Candidate forename		Candidate surname	

Centre number						Candidate number				

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION

B641/01

GATEWAY SCIENCE

CHEMISTRY B

Unit 1 Modules C1 C2 C3 (Foundation Tier)

MONDAY 17 JANUARY 2011: Morning
DURATION: 1 hour

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

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)

READ INSTRUCTIONS OVERLEAF

DC (NH/SW) 11MEP01139 40161/2

INSTRUCTIONS TO CANDIDATES

- **Write your name, centre number and candidate number in the boxes on the first page. 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.**

INFORMATION FOR CANDIDATES

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

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 ☐

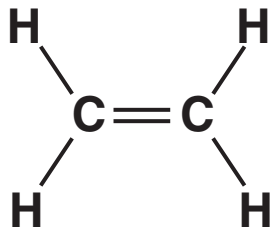
self-cooling drinks can ☐

tinned fruit containing an antioxidant ☐

[1]

(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.

_____

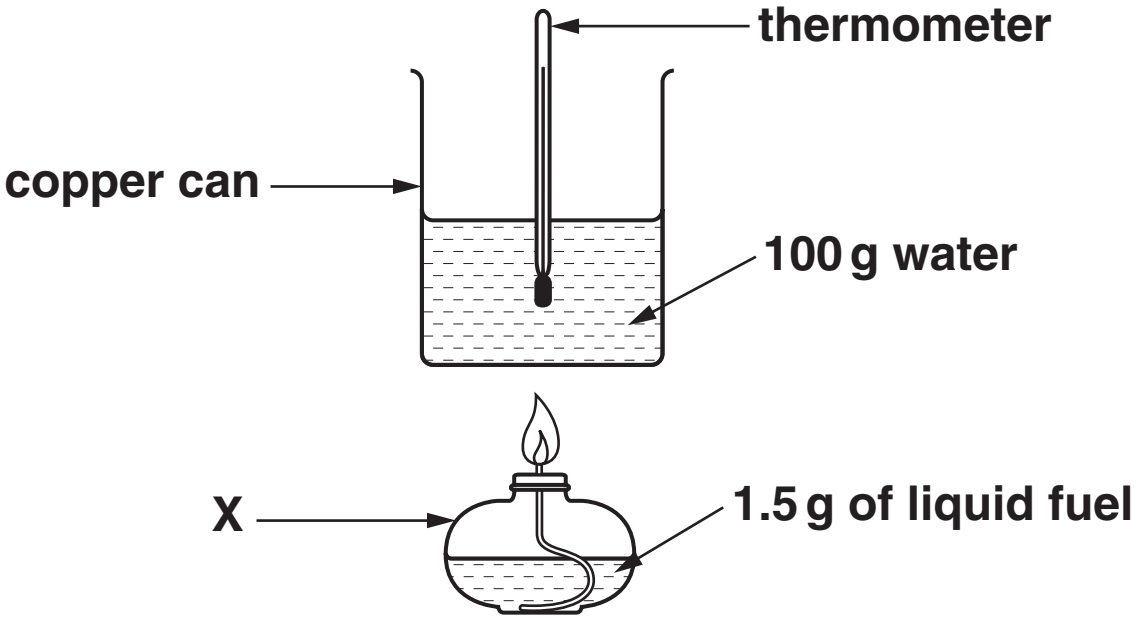
_____

_____ **[2]**

(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]

3 This question is about crude oil.

(a) Crude oil is a FOSSIL FUEL.

