

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
GATEWAY SCIENCE
CHEMISTRY B**

B641/01

Unit 1 Modules C1 C2 C3 (Foundation Tier)

Candidates answer on the question paper.
A calculator may be used for this paper.

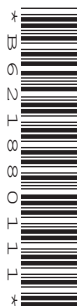
OCR supplied materials:
None

Other materials required:

- Pencil
- Ruler (cm/mm)

**Monday 17 January 2011
Morning**

Duration: 1 hour



Candidate forename		Candidate surname	
Centre number		Candidate number	

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Answer **all** the questions.
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The Periodic Table is printed on the back page.
- The total number of marks for this paper is **60**.
- This document consists of **24** pages. Any blank pages are indicated.

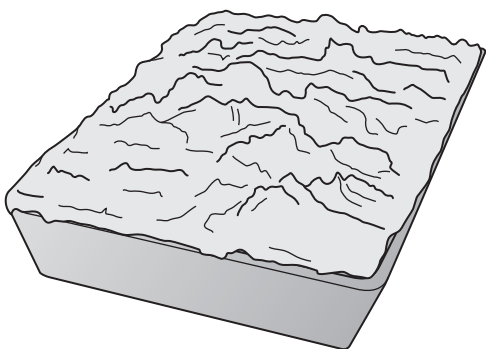
2

Answer **all** the questions.**Section A – Module C1**

1 John is cooking a fish pie for Debbie.

(a) Potato is present in the **greatest** amount in the pie.Complete the food label by writing **potato** in the correct place.

[1]

	FISH PIE Food label , salmon, prawn, water, milk, onion, double cream, skimmed milk powder,, cheddar cheese, lemon juice, parsley, E150, mustard powder,
---	--

(b) E150 is a food additive.

Suggest why there are food additives in the fish pie.

..... [1]

(c) John serves the fish pie with tomatoes.

The tomatoes are sold in a special kind of bag.

This is an example of **active packaging** because the bag absorbs gases that speed up the ripening of the fruit.(i) Put a tick (✓) in the box next to **one other** example of how active packaging can work.

jar of mayonnaise containing an emulsifier

☐

packet with a sensor to tell when fruit is ripe

☐

self-cooling drinks can

☐

tinned fruit containing an antioxidant

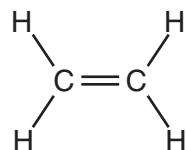
☐

[1]

3

- (ii) Ethene is a gas that speeds up the ripening of fruits.

The displayed formula for ethene is



What type of molecule is **ethene**?

Choose from the list.

alcohol

alkane

alkene

polymer

answer [1]

[Total: 4]

2 This question is about fuels.

(a) A gas is needed for the **combustion** (burning) of a fuel.

Write down the **name** of this gas.

..... [1]

(b) The table shows some information about four fuels.

fuel	state at room temperature	relative cost	energy value	method of delivery	how easy is it to light?
propane	gas	expensive	high	in small cylinders	easy
coal	solid	cheap	medium	in bags	difficult
natural gas	gas	moderate	high	supplied by underground pipes	easy
oil	liquid	expensive	high	in a metal tank	easy

Look at the picture of a camping stove.



Which fuel is most suitable for a camping stove?

answer

Give reasons for your answer. Use information from the table.

.....

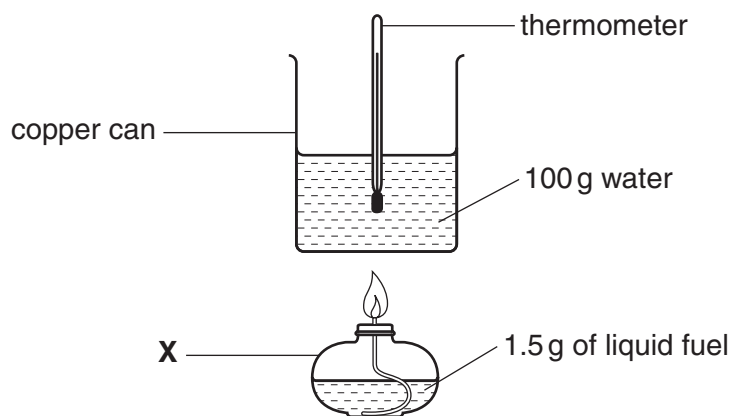
 [2]

5

(c) Karen and Phil investigate four different liquid fuels.

