

GENERAL CERTIFICATE OF SECONDARY EDUCATION
TWENTY FIRST CENTURY SCIENCE
CHEMISTRY A

Unit 2: Modules C4 C5 C6
 (Foundation Tier)

A322/01



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)

Wednesday 24 June 2009
Morning

Duration: 40 minutes



Candidate Forename					Candidate Surname				
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Centre Number						Candidate Number			
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INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use 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.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

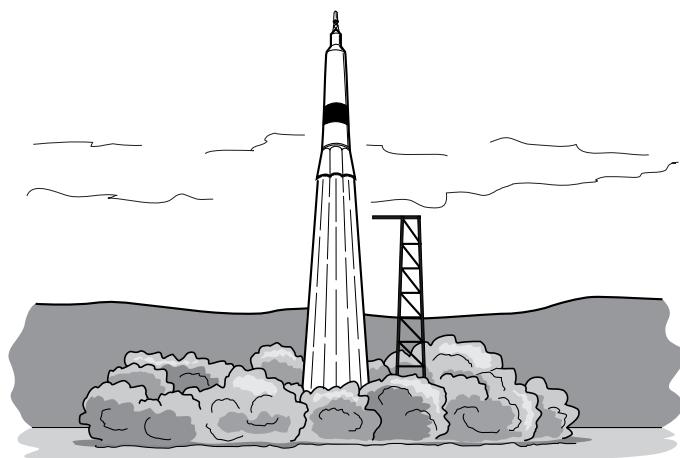
INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **42**.
- This document consists of **16** pages. Any blank pages are indicated.
- The Periodic Table is printed on the back page.

Answer **all** the questions.

1 Lithium is an element in Group 1.

It can be added to rocket fuel to give an extra boost for take off.



(a) Lithium works well in rocket fuels because it is very reactive.

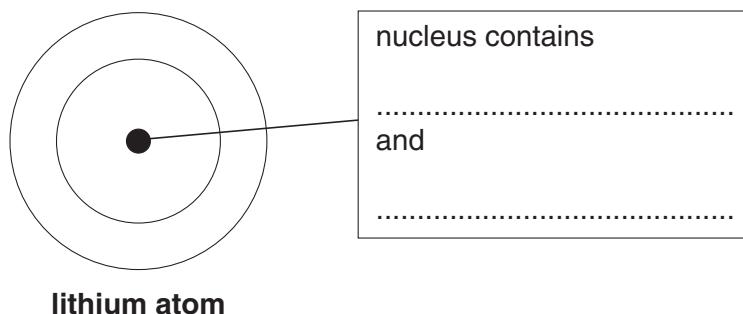
Which of the following statements about the reactivity of lithium are **true** and which are **false**?

Put ticks (✓) in the correct boxes.

	true	false
Lithium reacts with cold water.		
Lithium reacts with other group 1 elements to form compounds.		
Lithium tarnishes in moist air more quickly than potassium.		
Lithium chloride is very unstable.		

[2]

(b) The diagram shows an atom of lithium.



(i) Label the diagram by filling in the **names** of the particles in the nucleus.

Choose words from this list.

cytoplasm **electrons** **neutral** **neutrons** **protons** **protease**

[2]

(ii) Lithium has **three** electrons. Use crosses (x) to draw the electrons on the diagram of the lithium atom.

[1]

[Total: 5]

2 Iodine solution can be used as a treatment for cuts.



(a) Solid iodine is used to make iodine solution.

Solid iodine is kept in sealed jars because it easily changes into iodine gas.

Iodine gas is very harmful to people.

(i) Draw straight lines to show the correct **colour** for solid iodine and for iodine gas.

dark grey

solid iodine

red-brown

orange

purple

iodine gas

yellow

green

[2]

(ii) What are the **two most important** safety precautions for handling chemicals that can give off harmful gases?

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

Do experiments in a fume cupboard.

Wear a lab coat.

Keep away from naked flames.

Do not breathe in the gas.

Wear protective gloves.

[2]

(b) Iodine solution is used on cuts because it stops the cuts from becoming infected.