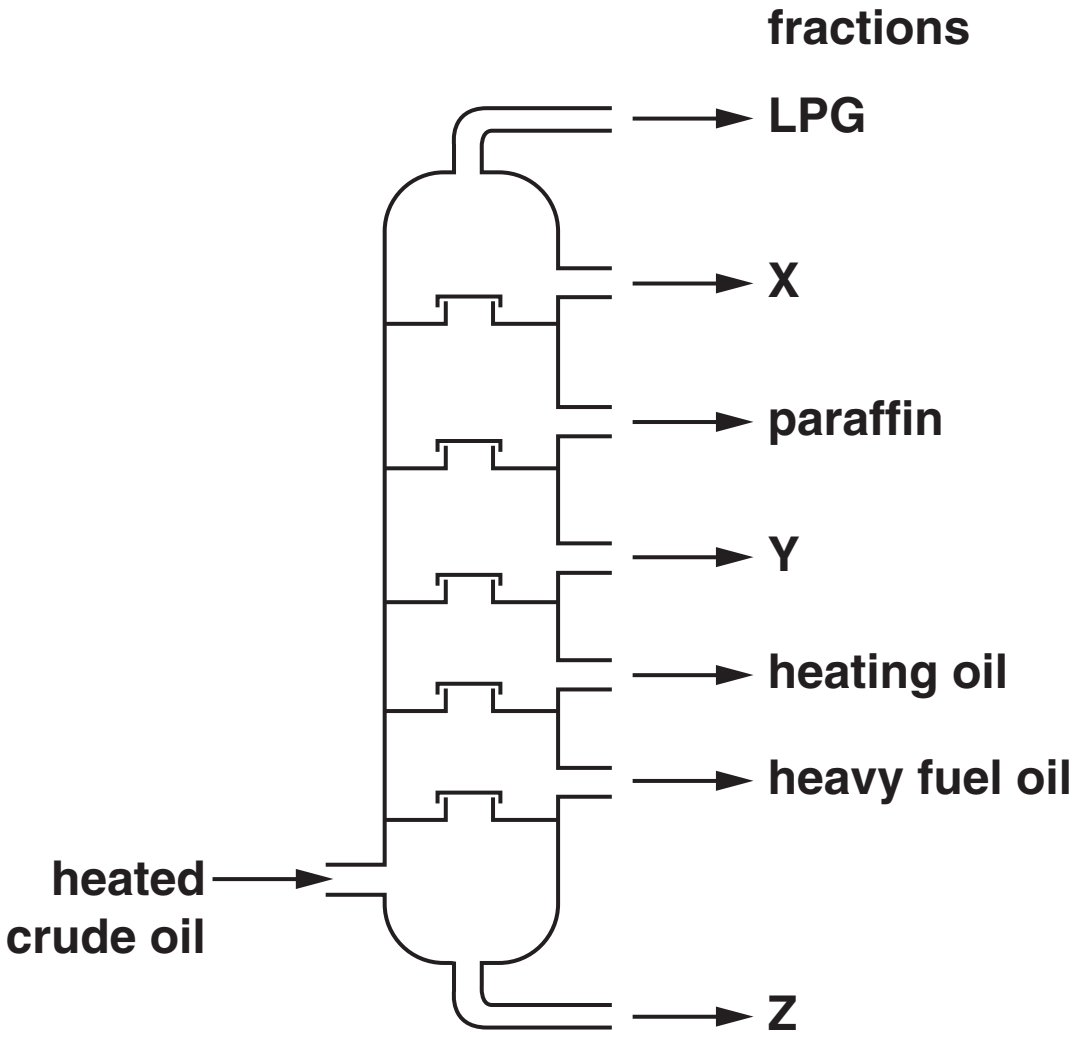
Write down the name of one OTHER fossil fuel.

_____ **[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]

(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]

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.

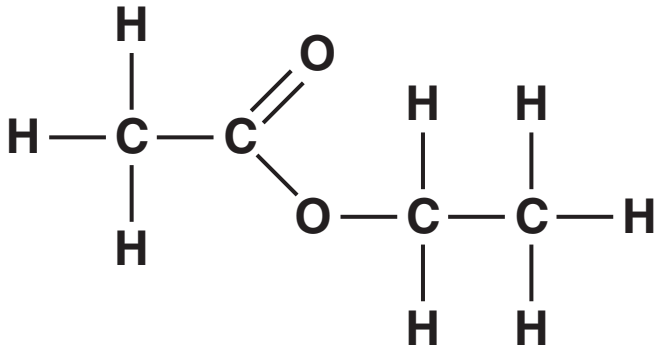
You should draw only three straight lines.

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]

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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]

8 Emily investigates antacid tablets.

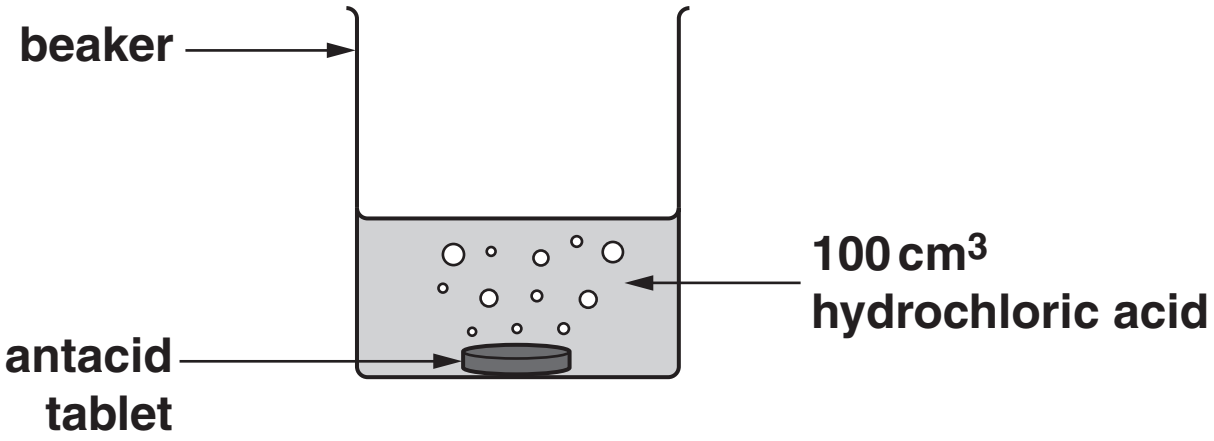
Antacids neutralise excess acid in your stomach.

