

FOR OFFICIAL USE

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KU

PS

Total
Marks

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0500/29/01

NATIONAL
QUALIFICATIONS
2013

WEDNESDAY, 1 MAY
9.00 AM – 10.30 AM

CHEMISTRY
STANDARD GRADE
General Level

Fill in these boxes and read what is printed below.

Full name of centre

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Town

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Forename(s)

--

Surname

--

Date of birth

Day Month Year

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Scottish candidate number

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Number of seat

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- 1 All questions should be attempted.
- 2 Necessary data will be found in the Data Booklet provided for Chemistry at Standard Grade and Intermediate 2.
- 3 The questions may be answered in any order but all answers are to be written in this answer book, and must be written clearly and legibly in ink.
- 4 Rough work, if any should be necessary, as well as the fair copy, is to be written in this book.
Rough work should be scored through when the fair copy has been written.
- 5 Additional space for answers and rough work will be found at the end of the book.
- 6 The size of the space provided for an answer should not be taken as an indication of how much to write. It is not necessary to use all the space.
- 7 Before leaving the examination room you must give this book to the Invigilator. If you do not, you may lose all the marks for this paper.



PART 1

In Questions 1 to 9 of this part of the paper, an answer is given by circling the appropriate letter (or letters) in the answer grid provided.

In some questions, two letters are required for full marks.

If more than the correct number of answers is given, marks will be deducted.

A total of 20 marks is available in this part of the paper.

SAMPLE QUESTION

A	CH ₄	B	H ₂	C	CO ₂
D	CO	E	C ₂ H ₅ OH	F	C

(a) Identify the hydrocarbon.

Ⓐ	B	C
D	E	F

The one correct answer to part (a) is A. This should be circled.

(b) Identify the **two** elements.

A	Ⓑ	C
D	E	Ⓕ

As indicated in this question, there are **two** correct answers to part (b). These are B and F.

Both answers are circled.

If, after you have recorded your answer, you decide that you have made an error and wish to make a change, you should cancel the original answer and circle the answer you now consider to be correct. Thus, in part (a), if you want to change an answer A to an answer D, your answer sheet would look like this:

Ⓐ	B	C
Ⓓ	E	F

If you want to change back to an answer which has already been scored out, you should enter a tick (✓) in the box of the answer of your choice, thus:

✓ Ⓐ	B	C
Ⓓ	E	F

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1. The grid contains the names of some metals.

A	B	C
sodium	beryllium	calcium
D	E	F
magnesium	potassium	lithium

(a) Identify the metal which was discovered in 1808.

You may wish to use page 8 of the data booklet to help you.

A	B	C
D	E	F

(b) Identify the metal which is an essential element for healthy plant growth.

A	B	C
D	E	F

(c) Identify the metal which gives a red flame colour.

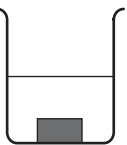
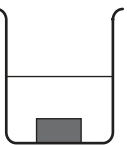
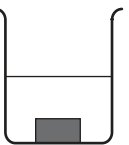
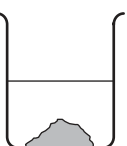
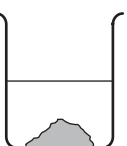
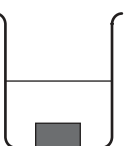
You may wish to use page 4 of the data booklet to help you.

A	B	C
D	E	F

[Turn over

Marks

2. A student investigated the rate of reaction between chalk and dilute hydrochloric acid.

A  lump 0.5 mol/l 20 °C	B  lump 1 mol/l 25 °C	C  lump 1 mol/l 30 °C
D  powder 1 mol/l 30 °C	E  powder 0.5 mol/l 25 °C	F  lump 0.5 mol/l 25 °C

- (a) Identify the **two** experiments that should be compared to show the effect of concentration on the rate of reaction.

A	B	C
D	E	F

1

- (b) Identify the experiment with the **fastest** speed of reaction.

