Centre No.						Paper Reference						Surname	Initial(s)
Candidate No.						4	4	3	7	/	2	F	Signature

Paper Reference(s)

4437/2F

London Examinations IGCSE

Science (Double Award)

Paper 2F

Foundation Tier

Specimen Paper

Time: 1 hour 15 minutes

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Total	

Materials required for examination
Nil

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number and candidate number, your surname, initial(s) and signature.
The paper reference is shown at the top of this page. Check that you have the correct question paper.
Answer **ALL** the questions in the spaces provided in this question paper.
Show all the steps in any calculations and state the units.
Calculators may be used.

Information for Candidates

There are 15 pages in this question paper. All blank pages are indicated.
The total mark for this paper is 75. The marks for the various parts of questions are shown in round brackets: e.g. (**2**).

Advice to Candidates

You are reminded of the importance of clear English and careful presentation in your answers.

Printer's Log. No.

Specimen

Turn over

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THE PERIODIC TABLE

Period	1	2											3	4	5	6	7	0
	Group																	
1							1 H Hydrogen 1											4 He Helium 2
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
3	23 Na Sodium 11	24 Mg Magnesium 12											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
4	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
5	86 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	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
6	133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57	179 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Indium 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	210 At Astatine 85	222 Rn Radon 86
7	223 Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89															

Key

Relative atomic mass
Symbol
Name
Atomic number

1. Using the Periodic Table (opposite) give the name or symbol of:

Leave blank

(a) a Group 1 element; .....

(b) the transition metal that has the atomic number 29; .....

(c) a non-metallic element that is in Period 2; .....

(d) an element in Group 7 that is a solid at room temperature and atmospheric pressure;

.....

(e) the element that is in both Group 3 and Period 3 .....

Q1

(Total 5 marks)

2. Complete the sentences using words from the box. Each word should only be used once.

alkalis	**allotropes**	**ions**	**isotopes**	**metals**

(a) The elements in Group 1 are all .....

(b) Different forms of the same element in the same physical state are called

.....

(c) Bases that are soluble in water are called .....

(d) Atoms that have lost or gained electrons are called .....

(e) Atoms of the same element that have different relative atomic masses are called

.....

Q2

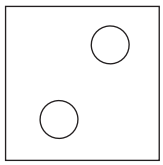
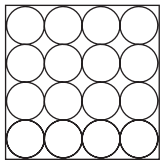
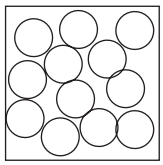
(Total 5 marks)

Turn over

3. (a) The diagrams show the arrangement of particles in the three states of matter: solid, liquid and gas.
Each circle represents a particle.

Leave blank

Draw a line to join each state to the correct diagram.

Solid •	•	
Liquid •	•	
Gas •	•	

(2)

(b) For each substance, tick a box to show its state at room temperature.

Substance	Solid	Liquid	Gas
Air			
Iron			
Water			

(3)

(c) Look at the Periodic Table on page 2.

In one group, all the elements are gases at room temperature.
Give the number and name of this group.

Number .....

Name .....

(2)

(d) Give the original and final state (solid, liquid or gas) of the substance when

(i) ice melts

from ..... to .....

(2)

(ii) steam in the atmosphere cooled to form the oceans, millions of years ago

from ..... to .....

(2)

(iii) petrol vaporises inside a car engine

from ..... to .....

(2)

Q3

(Total 13 marks)

Specimen Papers and Mark Schemes – London Examinations IGCSE in Science (Double Award) (4437)
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4. A small piece of sodium is dropped into a large beaker of water.
It reacts to form sodium hydroxide solution and a gas.

Leave blank

(a) Describe **three** things you would **see** in this experiment.

.....

.....

.....

.....

.....

.....

.....

(3)

(b) Give the name of the gas formed by this reaction.

.....

(1)

(c) Sodium hydroxide solution has a pH of 14.

Complete the sentences using a word from the box.

acidic	**alkaline**	**neutral**	**red**	**blue**

(i) Sodium hydroxide solution is .....

(1)

(ii) When litmus is added to sodium hydroxide solution it turns .....

