

Write your name here	
Surname	Other names
Centre Number	Candidate Number
Edexcel GCSE	
Chemistry/Science	
Unit 1: Chemistry in Our World	
Higher Tier	
Thursday 1 March 2012 – 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.

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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	<table border="1" style="margin: auto;"> <tr> <td>1 H hydrogen 1</td> </tr> </table>					1 H hydrogen 1	19 F fluorine 9	20 Ne neon 10	4 He helium 2							
1 H hydrogen 1																		
	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	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	127 I iodine 53	128 Te tellurium 52	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	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	[210] At astatine 85	[209] Po polonium 84	[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						

* 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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TURN OVER FOR QUESTION 1



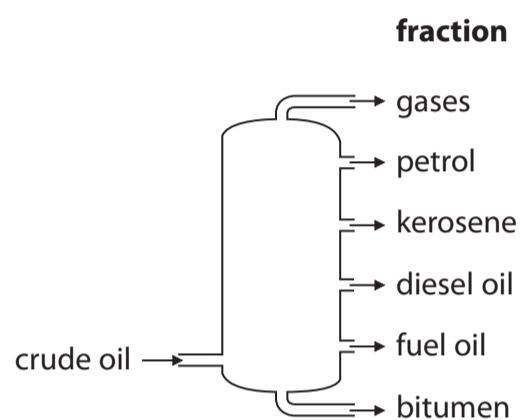
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Answer ALL questions.

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 .

Useful products from crude oil

- 1 Fractional distillation is used to separate crude oil into fractions. A fractionating column is used for the process. The diagram shows a fractionating column and the fractions obtained when crude oil is fractionally distilled.



- (a) Which of the following statements is true?

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

(1)

- A** fuel oil has a lower boiling point than petrol
- B** kerosene is more viscous than bitumen
- C** molecules in diesel oil are larger than molecules in petrol
- D** diesel oil is easier to ignite than petrol

- (b) Some fractions obtained from crude oil are cracked to produce alkenes.

- (i) Explain what is meant by **cracking**.

(2)

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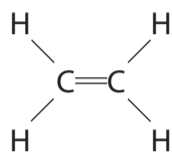
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- (ii) One alkene obtained is ethene.
The diagram shows the structure of a molecule of ethene.



Ethene is unsaturated.
Ethene is a hydrocarbon.

Explain why ethene is described as an **unsaturated hydrocarbon**.

(3)

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- (iii) Describe what you would **see** when a sample of ethene is shaken with bromine water.

(2)

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(Total for Question 1 = 8 marks)



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Gases in the atmosphere

2 (a) The table shows possible percentages of some of the gases in the Earth's early atmosphere.

gas	percentage in early atmosphere (%)
oxygen	small amount
nitrogen	small amount
carbon dioxide	12
water vapour	77

(i) Some time after the early atmosphere had been formed, oceans appeared on the Earth's surface.

State how these oceans were formed.

(1)

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(ii) The amount of carbon dioxide in today's atmosphere is much lower than that in the early atmosphere.

State how the formation of the oceans caused this reduction.

(1)

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(iii) The amount of oxygen in today's atmosphere is much higher than that in the early atmosphere.

Describe the process that has caused this increase.

(2)

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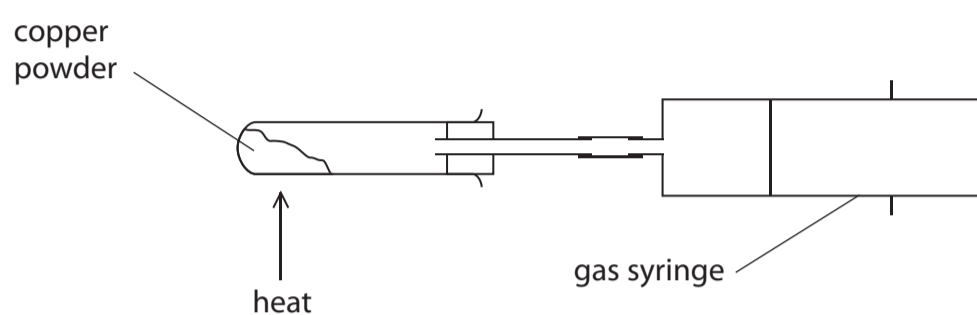
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(b) John was doing an experiment to find the percentage of oxygen in air at room temperature. He used this apparatus.



The copper powder in the test tube was heated strongly so that it could react with oxygen in the air in the apparatus. John stopped heating the copper when there was no further change in the reading on the gas syringe.

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

At the end of the experiment the apparatus was allowed to cool before the final reading on the syringe was recorded.

This is because

(1)

- A** reading the volume while the apparatus is hot is dangerous
- B** the apparatus must be left to allow the reaction to finish
- C** the gas must be at room temperature when its volume is measured
- D** the copper expands when it is hot

(ii) At the end of the experiment not all of the copper had reacted.