A	B	C
D	E	F

1
(2)

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- 1**

1

- 1**
(3)

- | | | |
|---|---|---|
| A | B | C |
| D | E | F |

A	B	C
D	E	F

- (c) Identify the gas which makes up approximately 20 % of the air.

[Turn over

[illegible]

A	B	C
magnesium chloride	calcium nitrate	barium sulphate
D	E	F
sulphur dioxide	sodium chloride	potassium oxide

(a) Identify the **two** compounds which contain three elements.

A	B	C
D	E	F

1

(b) Identify the compound which dissolves in water to form an alkaline solution.

A	B	C
D	E	F

1

(c) Identify the compound which reacts with water in the atmosphere to produce acid rain.

A	B	C
D	E	F

1

(3)

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A	tin
B	painting
C	plastic
D	zinc
E	magnesium

- You may wish to use page 7 of the data booklet to help you.

A
B
C
D
E

- (b) Identify the coating which is used to galvanise iron.

A
B
C
D
E

[Turn over

KU	PS

Identify the colour of sodium chromate solution.

A
B
C
D

(1)

KU	PS
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A
B
C
D
E

KU	PS
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- (2)

	Substance X
A	ionic solution
B	solid covalent compound
C	liquid covalent compound
D	solid metal
E	ionic solid

Identify the **two** experiments in which the bulb would light.

A
B
C
D
E

KU	PS
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- (2)

A
B
C
D
E

[Turn over for Part 2 on *Page twelve*

KU	PS
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2

- 1

1

- is the $\left\{ \begin{array}{l} \text{solute} \\ \text{solvent} \\ \text{solution} \end{array} \right\}$.

(ii) Poly(ethenol) contains hydroxyl groups.

Percentage of hydroxyl groups / %	Solubility in warm water
85	very soluble
90	soluble
95	slightly soluble
100	not soluble

1
(5)

[0500/29/01]

Marks

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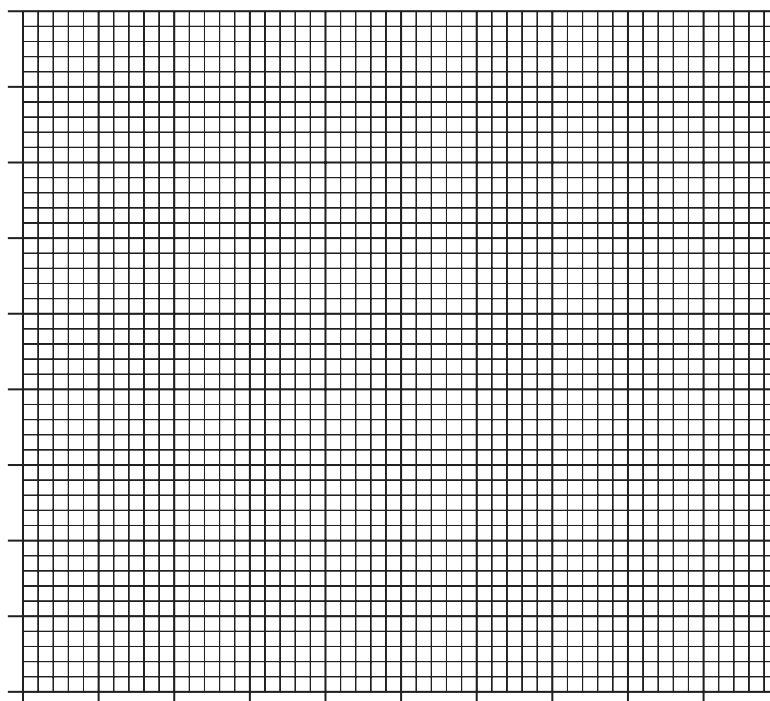
11. Fuel Mix Information gives the percentage of household electricity generated from different fuels.

Fuel Mix Information					
Fuel	Coal	Natural Gas	Nuclear	Renewable	Oil
Percentage / %	33	42	15	6	4

- (a) Present the information as a bar chart.

Use appropriate scales to fill most of the graph paper.

(Additional graph paper, if required, can be found on page 27.)