Emily uses one tablet in each experiment.

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

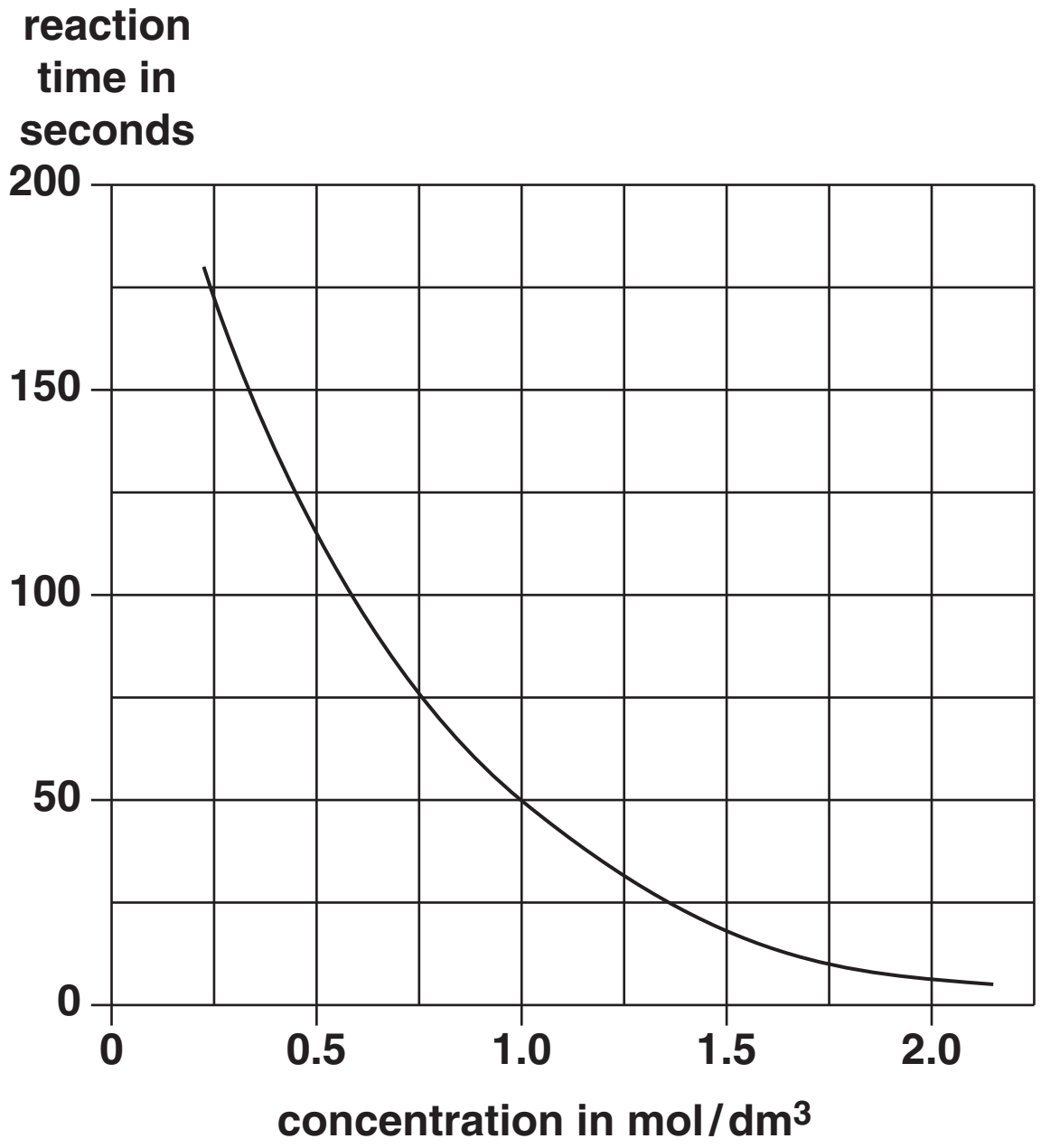
She measures the time it takes to fully react. This is the REACTION TIME.

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/dm^3.

Look at the graph.

What is the reaction time?

