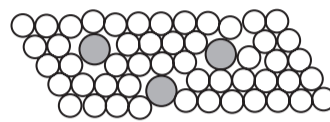
(1)



(b) The diagrams show the structure of a pure metal and an alloy it forms with another metal.



pure metal



alloy

Use these diagrams to help you explain why alloying increases the strength of the pure metal.

(3)

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(c) Aluminium and iron are both extracted from their oxides.

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

Iron is extracted from its oxide by heating the oxide with carbon.
In this process the iron oxide is

(1)

- A thermally decomposed
- B oxidised
- C neutralised
- D reduced

(ii) Aluminium cannot be extracted from its oxide by heating the oxide with carbon.
Electrolysis must be used.

Explain why electrolysis must be used to extract aluminium from its oxide.

(2)

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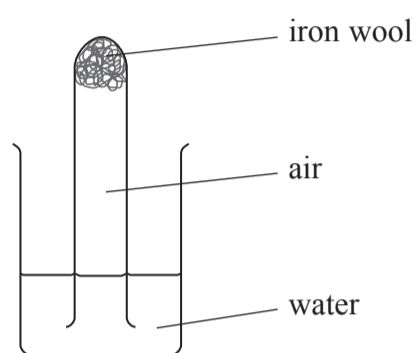
(Total for Question 1 = 8 marks)



The atmosphere

- 2 (a) Iron reacts with oxygen to form iron oxide.
Iron wool was placed in the bottom of a wet test tube.

The test tube was then put in a beaker of water as shown in the diagram.



After some time the water level in the test tube rose and some of the iron wool had formed iron oxide.

- (i) Write the word equation for the reaction of iron with oxygen. (1)

- (ii) Explain why the water level in the test tube rose during the experiment. (2)

- (iii) The volume of air in the test tube at the start of the reaction was 10 cm^3 .
Calculate the volume of gas that should be present in the test tube at the end of the reaction. (2)

answer =



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

Most of the gas remaining in the test tube at the end of the experiment would be (1)

- A argon
- B carbon dioxide
- C nitrogen
- D oxygen

(b) Several processes change the composition of the Earth's atmosphere.

Explain how the use of fossil fuels affects the composition of the atmosphere. (2)

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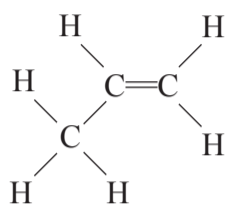
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(Total for Question 2 = 8 marks)



Propene

3 The diagram shows the structure of a propene molecule.



(a) Which row of the table describes propene?

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

(1)

	hydrocarbon	unsaturated
<input type="checkbox"/> A	yes	no
<input type="checkbox"/> B	no	yes
<input type="checkbox"/> C	yes	yes
<input type="checkbox"/> D	no	no

(b) Propene can form the polymer poly(propene).

Draw a diagram to show the part of a poly(propene) molecule formed from two propene molecules.

(2)



(c) Describe a test that shows that molecules of propene contain carbon to carbon double bonds.

(2)

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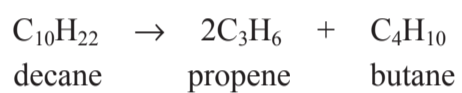
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(d) Propene can be made by cracking fractions obtained from crude oil.

(i) This equation shows the cracking of decane to produce propene and butane.



Give the total mass of products formed if 17 g of decane is cracked in this way.

(1)

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(ii) Explain what is meant by **cracking**.

(2)

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(iii) Explain why it is necessary to crack crude oil fractions that contain large molecules.