2

[illegible]

1

1

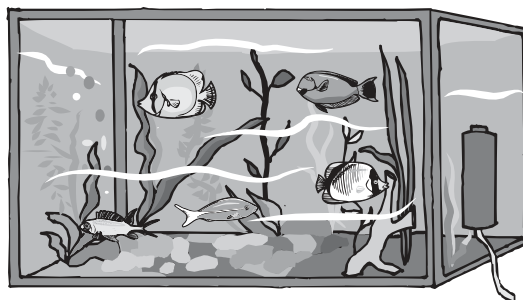
(i) Suggest a name for this metal.

1

1

(4)

- 1



- 1

- 1



Identify **X**.

- (c) The table shows how the solubility of oxygen in water changes with temperature.

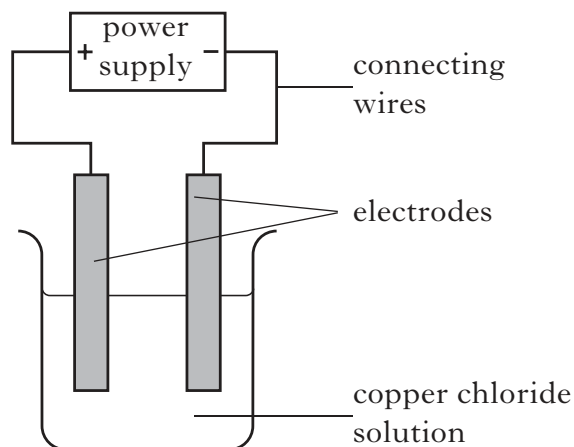
Temperature /°C	Solubility /mg per litre
10	52
15	36
20	24
25	16
30	

Predict the solubility of oxygen in water at 30 °C.

_____ mg per litre

(3)

[Turn over

[illegible]

(a) Name this process.

(b) Circle the correct word to complete the sentence.

In the experiment the positive metal ions are attracted to

the $\left\{ \begin{array}{c} \text{positive} \\ \text{negative} \end{array} \right\}$ electrode.

(c) A brown solid is produced at one of the electrodes.

What would be **seen** happening at the other electrode?

(d) Name a **non-metal** element which is suitable for use as the electrodes.

KU	PS
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-
- The diagram illustrates the experimental setup for the reduction of aluminium oxide. A horizontal test tube is shown, containing ceramic wool soaked in heptane at the left end and 0.7 g of aluminium oxide in the center. An upward arrow labeled 'heat' points to the aluminium oxide. The right end of the test tube is sealed with a stopper and connected to a delivery tube that dips into a test tube containing a bromine solution. Bubbles are shown emerging from the delivery tube into the bromine solution.

$$\text{C}_7\text{H}_{16}(\ell) \longrightarrow \text{C}_3\text{H}_6(\text{g}) + \mathbf{X}$$

- What effect would the C_3H_6 have on the bromine solution?

- What mass of catalyst will be present at the end of the experiment?

89

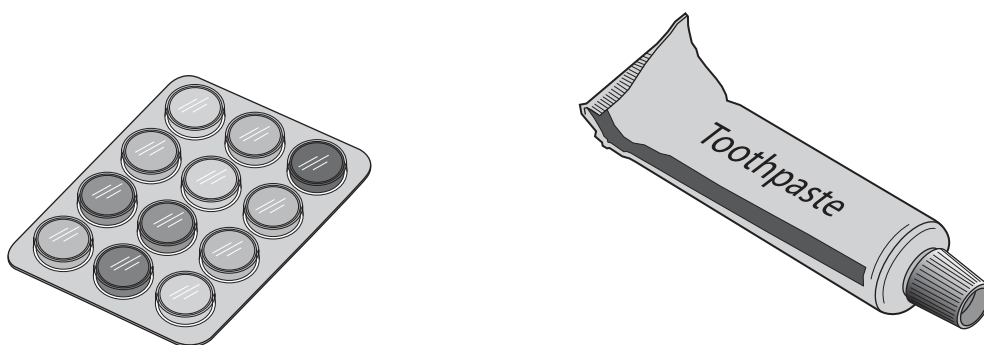
1

1

1

(3)

[0500/29/01]

[illegible]

- What effect do the tablets have on the pH value of stomach acid?