They want to find out which fuel releases most energy.

The diagram shows the apparatus they use.



(i) What is the name of the piece of apparatus labelled X?

..... [1]

(ii) Incomplete combustion takes place.

Carbon monoxide gas is produced.

Why is carbon monoxide gas dangerous?

..... [1]

(d) Look at Karen and Phil's results.

fuel	temperature of water at start in °C	temperature of water at end in °C	temperature change in °C
A	18	29	11
B	15	34	19
C	15	25	10
D		35	16

(i) **Complete** the table.

[1]

(ii) Which fuel released the **most** energy?

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

..... [1]

[Total: 7]

Turn over

3 This question is about crude oil.

(a) Crude oil is a **fossil fuel**.

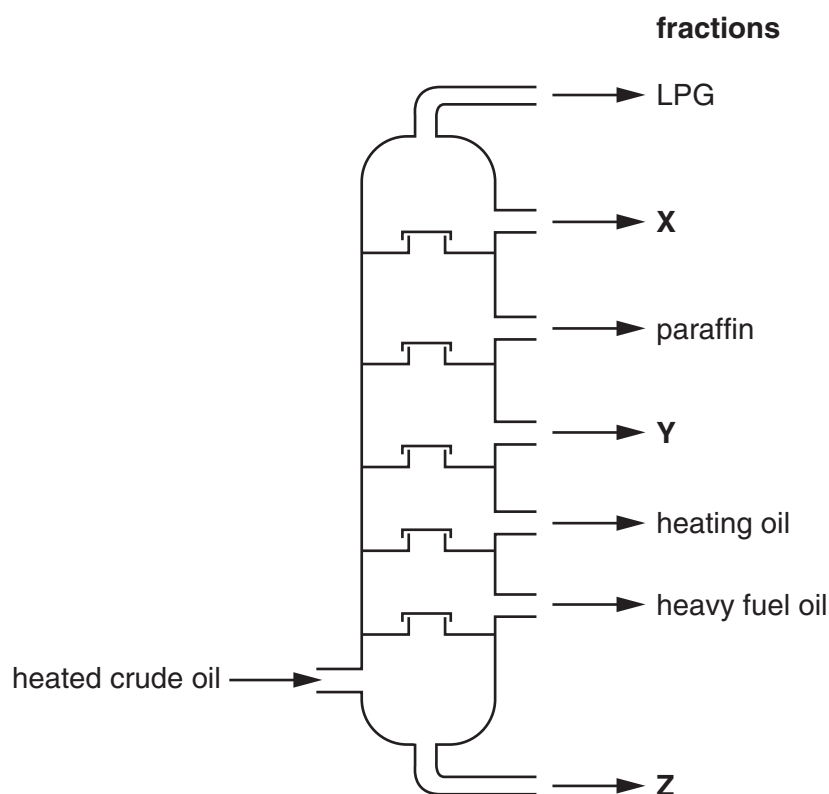
Write down the name of one **other** fossil fuel.

..... [1]

(b) Crude oil is separated into different parts by fractional distillation.

Look at the diagram.

It shows a fractionating column.



What are the names of the missing fractions **X**, **Y** and **Z**?

Choose your answers from the list.

bitumen

diesel

petrol

Fraction **X** is

Fraction **Y** is

Fraction **Z** is

[2]

7

(c) Fractional distillation makes too much fuel oil.

Fuel oil is **cracked**.

Write about cracking.

Your answer should include

- the conditions needed for cracking
- why cracking is a useful reaction.

.....

.....

.....

..... [2]

[Total: 5]

8

- 4 Colette uses nail varnish remover to remove her nail varnish.



The nail varnish dissolves in the nail varnish remover.

- (a) Draw a straight line between each **word** and the correct **description**.

