

Write your name here

Surname

Other names

Centre Number

Candidate Number

Edexcel GCSE

Chemistry/Science

Unit C1: Chemistry in Our World

Higher Tier

Tuesday 5 March 2013 – Morning

Time: 1 hour

Paper Reference

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.

Turn over ►

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PEARSON



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 Mg magnesium 12	13 Al aluminium 13	14 Si silicon 14	15 P phosphorus 15	16 S sulfur 16	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 [98]	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	72 Hf hafnium 72	73 Ta tantalum 73	74 W tungsten 74	75 Re rhenium 75	76 Os osmium 76	77 Ir iridium 77	78 Pt platinum 78	79 Au gold 79	80 Hg mercury 80	81 Tl thallium 81	82 Pb lead 82	83 Bi bismuth 83	84 Po polonium 84	85 At astatine 85	86 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						

1
H
hydrogen
1

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 ☒.

The atmosphere

- 1** A student used the internet to find information about the percentages of different gases in the Earth's early atmosphere. She was surprised to find the information given on two websites was very different.

The information from the two websites is shown in the table.

website 1		website 2	
gas	percentage gas in atmosphere (%)	gas	percentage gas in atmosphere (%)
hydrogen	60	carbon dioxide	92.2
water vapour	20	nitrogen	5.1
carbon dioxide	10	sulfur dioxide	2.3
hydrogen sulfide	6	hydrogen sulfide	0.2
nitrogen	3	ammonia	0.1
methane	1	methane	0.1

- (a) One of the gases in the table is present in a much larger amount in today's atmosphere.

State the name of this gas.

(1)

- (b) A gas not named in the table makes up about 21% of today's atmosphere.

State the name of this gas.

(1)

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

The amount of carbon dioxide in the early atmosphere was reduced by

(1)

- A** animals breathing
- B** volcanic activity
- C** deforestation
- D** the gas dissolving in oceans



(d) The information given on two websites is very different.

Explain why it is difficult to be certain about the composition of the Earth's early atmosphere.

(2)

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(e) In an experiment to find the percentage of oxygen in the air, some copper was heated in 50.0 cm³ of dry air.

All of the oxygen in this sample of air reacted to form copper oxide.

After the reaction, the volume of gas remaining was 41 cm³.

(i) Calculate the percentage of oxygen in this sample of air.

(2)

% oxygen =

(ii) The word equation for the reaction is

copper + oxygen → copper oxide

Balance the equation for this reaction by putting numbers in the spaces provided.

(1)



(Total for Question 1 = 8 marks)



Rocks and their uses

2 (a) Igneous, metamorphic and sedimentary are the three different types of rock.

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

An example of a metamorphic rock is

(1)

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

(ii) The photograph shows a sample of rock.



Explain which of the three types of rock this is most likely to be.

(2)

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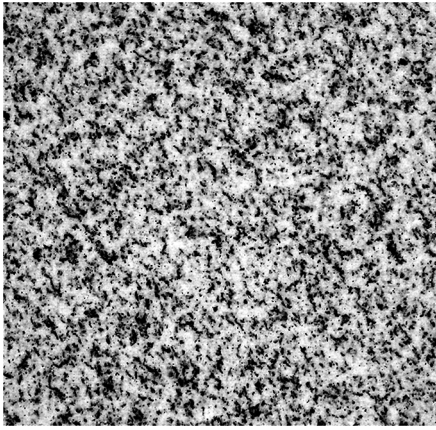
.....

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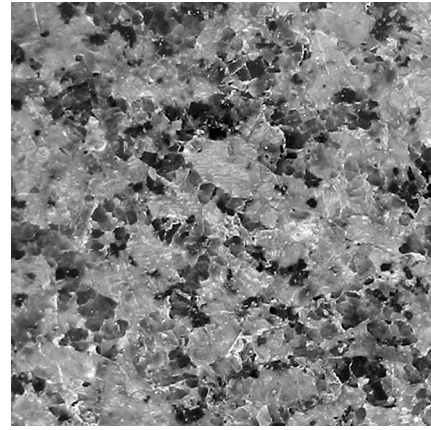
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(b) The photographs show the crystals in two samples of igneous rock, A and B.



rock A



rock B

Explain how these igneous rocks, containing different sized crystals, have been formed.

(3)

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(c) Limestone is mainly calcium carbonate.

Explain why calcium carbonate is used to treat waste gases produced in coal-fired power stations.

