Write your name here

Surname	Other names

Edexcel GCSE

Centre Number	Candidate Number

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 ▶

P41963A

1/1/1/1/

P 4 1 9 6 3 A 0 1 1 6

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 ☒.

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)

.....

.....

.....

.....

(e) In an experiment to find the percentage of oxygen in the air, some copper was heated in 50.0 cm^3 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 41cm^3.

(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)

.....Cu + O_2 → .....CuO

(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)

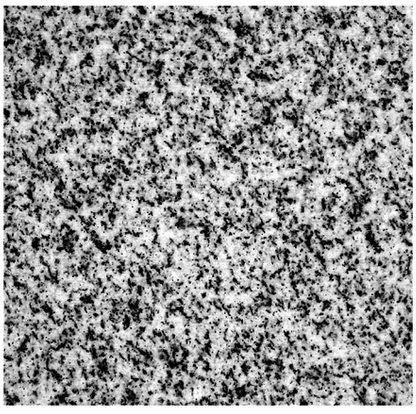
.....

.....

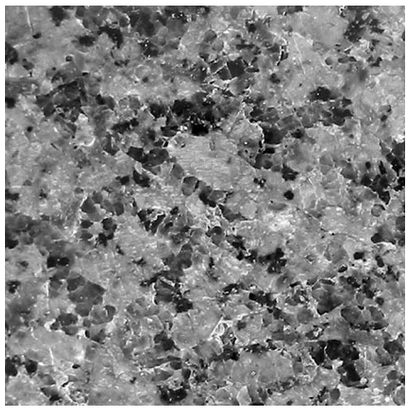
.....

.....

(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)

(c) Limestone is mainly calcium carbonate.

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

(3)

(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, CH_4, undergoes incomplete combustion.

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

(2)

$$2CH_4 + \text{.....}O_2 \rightarrow 2CO + \text{.....}H_2O$$

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

Explain how carbon monoxide can cause death.

(2)

.....

.....

.....

.....

(d) Biofuels are produced from plants.

Explain a problem caused by growing plants to produce biofuels.

(2)

.....

.....

.....

.....

(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

copper carbonate (s) + nitric acid (aq) → copper nitrate (aq) + carbon dioxide (g) + water (l)

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

(2)

.....

.....

.....

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

(3)

.....

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

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

(2)

(ii) One of the gases is oxygen.

Describe a test to show the gas is oxygen.

(2)

(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)

(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)

*(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)

(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

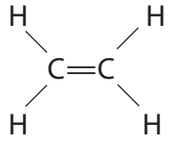
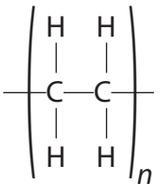
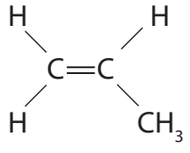
☒ **B** alkenes have a double bond between two hydrogen atoms

☒ **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
		
	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)

*(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)

(Total for Question 6 = 11 marks)

TOTAL FOR PAPER = 60 MARKS

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