(1)

(d) The reaction between sodium and water is exothermic.

How would the temperature of the water change during the reaction?

.....

(1)

Q4

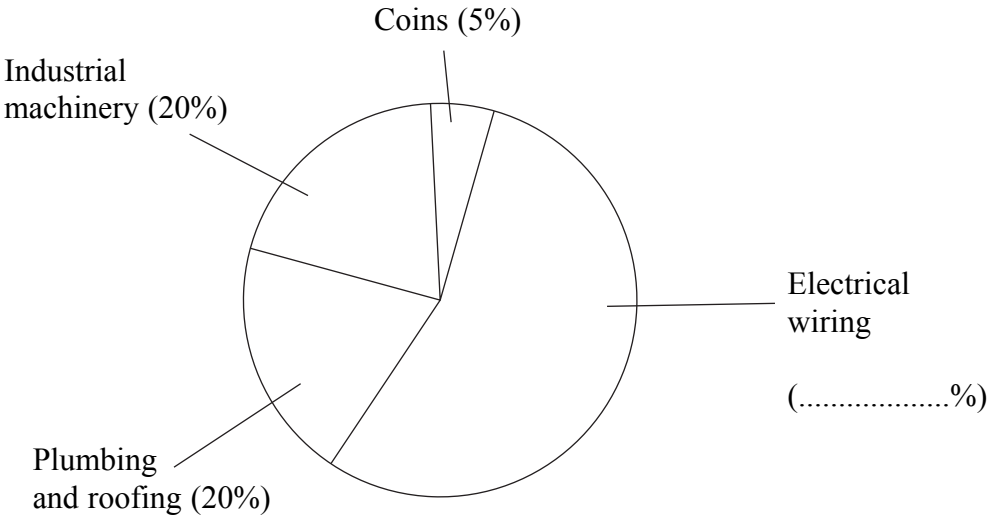
(Total 7 marks)

Turn over

5. (a) The pie chart shows some of the main uses of copper.

Leave blank

Complete the pie chart to show the percentage of copper used in electrical wiring.



(1)

(b) Copper can be made by reduction of copper oxide.

In this process copper oxide is heated strongly with another substance.

(i) Complete the word equation for the process.

Copper oxide + ... → copper + carbon dioxide

(1)

(ii) Write the chemical formula, with state symbol, for carbon dioxide gas.

.....

(2)

(iii) What is meant by reduction?

A addition of oxygen to a compound

B conversion of a compound into its elements

C heating a compound strongly

D removal of oxygen from a compound

Write the correct answer (**A**, **B**, **C** or **D**) in the space provided.

.....

(1)

Q5

(Total 5 marks)

6. The table gives information about four hydrocarbons.

Leave blank

Name of hydrocarbon	Number of carbon atoms in one molecule	Boiling point in °C
Ethane	2	–90
Propane	3	–40
Butane	4	0
Hexane	6	+70

(a) (i) Which element, other than carbon, is present in hydrocarbons?

.....

(1)

(ii) Which of these hydrocarbons has the lowest boiling point?

.....

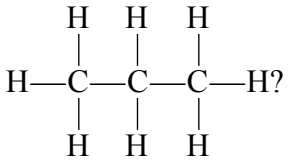
(1)

(iii) Which of these hydrocarbons has the biggest molecules?

.....

(1)

(iv) Which of these hydrocarbons has molecules with the structure



.....

(1)

Turn over

(b) Some of these hydrocarbons are present in petroleum gas which is obtained from crude oil.

Leave blank

(i) Name the process used to separate petroleum gas from crude oil.

.....

(2)

(ii) Name **two** other fuels obtained from crude oil by this process.

1 .....

2 .....

(2)

(c) Ethane gas burns in air.

Complete the word equation for this reaction.

ethane + ... → carbon dioxide + ...

(2)

Q6

(Total 10 marks)

7. (a) Name the starting materials used in the manufacture of ammonia.

Leave blank

..... and .....

(1)

(b) The industrial process for the manufacture of ammonia uses a catalyst of iron.

(i) What is a catalyst?

.....