1

- Calcium chloride, carbon dioxide and water are produced when calcium carbonate reacts with hydrochloric acid in the stomach.

- 1

- 1

KU	PS
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-
- The diagram shows a test tube held by a clamp on a stand. The test tube contains a grey substance, with a label 'ammonium nitrate + calcium hydroxide' pointing to it. An arrow labeled 'heat' points to the bottom of the test tube. A piece of 'damp pH paper' is held near the mouth of the test tube.

1

-

1

-
- ```
graph LR; ammonia[ammonia] --> reactor((reactor)); air[air] --> reactor; reactor --> nitrogen_dioxide[nitrogen dioxide]
```

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1

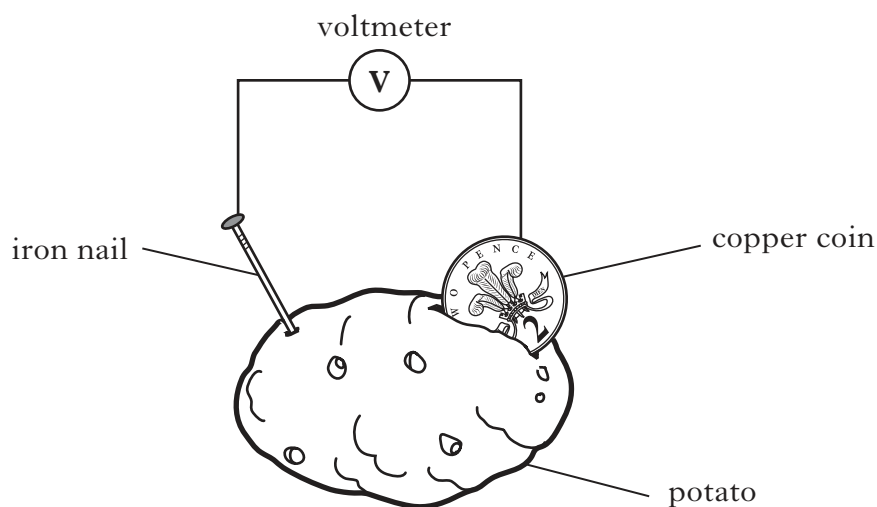
|    |    |
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| KU | PS |
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(d) Nitrogen dioxide is also produced in a natural process which takes place in the atmosphere.

**1**

(4)

[0500/29/01]

[illegible]

- Draw an arrow **on the wire** to show the direction of electron flow.
- What would happen to the size of the voltage if the iron nail was replaced with aluminium foil?

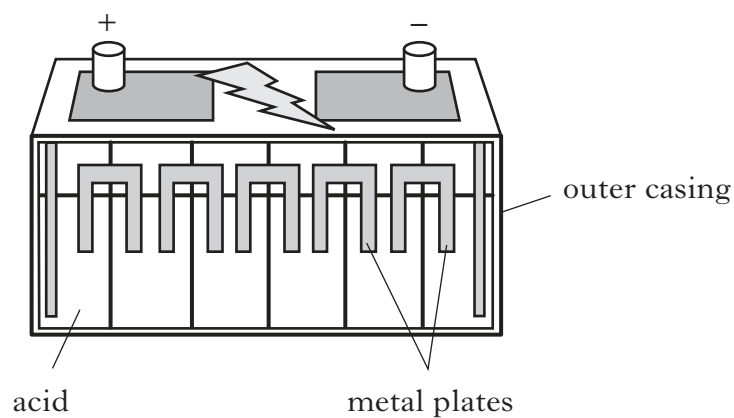
You may wish to use page 7 of the data booklet to help you.

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- (b) A battery is a number of cells joined together.

State **one** advantage of a battery over mains electricity.

(c) The type of battery used in cars is shown below.



- (ii) A car battery has six cells joined together.  
The voltage of the car battery is 12 volts.  
What is the voltage of **one** cell in the car battery?

