OCR
RECOGNISING ACHIEVEMENT

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GENERAL CERTIFICATE OF SECONDARY EDUCATION **B641/01**

GATEWAY SCIENCE

CHEMISTRY B

Unit 1 Modules C1 C2 C3 (Foundation Tier)

FRIDAY 18 JANUARY 2008

Afternoon
Time: 1 hour

Candidates answer on the question paper.
Additional materials (enclosed):
None

Calculators may be used.
Additional materials: Pencil
Ruler (cm/mm)

CUP/T45568

Candidate Forename		Candidate Surname	
Centre Number		Candidate Number	

INSTRUCTIONS TO CANDIDATES

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Do **not** write outside the box bordering each page.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is 60.
- The Periodic Table is printed on the back page.

FOR EXAMINER'S USE		
Section	**Max.**	**Mark**
A	**20**	
B	**20**	
C	**20**	
TOTAL	**60**	

This document consists of **20** printed pages.

  [Turn over

Answer **all** the questions.

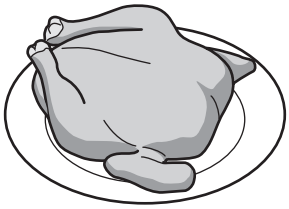
Section A – Module C1

1 This question is about cooking.

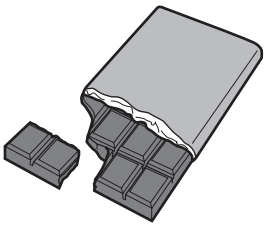
(a) Look at the list of foods.

apple

chicken

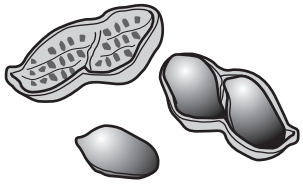


chocolate bar

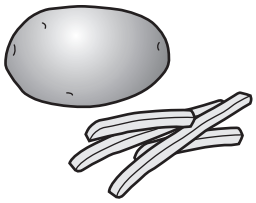


crisps

peanut



potato



Write down the **two** foods that need to be cooked before we can eat them.

Choose from the list.

answer ..... and ..... [2]

(b) **(i)** Eggs are usually cooked before they are eaten.

One method of cooking is frying.

Write down one **other** way of cooking an egg.

..... [1]

(ii) Write down **two** changes that happen when an egg is cooked.

1 .....

.....

2 .....

..... [2]

[Total: 5]

2 Some perfumes contain smelly chemicals called esters.

Esters can be made by reacting two types of chemical together.

(a) Complete this **word** equation about making esters.

alcohol + ... → ester + ... [2]

(b) Cosmetics are tested before they are used on humans.

In some countries cosmetics are still tested on animals before they are used on humans.

Write about the testing of cosmetics.

Your answer should include

- why cosmetics need to be tested
- one advantage of testing on animals
- one disadvantage of testing on animals.

.....

.....

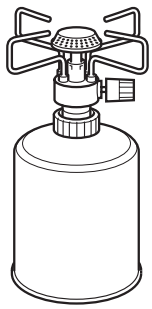
.....

.....

..... [3]

[Total: 5]

3 Propane is a gas used in camping stoves.



The formula of propane is C_3H_8.

Propane reacts with oxygen to make carbon dioxide and water.

(a) **(i)** How many **elements** are there in propane, C_3H_8?

..... [1]

(ii) How many **atoms** are there in one molecule of propane, C_3H_8?

..... [1]

(b) Propane reacts with oxygen to make carbon dioxide and water.

Look at the word equation for this reaction.

propane + oxygen → carbon dioxide + water

One of the four substances in the equation is an **element**.

Which one?

Choose from the list.

propane

oxygen

carbon dioxide

water

answer ..... [1]

(c) The oxygen supply to the flame is not enough.

The flame changes colour from blue to yellow.

The flame now contains a black solid and carbon monoxide gas.

(i) What is the name of the black solid?

..... [1]

(ii) Why is carbon monoxide gas dangerous?

..... [1]

[Total: 5]

4 This question is about plastics.

(a) Look at the table.

It shows the properties of some plastics.

	property			
plastic	**flexibility**	**hardness**	**ease of colouring**	**melting point in °C**
A	very flexible	soft	easy	367
B	rigid	soft	not easy	200
C	rigid	hard	not easy	874
D	very flexible	soft	very easy	178

(i) A plastic part of an electric toaster must not melt.