.....

(2)

(ii) Why does the same mass of a catalyst work better when it is in the form of thin wires rather than in large lumps?

.....

.....

(1)

(c) An NPK fertiliser is a mixture of chemicals containing elements represented by the symbols N, P and K.

Complete the following table.

Symbol	Name of element	Formula of a compound containing this element
N	Nitrogen	NH_4NO_3
P		P_2O_5
K	Potassium	

(2)

(d) The chemical formula NH_4NO_3 represents the compound ammonium nitrate.

(i) How many atoms of nitrogen are shown in the formula for ammonium nitrate?

.....

(1)

(ii) What is the relative formula mass of ammonium nitrate?

.....

(1)

Q7

(Total 8 marks)

Turn over

8. In an experiment a small crystal of potassium manganate(VII) (potassium permanganate) was placed at the bottom of a beaker of cold water. After a short time the colour of the crystal began to spread through the water.

Leave blank

(a) Name the process by which the potassium and manganate(VII) ions move through the water.

.....

(1)

(b) In what way would the outcome of the experiment be different, if at all, if warm water was used in place of cold water?

.....

.....

(1)

(c) Explain your answer to part (b) in terms of the movement of particles.

.....

.....

.....

(2)

(d) The dot (•) below represents a single manganate(VII) ion. Draw lines from it to show the typical movement of the ion in water.

•

(2)

Q8

(Total 6 marks)

9. (a) Draw a dot-and-cross diagram (representing outer electrons only) to show the type of bonding present in methane (CH_4).

Leave blank

(1)

(b) When methane is burnt in a good supply of air it produces only water and carbon dioxide.

(i) Write a word equation for this reaction.

.....

(1)

(ii) Under what conditions would carbon monoxide gas also be produced?

.....

(1)

(iii) Why is it dangerous for methane gas to produce carbon monoxide?

.....

.....

(1)

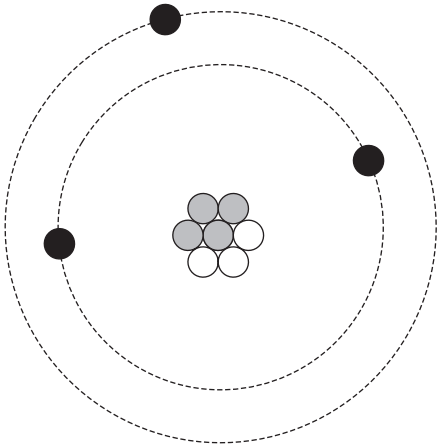
Q9

(Total 4 marks)

Turn over

10. (a) The diagram shows the arrangement of particles in an atom of the element lithium.

Leave blank



Key

- Particle **A**
- Particle **B**
- Particle **C**

(i) Identify the particles **A**, **B** and **C**.

Particle **A** .....

Particle **B** .....

Particle **C** .....

(3)

(ii) What is the mass number of the atom in the diagram?

.....

(1)

(iii) Use the diagram to explain why this element is in group 1 of the periodic table.

.....

.....

(1)

(b) Sodium chloride solution is used to manufacture chlorine, hydrogen and sodium hydroxide.

Leave blank

(i) This manufacturing process uses

A combustion
B cracking
C electrolysis
D neutralisation

Write the correct answer (**A**, **B**, **C** or **D**) in the box.

(1)

(ii) Which product is used in water purification?

A chlorine
B hydrogen
C sodium hydroxide

Write the correct answer (**A**, **B** or **C**) in the box.

(1)

(c) The table shows the number of protons, neutrons and electrons in a chlorine atom.

(i) Complete the table to show the number of these particles in the chloride ion, Cl^-, formed from this atom.

	Chlorine atom (Cl)	Chloride ion (Cl^-)
Number of protons	17	.....
Number of neutrons	18	.....
Number of electrons	17	.....

(3)

(ii) What is the arrangement of electrons in a chlorine **atom**?

.....

(1)

(iii) What is the arrangement of electrons in a chloride **ion**.

.....

(1)

Q10

(Total 12 marks)

TOTAL FOR PAPER: 75 MARKS

END