(3)

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(Total for Question 2 = 9 marks)



Crude oil and biofuels

- 3 (a) Gases, petrol, kerosene, diesel oil, fuel oil and bitumen are the fractions obtained from crude oil by fractional distillation.

Identify the fraction described in each of the following statements.

- (i) This fraction is more difficult to ignite than most other fractions and is used as a fuel in large ships.

(1)

name of fraction

- (ii) This fraction is obtained from the top of the fractionating column.

(1)

name of fraction

- (iii) This fraction has a higher boiling point than kerosene and is used as a fuel for some cars.

(1)

name of fraction

- (b) When hydrocarbon fuels are burnt, several different products can be formed.

Which of these cannot be a product of burning hydrocarbon fuels?

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

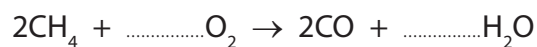
(1)

- A** carbon
- B** carbon dioxide
- C** hydrogen
- D** water



(c) Carbon monoxide gas, CO, can be formed when methane, CH₄, undergoes incomplete combustion.

(i) Balance this equation for the incomplete combustion of methane by putting numbers in the spaces provided.



(2)

(ii) Carbon monoxide is a toxic gas and can cause death.

Explain how carbon monoxide can cause death.

(2)

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(d) Biofuels are produced from plants.

Explain a problem caused by growing plants to produce biofuels.

(2)

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(Total for Question 3 = 10 marks)



Acids and electrolysis

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

An acid reacts with a metal oxide to form

(1)

- A** a salt and hydrogen only
- B** a salt and oxygen only
- C** a salt only
- D** a salt and water only

- (b) Acids also react with metal carbonates.

The word equation for the reaction of copper carbonate with dilute nitric acid is



- (i) State **two** things you would **see** when solid copper carbonate reacts with dilute nitric acid.

(2)

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- (ii) Write the balanced equation for the reaction of copper carbonate with dilute nitric acid.

(3)

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(c) Two gases can be produced by the electrolysis of water, under suitable conditions.

(i) Explain what is meant by **electrolysis**.

(2)

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(ii) One of the gases is oxygen.

Describe a test to show the gas is oxygen.

(2)

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(Total for Question 4 = 10 marks)



Metals and alloys

5 Gold is used to make some jewellery.

(a) Explain why gold is used to make jewellery.

(2)

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

The purity of gold can be measured in carats.

Pure gold is

(1)

- A** 9 carat
- B** 18 carat
- C** 24 carat
- D** 100 carat

(c) Gold can be alloyed with other metals to produce alloys that have a higher strength than pure gold.

Explain why gold alloys are stronger than gold.

(3)

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***(d)** Iron and aluminium occur in the Earth’s crust as their oxides.

Different methods are used to extract iron and aluminium from their oxides.

Explain, in terms of the position of the metal in the reactivity series and the cost of the extraction processes, why iron and aluminium are extracted by different methods.

(6)

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(Total for Question 5 = 12 marks)



Polymers and alternative fuels

6 Polymers can be made from alkenes.

(a) Which of the following statements about alkenes is correct?

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

(1)

- A** alkenes turn bromine water orange
- B** alkenes have a double bond between two hydrogen atoms
- C** alkenes are unsaturated hydrocarbons
- D** alkenes can undergo complete combustion to produce carbon monoxide

(b) The table shows two monomers and the polymers they form.

Complete the table.

monomer structure	name of polymer formed	polymer structure
$ \begin{array}{ccc} \text{H} & & \text{H} \\ & \diagdown & / \\ & \text{C}=\text{C} & \\ & / & \diagdown \\ \text{H} & & \text{H} \end{array} $		$ \left(\begin{array}{cc} \text{H} & \text{H} \\ & \\ -\text{C} & -\text{C}- \\ & \\ \text{H} & \text{H} \end{array} \right)_n $
$ \begin{array}{ccc} \text{H} & & \text{H} \\ & \diagdown & / \\ & \text{C}=\text{C} & \\ & / & \diagdown \\ \text{H} & & \text{CH}_3 \end{array} $	poly(propene)	

(2)



(c) A number of methods are used to dispose of waste polymers.

Explain a problem caused by the disposal of polymers.

(2)

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*(d) Most of the energy we require comes from burning fossil fuels.
The supply of fossil fuels is limited and therefore other fuels are needed.

Various fuels are being tested.

Explain the properties required of a good fuel.

(6)

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(Total for Question 6 = 11 marks)

TOTAL FOR PAPER = 60 MARKS





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