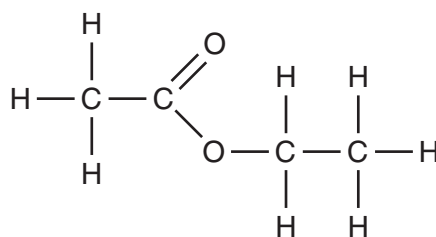
You should draw only three straight lines.

word	description
solvent	the solid that dissolves in a liquid
solute	a solid that does not dissolve in a liquid
insoluble	the liquid that dissolves a solid

[2]

- (b) Ethyl ethanoate is a nail varnish remover.

Look at the displayed formula of ethyl ethanoate.



Complete the table to show the number of each type of atom in ethyl ethanoate.

atom	number
C	
H	
O	

[2]

[Total: 4]

Section B – Module C2

- 5 Limestone is a rock used for building.

Limestone is a form of calcium carbonate.

- (a) Write down the name of another rock which is a form of calcium carbonate.

Choose from:

basalt

granite

iron ore

marble

answer [1]

- (b) Limestone is mined in quarries.



One environmental problem of quarries is that they change the landscape.

Write about **two other** environmental problems caused by quarries.

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

[Total: 3]

6 This question is about metals.

Look at the table. It shows the properties of some metals.

metal	melting point in °C	density in g/cm ³	relative electrical conductivity	cost per tonne in £
aluminium	660	2.7	40	1350
copper	1083	8.9	64	3800
lead	328	11.3	5	1500
silver	962	10.5	67	20 000
solder	188	8.2	7	6700
tin	232	5.7	9	10 000

(a) One of the metals in the table is an alloy.

Which one?

..... [1]

(b) Which metal in the table has the **highest** density?

..... [1]

(c) Solder is used for joining electrical wires.

Suggest why. Use information from the table.

..... [1]

(d) Aluminium is used for making aeroplane bodies.

Apart from cost, suggest why. Use information from the table.

..... [1]

(e) Copper is recycled so that it can be used again.

Recycling is cheaper than extracting copper.

Write down one **other** advantage of recycling copper.

..... [1]

[Total: 5]

7 This question is about paints.



(a) Look at the table.

It shows the three materials used to make paint. It also shows their jobs.

Complete the table.

material	its job in the paint
pigment	gives the paint its colour
binding medium	helps to stick the paint to a surface
solvent	

[1]

(b) Pigments give the paint its colour.

Some pigments are **thermochromic**.

What is meant by a thermochromic pigment?

..... [1]

(c) Paints are **colloids**.

Look at the sentences about colloids.

Which sentences about colloids are correct?

Put ticks (✓) in the boxes next to the **two** correct sentences.

Particles are mixed and dispersed through a liquid.

☐

Solid particles are dissolved in a liquid.

☐

A colloid is a single compound.

☐

Solid particles are suspended in a liquid.

☐

A colloid is two separated liquids.

☐

[2]

[Total: 4]

Turn over

8 Emily investigates antacid tablets.

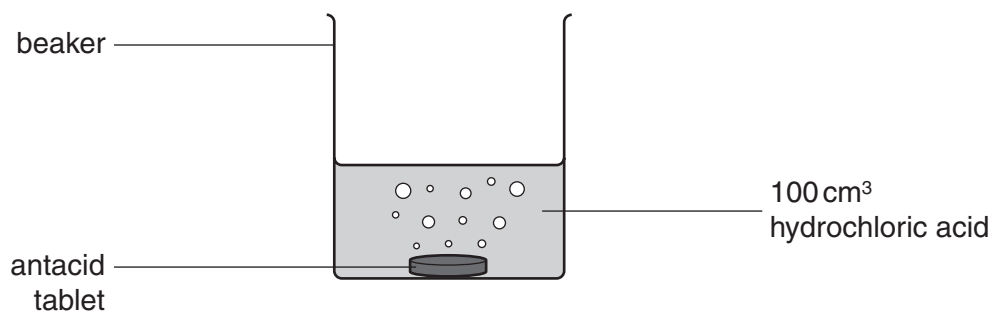
Antacids neutralise excess acid in your stomach.

Emily uses one tablet in each experiment.

She adds the tablet to 100 cm^3 of hydrochloric acid.