Which plastic has the **highest** melting point?

Choose from **A**, **B**, **C** or **D**.

answer ..... [1]

(ii) Plastic **B** is polystyrene.

Write down one use for polystyrene.

..... [1]

(b) Many plastics are **non-biodegradable**.

Write down what is meant by non-biodegradable.

.....

..... [1]

(c) Disposal of waste plastics causes problems.

One of these problems is litter.

Write about **other** problems of disposing of plastics.

.....

.....

..... [2]

[Total: 5]

Section B – Module C2

5 Stowmarket Synthetics make an oil paint.

This oil paint contains a pigment and a solvent.

(a) What is the job of the solvent in the paint?

..... [1]

(b) The pigment gives the oil paint a colour.

What type of pigment changes colour when it is heated or cooled?

Choose from the list.

colloid

natural

phosphorescent

synthetic

thermochromic

answer ..... [1]

(c) What type of pigment glows in the dark?

Choose from the list.

colloid

natural

phosphorescent

synthetic

thermochromic

answer ..... [1]

[Total: 3]

6 Air is a mixture of many gases.

Carbon monoxide, sulfur dioxide and oxides of nitrogen are pollutants sometimes found in air.

(a) Write down the name of one gas found in **non-polluted** air.

..... [1]

(b) Sulfur dioxide causes acid rain.

One environmental problem caused by acid rain is that it corrodes metals.

Write about **other** environmental problems caused by acid rain.

.....

.....

..... [2]

(c) Nitrogen monoxide is made in a car engine.

It can be removed from the exhaust gases of a car by a catalytic converter.

In a catalytic converter nitrogen monoxide reacts with carbon monoxide.

Carbon dioxide and nitrogen are made.

Write down the **word** equation for the reaction in the catalytic converter.

..... [1]

(d) The catalyst in a catalytic converter has a large surface area.

The reaction between nitrogen monoxide and carbon monoxide is very fast.

Explain why.

Use ideas about particles.

.....

..... [1]

[Total: 5]

7 Metals are a very useful type of material.

Steel is an alloy. It is a mixture of iron and carbon.

(a) Look at this list of metals.

brass

copper

lead

mercury

solder

Two of the metals are alloys.

Which two?

..... and ..... [2]

(b) Look at the table.

It shows some information about four metals.

metal	melting point in °C	density in g/cm^3	relative strength (1 is very weak)	relative hardness (1 is very soft)
aluminium	660	2.7	11	2.8
copper	1085	8.9	33	3.0
iron	1538	7.9	20	4.5
titanium	1668	4.5	40	6.0

(i) Which metal is the **hardest**?

..... [1]

(ii) Which metal has the **lowest** density?

..... [1]

(iii) Iron corrodes quickly in moist air.

This is called rusting.

Aluminium does not corrode in moist air.

Explain why.

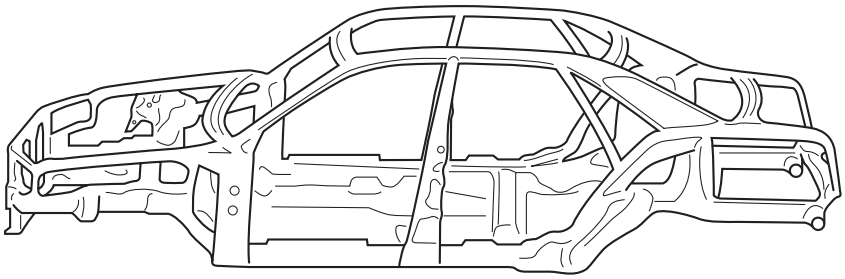
.....

.....

..... [2]

(iv) Steel is an alloy that contains mostly iron.

Look at the diagram. It shows a car body.



Aluminium or steel can be used to make a car body.

One advantage of aluminium is that it will not corrode in moist air.

Describe **another** advantage and a disadvantage of using aluminium instead of steel to make a car body.

Information in the table may help you answer this question.

advantage of using aluminium .....

.....

disadvantage of using aluminium .....

..... [2]

(c) Aluminium and steel are both recycled.

One reason is to save money.

Suggest **one** other reason for recycling.

.....

