

**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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MODIFIED LANGUAGE

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.

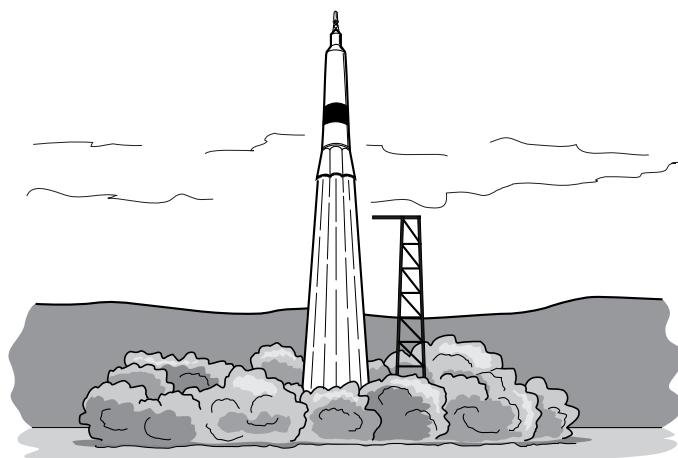
INFORMATION FOR CANDIDATES

- 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.

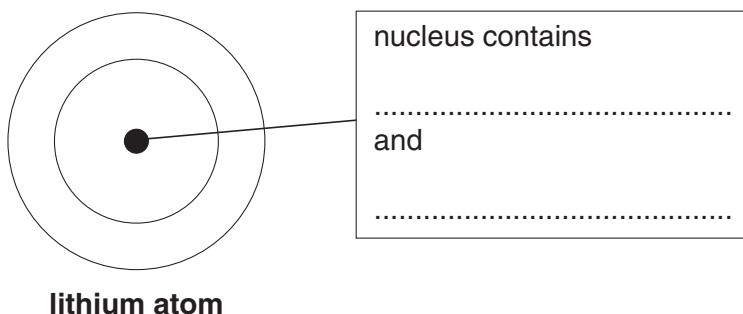
Which of the following statements about the reactivity of lithium are **true** and which are **false**?

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.

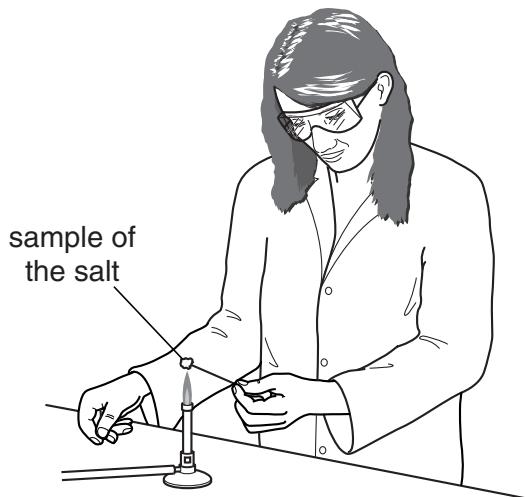
[1]

[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) Eve looks at the flame through a spectroscope during the test.

What will she see?

Put a tick (\checkmark) 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]

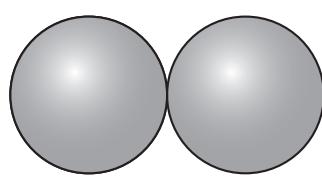
- (c) The salt Eve tested has the formula KCl .

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

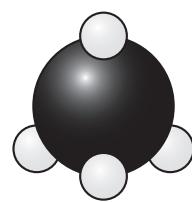
..... and [2]

[Total: 4]

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



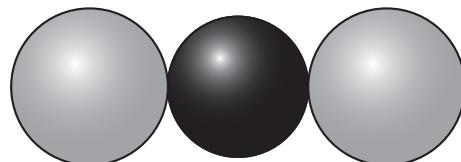
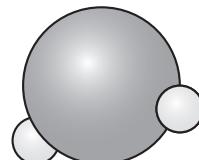
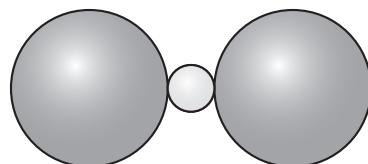
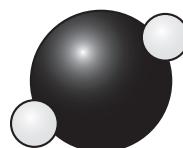
oxygen
 O_2



methane
 CH_4

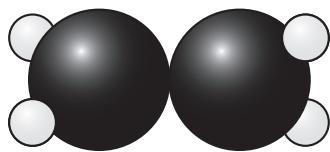
- (a) Which of the diagrams below shows a molecule of water, H_2O ?