(2)

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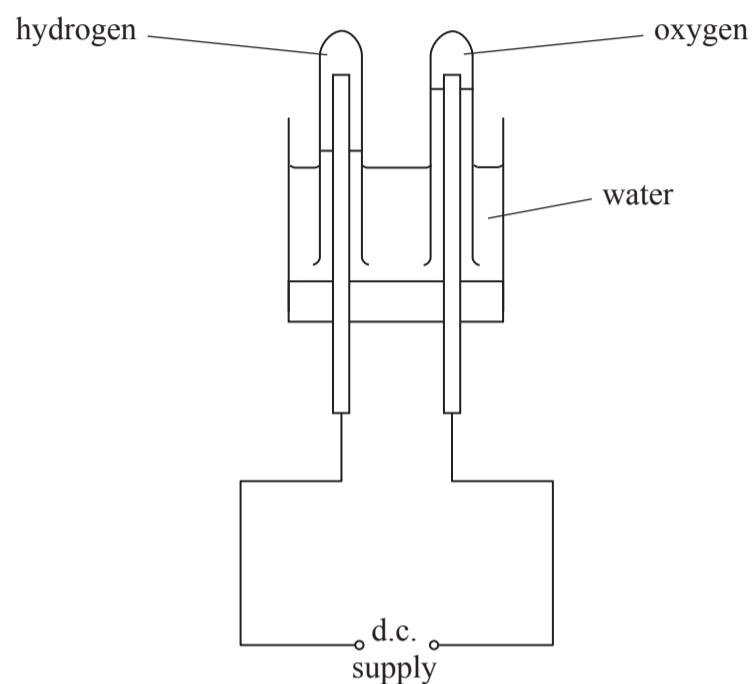
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(Total for Question 3 = 10 marks)



Useful liquids

- 4 (a) Water can be decomposed by electrolysis.
Hydrogen and oxygen are formed.
This apparatus can be used to carry out the electrolysis.



- (i) Write the balanced equation for water decomposing to form hydrogen and oxygen.

(3)

- (ii) Describe the test to show that a gas is hydrogen.

(2)

- (iii) Describe the test to show that a gas is oxygen.

(2)



(b) Seawater can also be decomposed using electrolysis.
Seawater is sodium chloride solution.
When this is decomposed one product is a toxic gas.

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

The toxic gas produced is

(1)

- A hydrogen
- B chlorine
- C oxygen
- D carbon monoxide

(ii) Give a safety precaution that should be taken when collecting this toxic gas.

(1)

(c) Sodium chloride solution can be prepared by reacting sodium hydroxide solution with an acid.

Give the name of the acid that must be used.

(1)

(Total for Question 4 = 10 marks)



Limestone

5 The photograph shows a limestone cliff face.



(a) What is formed from limestone when it is subjected to heat and pressure?

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

(1)

- A chalk
- B granite
- C marble
- D fossils

(b) Large quantities of limestone are extracted from quarries.

Give an advantage and a disadvantage, to local communities, of a nearby limestone quarry.

(2)

advantage

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disadvantage

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(c) Limestone is a natural form of calcium carbonate.
Limewater is calcium hydroxide solution.

Describe how limewater can be made from calcium carbonate.

(3)

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*(d) Limestone is a sedimentary rock.

The limestone shown in the photograph was originally formed beneath the sea and then earth movements forced the rock upwards to form the cliff.

Describe how the limestone was originally formed and has become the cliff face shown in the photograph.

(6)

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(Total for Question 5 = 12 marks)



Fuels

- 6 The photograph shows a multifuel camping stove designed to use various fuels.
This stove can burn the hydrocarbon fuels, propane gas, petrol, kerosene or diesel.



- (a) Suggest **two** reasons why it is usually difficult to burn different hydrocarbon fuels efficiently in the same appliance.

(2)

reason 1

reason 2

- (b) The fuels that can be used in the stove are obtained by the fractional distillation of crude oil.

Which of these statements about the fractions obtained by the fractional distillation of crude oil is correct?

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

(1)

- A each fraction is a pure substance
- B fuel oil is used as fuel for cars
- C diesel oil is used as a fuel for some trains
- D some fractions are biofuels



(c) Ethane, C_2H_6 , is present in crude oil.

Write the balanced equation for the complete combustion of ethane.

(3)

***(d)** Petrol is the fuel used in many car engines.

Research is being carried out into the use of hydrogen instead of petrol.

Evaluate the advantages and disadvantages of using hydrogen rather than petrol as a fuel for cars.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS



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