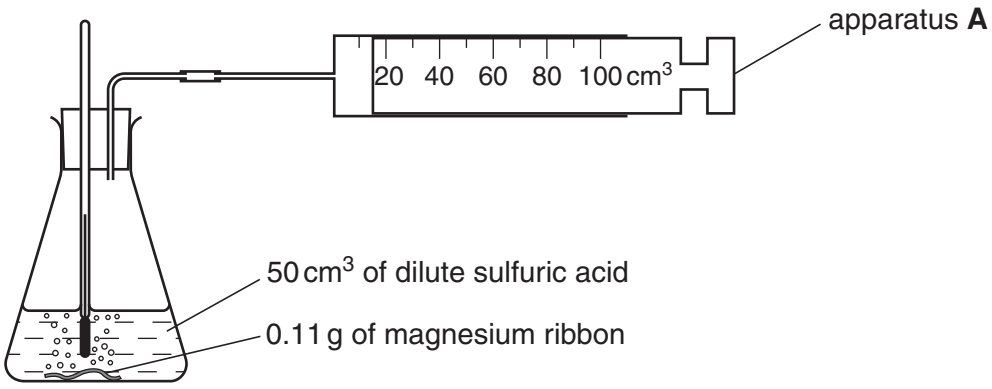
..... [1]

[Total: 9]

8 Blessy and Anu investigate the reaction between magnesium and dilute sulfuric acid.

This reaction makes hydrogen and magnesium sulfate.

Look at the apparatus they use.



(a) What is the name of apparatus **A**?

..... [1]

(b) Blessy and Anu do four experiments.

They do each experiment using acid at a different temperature.

Each time they use

- 50 cm^3 of dilute sulfuric acid
- 0.11 g of magnesium.

They measure the time it takes to collect 100 cm^3 of hydrogen.

Look at their results.

temperature of acid in °C	**time to collect 100 cm^3 of hydrogen in seconds**
20	36
30	18
40	9
50	5

(i) At what temperature was the time taken to collect 100 cm^3 of hydrogen the **longest**?

..... °C [1]

(ii) What happens to the **rate** of reaction as the temperature **increases**?

..... [1]

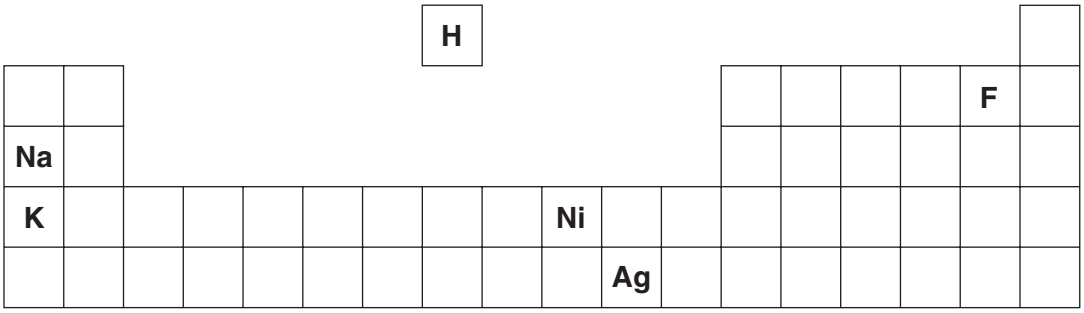
[Total: 3]

Section C – Module C3

9 This question is about the Periodic Table and transition elements.

Look at the diagram.

It shows the position of some elements in the Periodic Table.



(a) (i) Write down the symbols for **two** elements that are in the same **group**.

Choose from the diagram.

answer ..... and..... [1]

(ii) Write down the symbols for **two** elements that are in the same **period**.

Choose from the diagram.

answer ..... and..... [1]

(iii) Write down the symbol of a transition element.

Choose from the diagram.

answer ..... [1]

(b) Compounds of transition elements are often coloured.

Iron(II) compounds are usually green.

Look at the list. It gives the colours of some transition metal compounds.

blue

grey

orange

pink

purple

(i) What colour are most copper compounds?

Choose from the list.

answer ..... [1]

(ii) What colour are most iron(III) compounds?

Choose from the list.

answer ..... [1]

[Total: 5]

10 This question is about the halogens and their reactions.

(a) Write down **two** uses of chlorine.

1 .....

2 ..... [2]

(b) Bromine, chlorine and iodine are halogens.