Why does iodine stop infection?

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

Iodine solution contains a non-metal element.

Iodine solution is neutral.

Iodine solution kills bacteria.

Iodine is more reactive than chlorine.

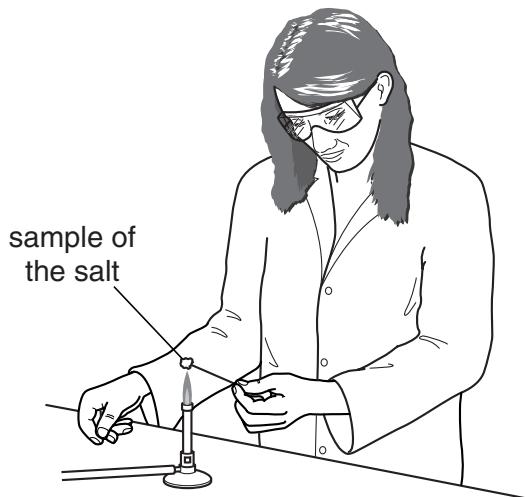
[1]

[Total: 5]

3 Eve wants to find out what elements are in a salt.

She does a flame test.

She heats a sample of the salt in a Bunsen flame.



(a) What should Eve look for when she does the flame test?

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

how quickly the salt evaporates in the flame

the colour of the flame

whether or not a gas is given off

whether the crystal melts

[1]

(b) During the test, Eve looks at the flame through a spectroscope.

What will she see?

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

a fixed pattern of lines

lines that keep changing position

a series of numbers

an outline of the crystal

[1]

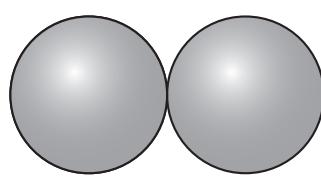
(c) The salt Eve tested has the formula KCl .

Give the **names** of the two elements in this salt.

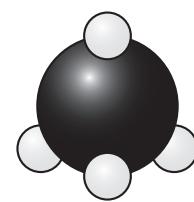
..... and [2]

[Total: 4]

4 These diagrams show the arrangement of atoms in oxygen and methane molecules.



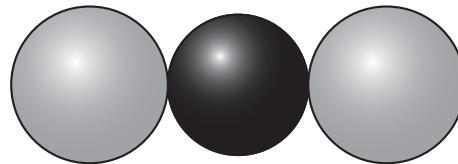
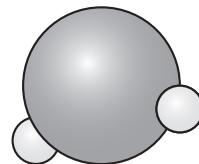
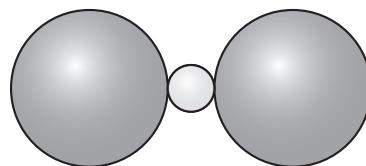
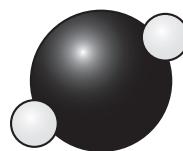
oxygen
 O_2



methane
 CH_4

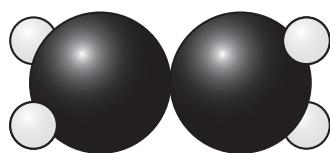
(a) Which of the diagrams below shows a molecule of water, H_2O ?

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



[1]

(b) What is the formula for this molecule?



formula [2]