\_\_\_\_\_volts

**1**

**1**

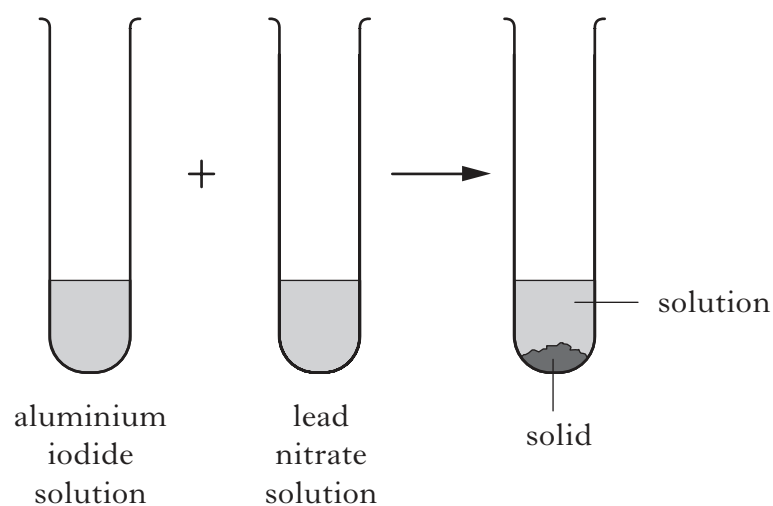
(5)

Marks

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| 1   |    |
|     |    |
| 1   |    |
|     |    |
| 1   |    |
| (3) |    |

19. (a) Write the formula for aluminium iodide.

(b) When aluminium iodide solution and lead nitrate solution are mixed together a chemical reaction takes place.



(i) Name the solution formed in this reaction.

You may wish to use page 5 of the data booklet to help you.

\_\_\_\_\_

(ii) How could the solid be separated from the solution?

\_\_\_\_\_

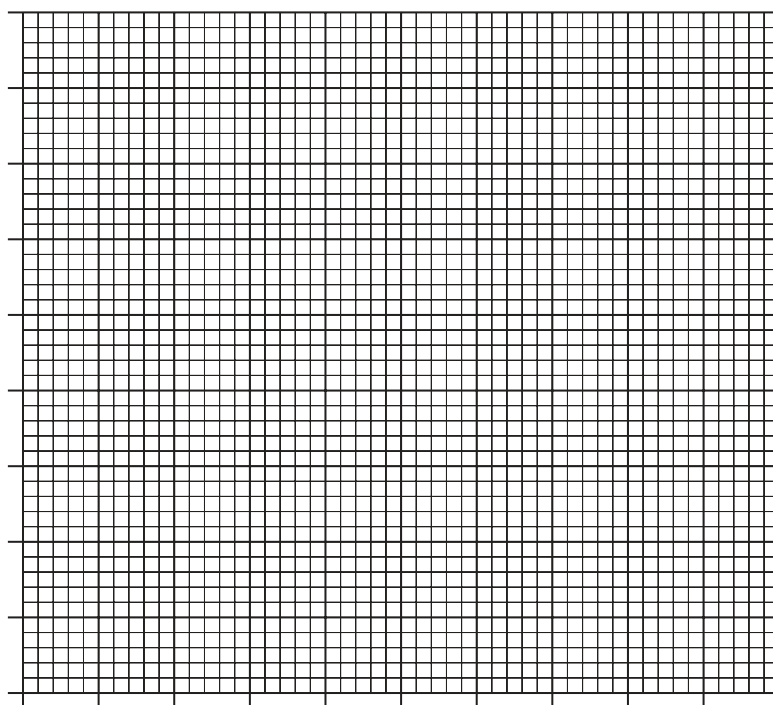
\_\_\_\_\_

[END OF QUESTION PAPER]

| KU | PS |
|----|----|
|    |    |

# ADDITIONAL SPACE FOR ANSWERS

ADDITIONAL GRAPH PAPER FOR QUESTION 11(a)



### ADDITIONAL SPACE FOR ANSWERS