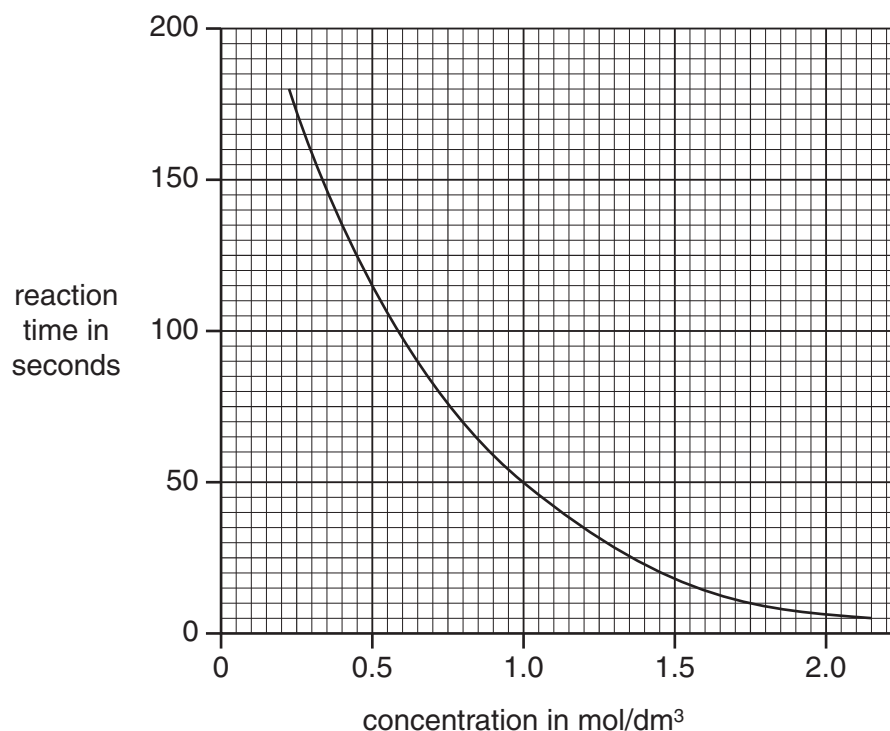
She measures the time it takes to fully react. This is the **reaction time**.

Look at the diagram. It shows the apparatus she uses.



Emily does the experiment several times. Each time she uses a different concentration of acid.

Look at the graph of Emily's results.



(a) Emily uses hydrochloric acid with a concentration of **1.0 mol/dm³**.

Look at the graph.

What is the reaction time?

..... seconds

[1]

13

- (b) Emily finds that the reaction time is shorter with **concentrated** acid than with **dilute** acid.

Explain why. Use ideas about particles.

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

- (c) Emily crushes the antacid tablet into a powder.

She adds the powder to the hydrochloric acid.

What, if anything, happens to the speed of reaction when she uses the powder instead of a whole tablet?

..... [1]

- (d) Emily has investigated how

- changing the concentration of acid
- crushing the tablet

affects the speed of the reaction.

Write down **one other** thing that Emily can do which will affect the speed of the reaction.

She does **not** want to change the tablet or the volume of acid.

..... [1]

[Total: 5]

9 Air contains polluting gases.

Look at the table. It shows some polluting gases and the problems they cause.

gas	problem caused
sulfur dioxide	acid rain
oxides of nitrogen	

(a) Complete the table. [1]

(b) Acid rain can kill plants.

Write down **two other** problems caused by acid rain.

1

2 [2]

[Total: 3]

Section C – Module C3

- 10 This question is about the uses of substances.

Draw straight lines to join each **substance** to its **use**.

Use only four straight lines.

substance

sodium chloride

iron

chlorine

copper

use

to make electrical wiring

to make bridges

to make pesticides

as a preservative

[3]**[Total: 3]**

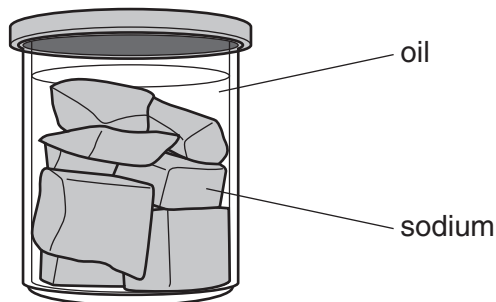
11 Sodium, potassium and lithium are Group 1 metals.

(a) Write down the name of **one other** Group 1 metal.