Put the halogens in order of reactivity.

Write the most reactive first.

most reactive .....

.....

least reactive ..... [1]

(c) Chlorine water is added to a solution of sodium iodide.

A brown solution is formed.

Similar experiments can be done with

- chlorine water and sodium bromide solution
- bromine water and sodium iodide solution
- iodine solution and sodium bromide solution.

Look at the table. It shows the results from these and other experiments.

	chlorine water	**bromine water**	**iodine solution**
sodium chloride solution		no reaction	no reaction
sodium bromide solution	orange solution		no reaction
sodium iodide solution	brown solution	……	

Complete the table to show the missing result. [1]

(d) Chlorine is a green gas.

Bromine is an orange liquid.

Iodine is a solid.

What colour is solid iodine?

..... [1]

(e) Chlorine, bromine and iodine are all in Group 7 of the Periodic Table.

They all react in a similar way.

Explain why.

Use ideas about electronic structure.

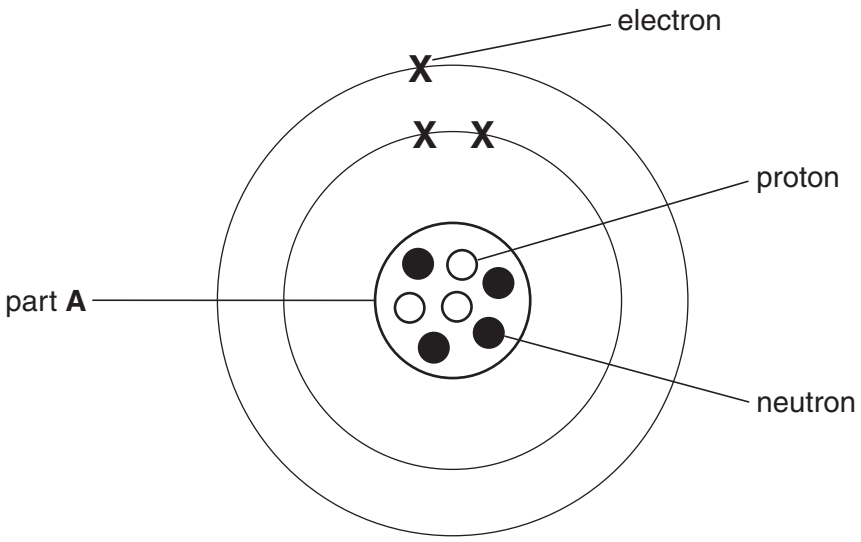
.....

..... [1]

[Total: 6]

11 This question is about atoms.

(a) Look at the diagram. It shows a lithium atom.



(i) Part **A** contains protons and neutrons.

What is the name of part **A**?

..... [1]

(ii) What is the charge on an electron?

Choose from the list.

negative

neutral

positive

answer ..... [1]

(iii) Which group of the Periodic Table is this element in?

Group ..... [1]

(iv) The outer electron is removed.

This forms a charged particle, Li^+.

What is a charged particle, such as Li^+, called?

..... [1]

(b) Look at the Periodic Table on the back page.

Find the element with the symbol Na.

What is the atomic number of this element?

..... [1]

[Total: 5]

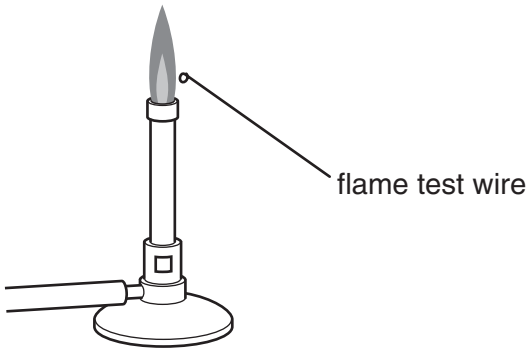
12 Lithium, sodium and potassium are known as the alkali metals.

(a) They are stored in oil. Explain why.

.....

..... [2]

(b) Different flame colours are seen when compounds of the alkali metals are put into a Bunsen flame.



Draw straight lines to match the **metal** to its **flame colour**.

metal	flame colour
lithium	orange
sodium	lilac
potassium	red

[2]

[Total: 4]

END OF QUESTION PAPER

PLEASE DO NOT WRITE ON THIS PAGE

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.