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



[1]

(b) What is the formula for this molecule?



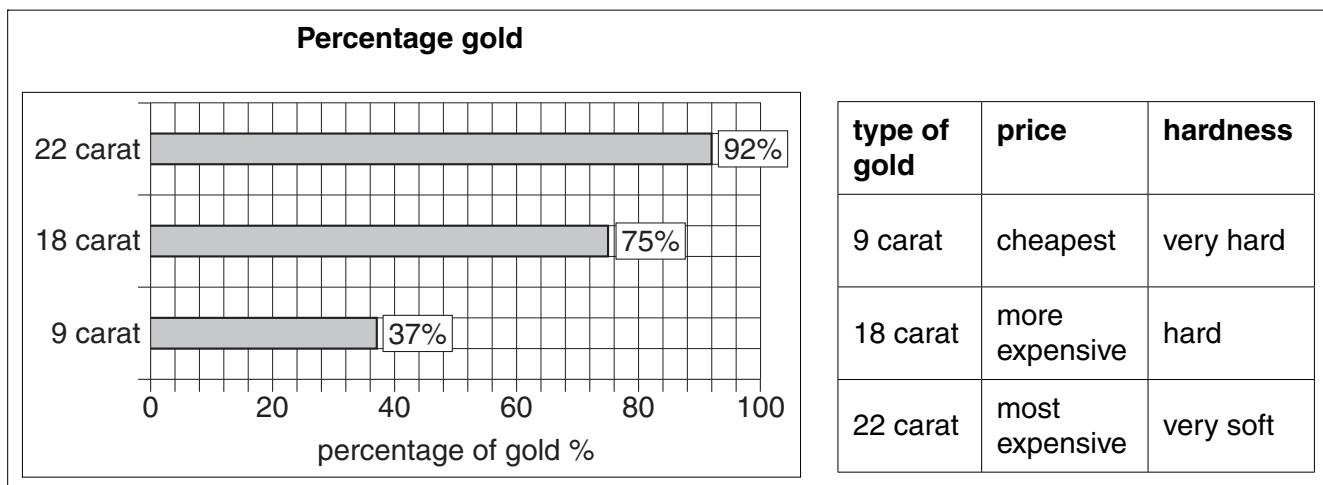
formula [2]

[Total: 3]

- 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**.

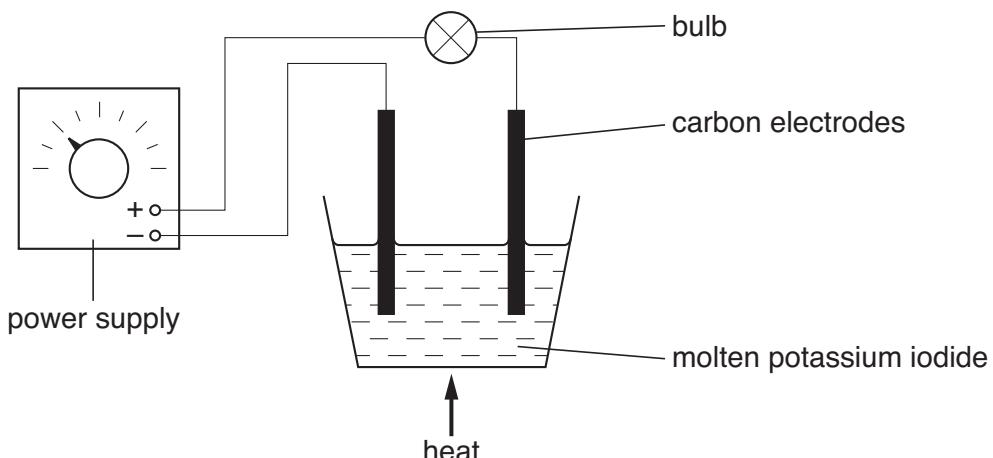
use	property
Car air bags have gold electrical contacts.	very unreactive
Jewellery can be made by shaping gold wires.	easily bent
Some people have gold fillings in their teeth.	good conductor

[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]

- 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.