Suggest a reason for this.

(1)

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Metals

3 Metals have many uses.

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

Aluminium and magnesium are melted together to form magnalium.

Magnalium is

(1)

- A** an element
- B** an ore
- C** an alloy
- D** a type of steel

(b) Describe how iron is extracted from its ore.

(2)

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(c) Copper oxide reacts with hydrogen to form copper and water.

The equation for the reaction is



Explain how this reaction involves both oxidation and reduction.

(3)

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(d) Some modern spectacle frames are made of shape memory alloys.



Explain why shape memory alloys are better than other alloys for making spectacle frames.

(2)

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

Alloys are usually stronger than the pure metals from which they are made because they

(1)

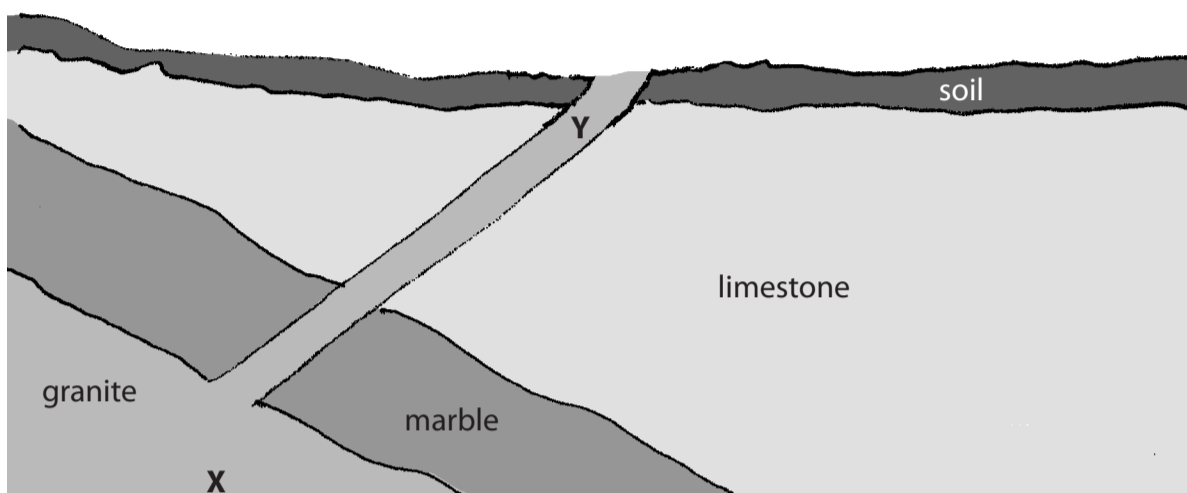
- A** have stronger bonds between the molecules they contain
- B** combine the properties of the metals from which they are made
- C** have atoms of different sizes in their structures
- D** are made using electrolysis

(Total for Question 3 = 9 marks)



Rocks

4 A student produced this sketch of a quarry face.



(a) The limestone shown was originally formed in layers.

State what type of rock limestone is.

(1)

(b) Granite is an igneous rock formed from magma.

(i) Explain how the marble has formed above the granite.

(2)

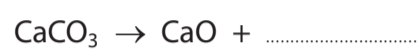
(ii) Explain why the rock at **X** contained larger crystals than the rock at **Y**.

(2)



(c) Limestone is a natural form of calcium carbonate.
When calcium carbonate, CaCO_3 , is heated it decomposes.

(i) Complete the equation for this reaction. (1)



(ii) Calcium oxide reacts with water to form calcium hydroxide.
Write the balanced equation for this reaction. (2)

(iii) Explain why calcium hydroxide (slaked lime) is spread on fields. (2)

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(Total for Question 4 = 10 marks)



Chemical reactions

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

When dilute hydrochloric acid reacts with copper oxide one of the products is

(1)

- A copper
- B copper hydroxide
- C copper chlorate
- D copper chloride

(b) Chlorine is manufactured by electrolysis.

Explain what is meant by **electrolysis**.

(2)

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(c) Chlorine gas reacts with sodium hydroxide solution to form sodium chlorate(I), NaOCl, sodium chloride and water.

Write the balanced equation for this reaction.

(3)

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Burning fuels

6 The picture shows a gas water heater.
The fuel used in this heater is natural gas which is mainly methane.



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

Natural gas is a good fuel because

(1)

- A supplies of it will never run out
- B it always burns with a yellow flame that is easily seen
- C it produces no waste gases on complete combustion
- D it produces no solid waste on complete combustion

(b) The complete combustion of fossil fuels releases gases into the atmosphere.

Explain how these gases could cause an increase in the temperature of the Earth.

(2)

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(c) Biofuels, made from plants, can be used as alternatives to fossil fuels.

(i) State an advantage of replacing fossil fuels with biofuels made from plants.

(1)

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