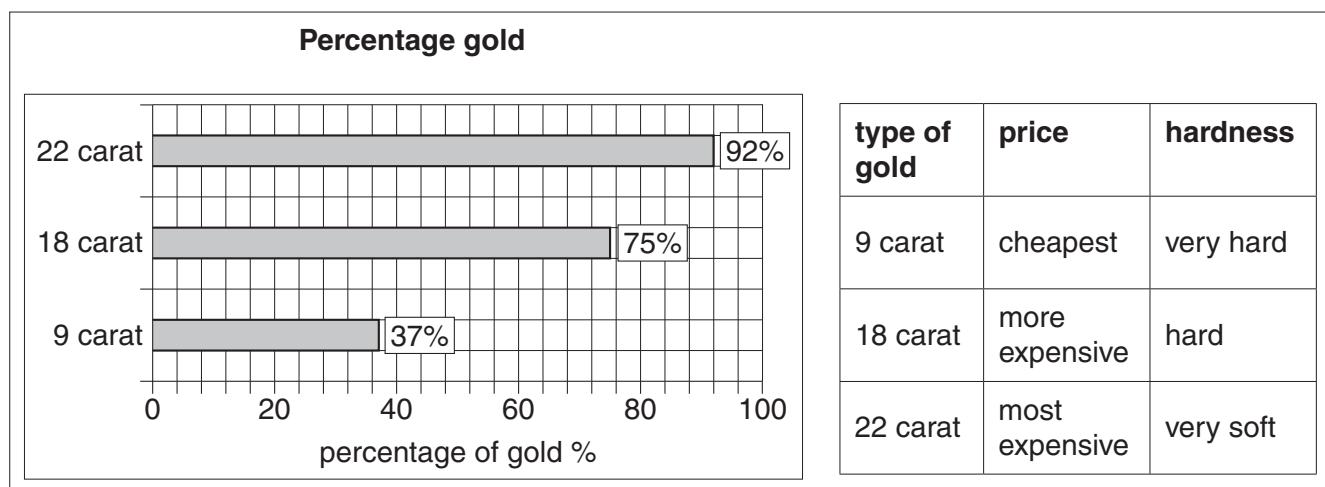
[Total: 3]

10

5 Gold used in jewellery is a mixture of gold with other metals.

Different types of gold have different carat numbers to show how much gold they contain.

(a) The box shows information about different types of gold.



(i) Put a **ring** around the correct word to complete each sentence.

Gold with a higher carat number contains **more** / **less** gold.

Gold with a higher carat number is **more** / **less** expensive.

Gold with a higher carat number is **more** / **less** hardwearing. [2]

(ii) Another type of gold has a carat number of 14.

Use the graph to estimate the percentage of gold in 14 carat gold.

percentage of gold %

[1]

(b) The sentences show some uses of gold.

Each use depends on a different property.

Draw lines to connect each **use** with the best **property**.

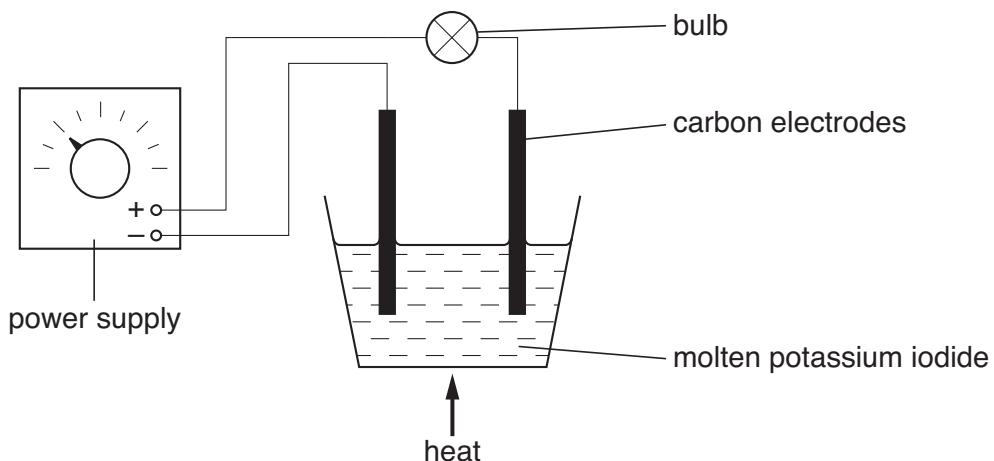
use	property
Car air bags have gold electrical contacts.	very unreactive
Jewellery can be made by shaping gold wires.	easily bent
Some people have gold fillings in their teeth.	good conductor

[2]

[Total: 5]

6 Joe does an experiment. He passes electricity through molten potassium iodide.

The diagram shows how he sets up his experiment.



(a) What will Joe see when the power supply is switched on?

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

The bulb dims.

The liquid evaporates.

Bubbles form around an electrode.

The bulb lights up.