Use the periodic table on the back page to help you.

..... [1]

(b) Sodium is stored under oil.



Explain why.

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

(c) The Group 1 metals react when put into water.

Look at the table.

metal	time for 0.5 g of metal to react in seconds	observations
sodium	12	melts skates across surface of water gas given off alkaline solution made
potassium	6	melts and catches fire skates across surface of water gas given off alkaline solution made
lithium	20	skates across surface of water gas given off alkaline solution made

(i) All three reactions give off the same gas.

Write down the name of this gas.

..... [1]

(ii) Look at the observations for sodium.

Write down the name of the substance that makes the solution alkaline.

..... [1]

(iii) Write down the order of reactivity of sodium, potassium and lithium with water.

Use the table to help you.

most reactive

.....

least reactive

[1]

[Total: 6]

12 This question is about atoms and the periodic table.

Look at the periodic table on the back page.

(a) How many elements are there in the periodic table?

Put a tick (✓) in the box next to the correct answer.

number of elements in the periodic table	
less than 50	
about 50	
between 80 and 120	
over 200	

[1]

(b) Find copper, Cu, on the periodic table.

What is the **atomic number** of copper?

.....

[1]

(c) Find aluminium, Al, on the periodic table.

Write down the name of an element in the same **period** as aluminium.

.....

[1]

(d) Find any **transition element** on the periodic table.

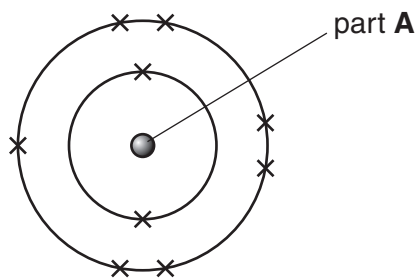
Write down its atomic symbol.

.....

[1]

19

(e) Look at the diagram. It shows a fluorine atom.



Write down the name of part **A**.

..... [1]

(f) Look at the table. It shows some information about the particles which make up atoms.

particle	charge	relative mass
proton		1
electron	negative	0.0005
neutron	neutral	

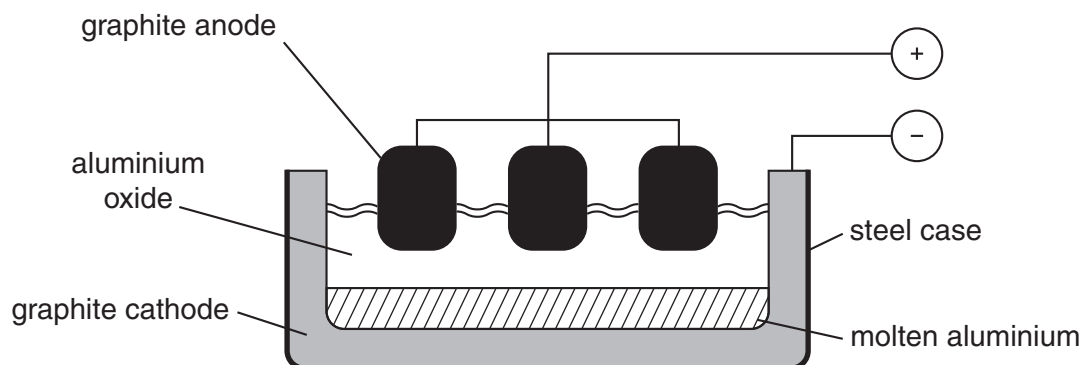
Complete the table.

[2]

[Total: 7]

13 This question is about the extraction of aluminium.

Look at the diagram. It shows the equipment used.



(a) What is the name of the type of process used?

Choose from:

displacement

electrolysis

electrostatic

precipitation

answer [1]

(b) The aluminium oxide is extracted from a mineral.

Write down the name of this mineral.

..... [1]

(c) Aluminium oxide is broken down into aluminium and oxygen.

Write a **word** equation for this reaction.

..... [1]

(d) Oxygen is made at one of the electrodes.

Which one?

..... [1]

[Total: 4]

END OF QUESTION PAPER

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The Periodic Table of the Elements

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1	2	Key										3	4	5	6	7	0						
		relative atomic mass atomic symbol name atomic (proton) number																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.