Edexcel GCSE

Science: Double Award B (1536)
Chemistry B (1539)

(Modules 9 and 10)

Paper 5C

Higher Tier

Wednesday 13 June 2007 – Morning

Time: 30 minutes

Materials required for examination	**Items included with question papers**
Nil	Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature, and complete the paper reference.
Check that you have the correct question paper.
Answer ALL the questions. Write your answers in the spaces provided in this question paper.
Show all stages in any calculations and state the units. Calculators may be used.
Include diagrams in your answers where these are helpful.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 5 questions in this question paper. The total mark for this paper is 30.
There are 8 pages in this question paper. Any blank pages are indicated.
A copy of the periodic table is on page 2.

Advice to Candidates

This symbol shows where the quality of your written answer will also be assessed.

Turn over

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THE PERIODIC TABLE

Group

Period	1	2		3	4	5	6	7	0
1									4 **He** Helium 2

| | 1
H
Hydrogen
1 | | | | | | | | |

Group headings: 1, 2, 3, 4, 5, 6, 7, 0

| 7
Li
Lithium
3 | 9
Be
Beryllium
4 |
| 23
Na
Sodium
11 | 24
Mg
Magnesium
12 |

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
85 **Rb** Rubidium 37	88 **Sr** Strontium 38	89 **Y** Yttrium 39	91 **Zr** Zirconium 40	93 **Nb** Niobium 41	96 **Mo** Molybdenum 42	99 **Tc** Technetium 43	101 **Ru** Ruthenium 44	103 **Rh** Rhodium 45	106 **Pd** Palladium 46	108 **Ag** Silver 47	112 **Cd** Cadmium 48
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
223 **Fr** Francium 87	226 **Ra** Radium 88	227 **Ac** Actinium 89

| 11
B
Boron
5 | 12
C
Carbon
6 | 14
N
Nitrogen
7 | 16
O
Oxygen
8 | 19
F
Fluorine
9 | 20
Ne
Neon
10 |
27 **Al** Aluminium 13	28 **Si** Silicon 14	31 **P** Phosphorus 15	32 **S** Sulphur 16	35.5 **Cl** Chlorine 17	40 **Ar** Argon 18
70 **Ga** Gallium 31	73 **Ge** Germanium 32	75 **As** Arsenic 33	79 **Se** Selenium 34	80 **Br** Bromine 35	84 **Kr** Krypton 36
115 **In** Indium 49	119 **Sn** Tin 50	122 **Sb** Antimony 51	128 **Te** Tellurium 52	127 **I** Iodine 53	131 **Xe** Xenon 54
204 **Tl** Thallium 81	207 **Pb** Lead 82	209 **Bi** Bismuth 83	210 **Po** Polonium 84	210 **At** Astatine 85	222 **Rn** Radon 86

Key

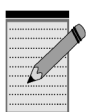| Relative atomic mass |
| Symbol |
| Name |
| Atomic number |

Answer ALL the questions. Write your answers in the spaces provided.

1. In this experiment, hydrogen is passed over heated copper oxide to produce copper.

copper oxide

hydrogen ⟶

excess
hydrogen
burning

heat
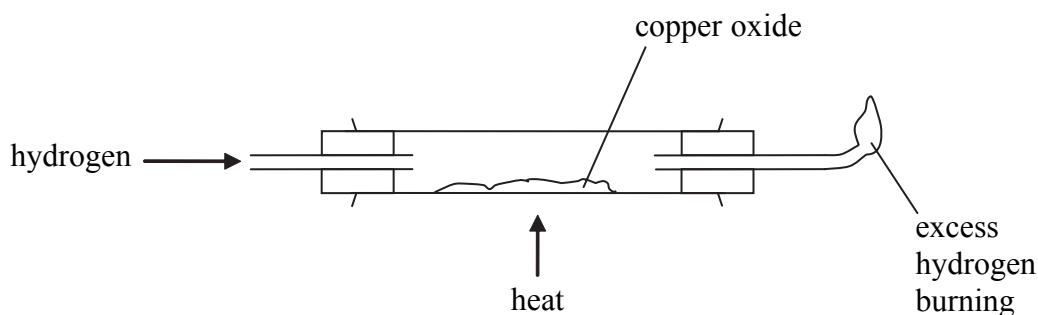
(a) Describe what changes would be seen during this reaction.

....

....

....

....

(3)

(b) Write the balanced equation for the reaction between copper oxide and hydrogen.

....

(2)

(c) Complete this sentence to show the type of reaction.

During this reaction, copper oxide is .... to copper.

(1)

Q1

(Total 6 marks)

2. The atomic number of chlorine is 17.

Chlorine and magnesium both form ions.

(a) Complete this table.

	element	
	magnesium	**chlorine**
symbol of atom	Mg	Cl
number of electrons in atom	12	
symbol of ion	Mg^{2+}	Cl^-
number of electrons in ion		

(3)

(b) Use information from the table to explain why the formula of magnesium chloride is $MgCl_2$.

....

....

....

....

(2)

(c) Explain why magnesium chloride has a high melting point.

....

....

....

(1) **Q2**

(Total 6 marks)

3. The photograph shows Fingal's Cave on the island of Staffa.

Source: www.fingals-cave-staffa.co.uk

The rocks in the photograph are mainly basalt.

Basalt is a rock that contains small crystals.

(a) What type of rock is basalt? ....

(1)

(b) Describe how basalt was formed.

....

....

....

(2)

(Total 3 marks)

4. When hydrogen reacts with oxygen, water is formed.

(a) Write the balanced equation for the reaction of hydrogen with oxygen.

....

(3)

(b) Draw a dot and cross diagram to show the bonding in a water molecule. Show outer electrons only.

(2)

(c) When 12.8 g of copper reacted with oxygen, 14.4 g of an oxide was formed.

Calculate the empirical formula of this oxide.
(Relative atomic masses: O = 16; Cu = 64)

....

....

....

....

....

....

(4)   Q4

(Total 9 marks)

5. (a) This article was downloaded from the internet.

> ## Limited supplies of helium gas
> Helium gas that is used to fill balloons and also makes voices go squeaky, is running out. It is the second most common element in the Universe but any in the Earth's atmosphere rapidly escapes. Also, helium does not combine to form compounds. Our supplies of it come mainly from gas wells and these reserves are being used up.
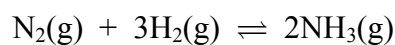
(i) Explain why helium rapidly escapes from the Earth's atmosphere.

....

(1)

(ii) Explain why helium is inert and does not form compounds.

....

(1)

(b) The main gas in the Earth's atmosphere is nitrogen.
Nitrogen can be used to make ammonia in the Haber process.
The equation for the reaction is

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$$

(i) Explain how increasing the pressure on a mixture at equilibrium would affect the equilibrium yield of ammonia.

....

....

....

....

....

(3)

(ii) A catalyst is used in this reaction.

Suggest why scientists carry out research to find better catalysts.

....

....

....

(1) Q5

(Total 6 marks)

TOTAL FOR PAPER: 30 MARKS

END

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N 2 5 9 9 0 A 0 8 0 8