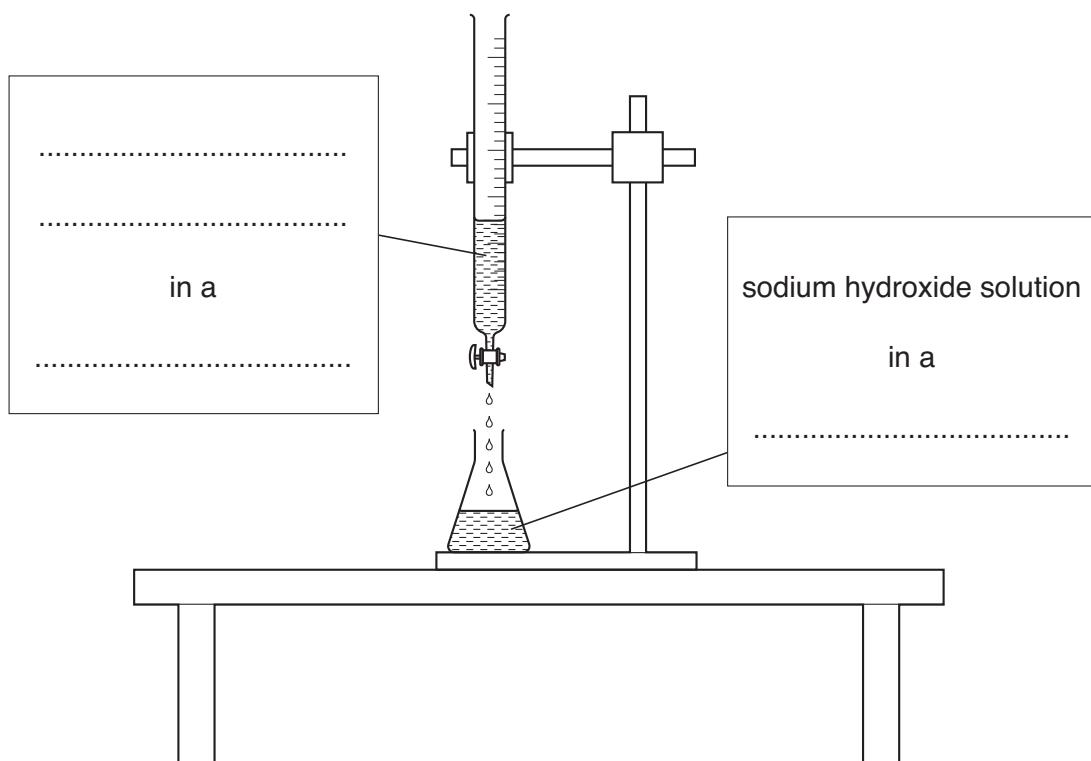
- (a) She carries out the reaction using a titration.

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	[1]
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- (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	3	4	5	6	7	0
Li lithium 3	Be beryllium 4	Ca calcium 20	Sc scandium 21	Ti titanium 22	V vanadium 23	Cr chromium 24	52 51 50 56 59 63.5 65
K potassium 19	Ca strontium 38	Y yttrium 39	Nb niobium 41	Zr zirconium 40	91	93	55 56 59 63.5 65 70 73 75 79 80
Rb rubidium 37	Sr barium 56	La* lanthanum 57	Mo molybdenum 42	Tc technetium 43	[98]	101	103 106 112 115 119 122 128 129 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 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* 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.