_____ seconds **[1]**

(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]

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	USE
sodium chloride	to make electrical wiring
iron	to make bridges
chlorine	to make pesticides
copper	as a preservative

[3]

[Total: 3]

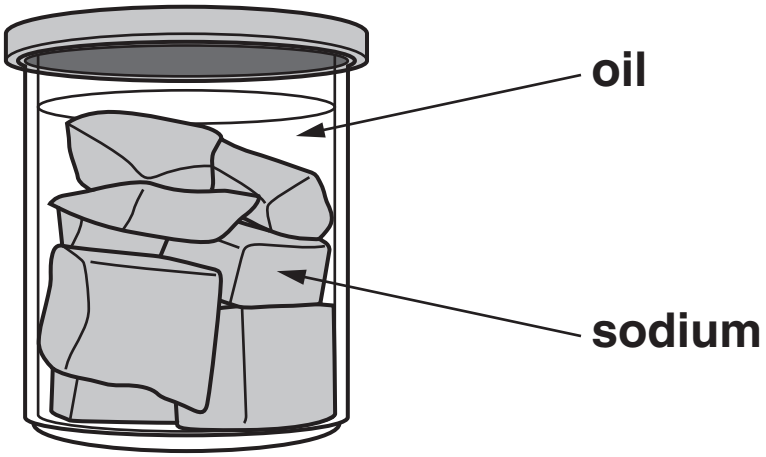
11 Sodium, potassium and lithium are Group 1 metals.

(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, A*l*, on the periodic table.

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

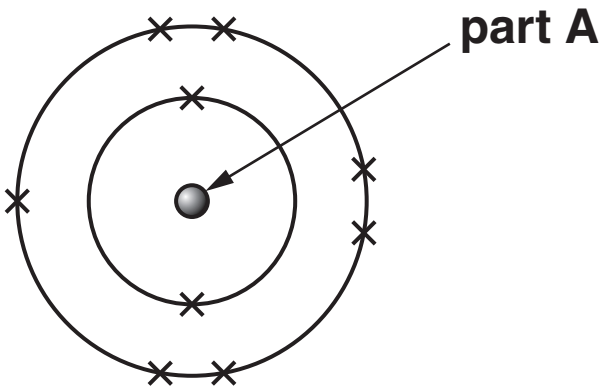
_____ **[1]**

(d) Find any TRANSITION ELEMENT on the periodic table.

Write down its atomic symbol.

_____ **[1]**

(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.

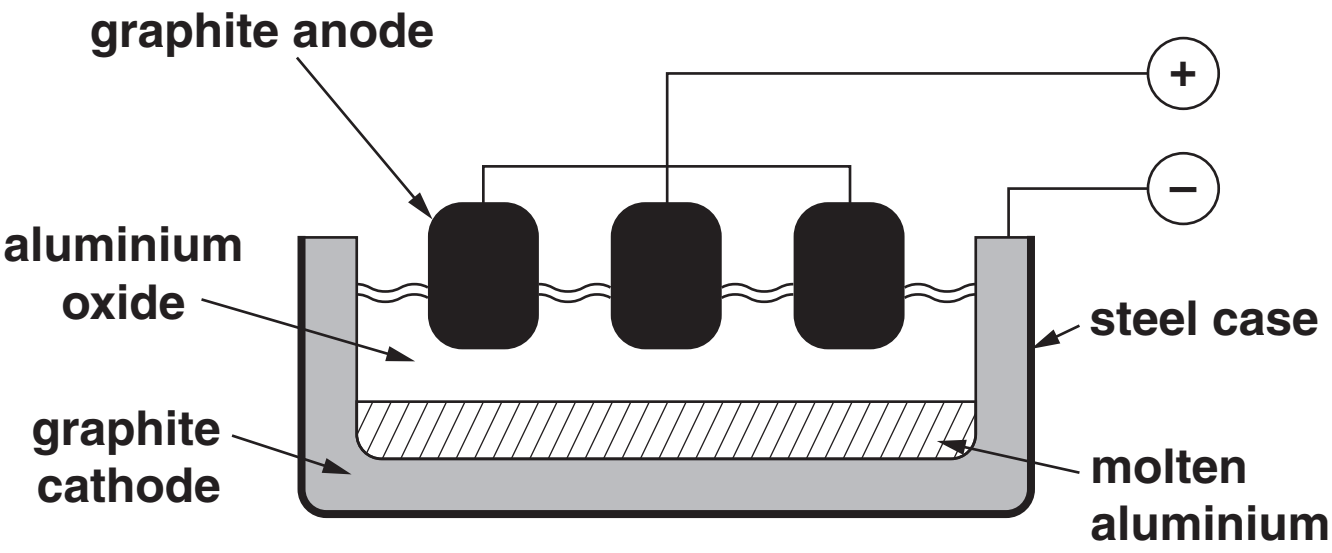
particle	charge	relative mass
proton	_____	1
electron	negative	0.0005
neutron	neutral	_____

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

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.