The liquid solidifies.

[2]

(b) Complete the sentences to explain what happens when molten potassium iodide conducts electricity.

Choose words from this list.

atoms covalent ionic ions metal neutral positive

The bonding in potassium iodide is

When potassium iodide melts can move around.

Iodine forms at the electrode.

[3]

(c) Lead bromide also conducts electricity when it is molten.

What is the name of the element that forms at the **negative** electrode?

..... [1]

[Total: 6]

12

7 Ben makes some magnesium sulfate crystals for a school display.

(a) He makes magnesium sulfate by reacting a solid with an acid.

(i) Give the name of the acid Ben should use.

..... [1]

(ii) Two of the following compounds react with the acid to make magnesium sulfate.

Put a **ring** around the **two** correct compounds.

magnesium carbonate

magnesium chloride

magnesium bromide

magnesium oxide

magnesium nitrate

[2]

(b) Ben thinks the rate of reaction between the solid and the acid is too fast.

Which of the following changes will **slow down** the rate of reaction?

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

increase the temperature

use a catalyst

use acid that is more dilute

grind the solid into smaller pieces

[1]

[Total: 4]

13

8 Joe uses a pH meter to measure the pH of some lemon juice.



(a) What else could Joe use to measure the pH?

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

a burette

a measuring cylinder

a pipette

indicator paper

[1]

(b) Joe knows that lemon juice is weakly acidic.

He finds out the pH of some other chemicals.

The table shows some of his results.

Complete the table by filling in the empty boxes.

chemical	acidic, alkaline or neutral?	pH number
lemon juice	weakly acidic	6
sulfuric acid	strongly acidic
water	7
sodium hydroxide	strongly alkaline	14
toothpaste	weakly alkaline

[3]

[Total: 4]

9 Rose reacts hydrochloric acid with sodium hydroxide to make a salt.

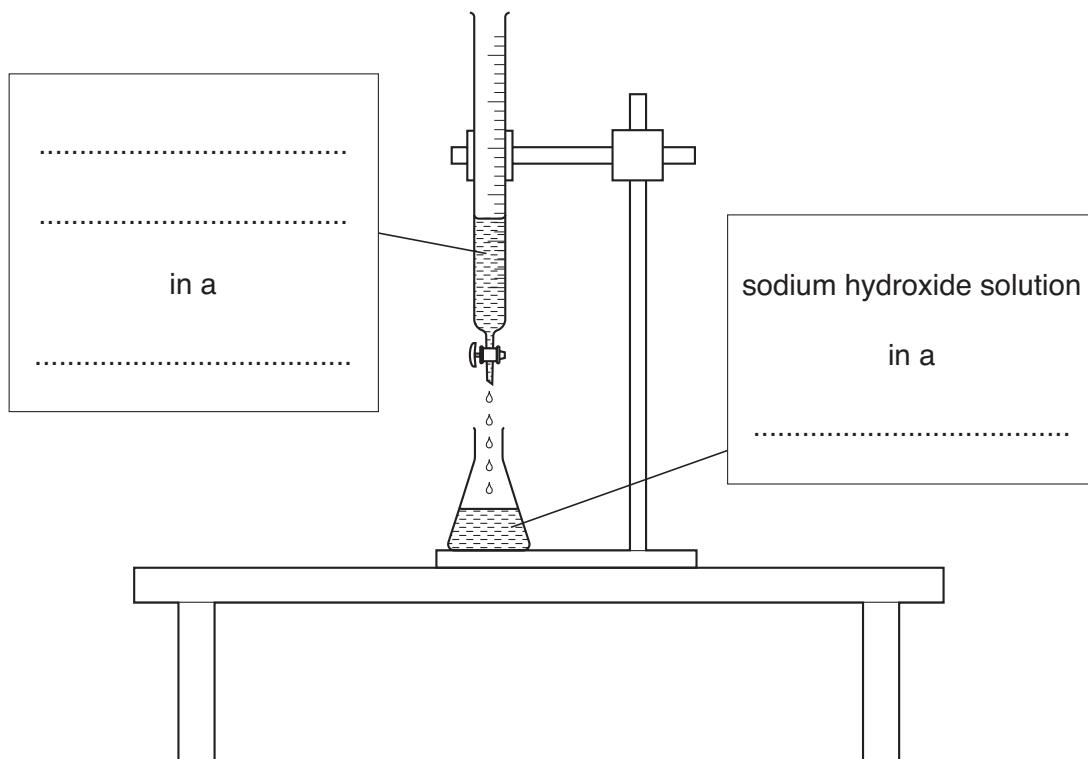
(a) She carries out the reaction using a titration.

The diagram shows the apparatus she uses.

Label the diagram.

Choose words from this list.

beaker	burette	condenser	distilled water
flask	hydrochloric acid	sodium hydroxide	



[3]

(b) What type of reaction happens when an acid reacts with an alkali?

Put a **(ring)** around the correct answer.

concentration	filtration	neutralisation	precipitation
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[1]

(c) Rose evaporates her solution to get salt crystals. She works out the amount of solid salt she should make at the end of her experiment (her theoretical yield).

(i) First, Rose works out the formula mass of hydrochloric acid.

formula of hydrochloric acid:	HCl
relative mass of atoms in formula:	H = 1 Cl = 35.5
	formula mass of HCl = 1 + 35.5 = 36.5

What is the formula mass of sodium hydroxide, NaOH?

Use these relative atomic masses to help you.

Na = 23, O = 16, H = 1.

Formula mass of NaOH =

[1]

(ii) Rose is disappointed that her actual yield is less than she expects.

What might have happened to make her actual yield less than she expects?

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

She used too much acid.

She spilled some chemicals.

She should have used a higher temperature.

Her salt was wet when she weighed it.

[1]

[Total: 6]

END OF QUESTION PAPER

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The Periodic Table of the Elements

1 2

1	H	hydrogen	1
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Key

relative atomic mass
atomic symbol
name
atomic (proton) number

7	Li	9	Be	4
lithium		beryllium		

23	Na	24	Mg	12
sodium		magnesium		

39	K	40	Ca	45	Sc	48	Ti	51	V	52	Cr	55	Mn	56	Fe	59	Co	63.5	Cu	65	Zn	70	Ga	73	Ge	75	As	79	Se	80	Br	84	Kr			
potassium			calcium	scandium	21	22	titanium	23	24	chromium	24	25	manganese	25	iron	26	cobalt	27	nickel	28	copper	29	gallium	31	germanium	32	arsenic	33	selenium	34	bromine	35	krypton	36		
19																																				
85	Rb	88	Sr	89	Y	91	Zr	93	Nb	96	Mo	99	Tc	[98]	Ru	101	Rh	103	Pd	106	Ag	108	Cd	112	In	115	Sn	119	Tl	122	Po	128	Te	127	Xe	
rubidium			strontium	yttrium	39	39	zirconium	40	41	molybdenum	42	42	technetium	43	ruthenium	44	rhodium	45	palladium	46	silver	47	cadmium	48	indium	49	tin	50	thallium	51	polonium	84	bromine	53	xenon	54
37																																				
133	Cs	137	Ba	139	La*	178	Hf	181	Ta	184	W	186	Re	190	Os	192	Ir	195	Pt	197	Hg	201	Tl	204	Pb	207	Bi	209	Po	209	At	[210]	Rn	[222]		
caesium			barium	lanthanum	57	72	hafnium	73	tantalum	74	tungsten	75	rhenium	75	osmium	76	iridium	77	platinum	78	gold	79	mercury	80	thallium	81	lead	82	bismuth	83	polonium	84	astatine	85	radon	86
55																																				
[223]	Fr	[226]	Ra	[227]	Ac*	[261]	Rf	[262]	Db	[266]	Sg	[264]	Bh	[268]	Hs	[277]	Mt	[271]	Ds	[272]	Rg	[272]	Roentgenium	110	meitnerium	109	hassium	108	bohrium	107	curium	111	francium	87	radium	88

Elements with atomic numbers 112-116 have been reported but not fully authenticated