FOR OFFICIAL USE					
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			Total Marks		
0500/401					

NATIONAL FRIDAY, 23 MAY QUALIFICATIONS 9.00 AM - 10.30 AM 2003

CHEMISTRY STANDARD GRADE General Level

Fi	Il in these boxes and read what is printed below.
Fu	ull name of centre
F	prename(s) Surname
	ate of birth Day Month Year Scottish candidate number Number of seat
4	All questions should be attempted.
	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.

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1. The grid contains the names of some metals. You may wish to use page 8 of the data booklet.

A	В	С
magnesium	lithium	calcium
D	Е	F
nickel	aluminium	potassium

(a) Identify the metal which was discovered in 1827.

A	В	С	
 D	E	F	

(b) Identify the transition metal.

A	В	С	
D	Е	F	

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2. There are many compounds of potassium.

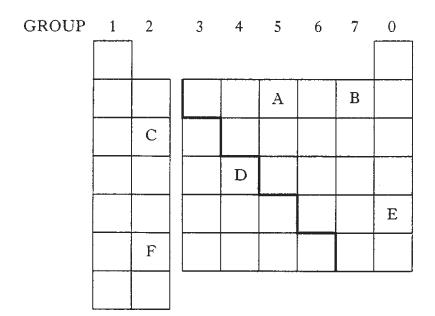
A	В
potassium sulphate	potassium chloride
С	D
potassium sulphite	potassium nitrate

Identify the compound which does not contain oxygen.

A	В
С	D

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The diagram shows part of the Periodic Table.
 The letters do not represent the symbols for the elements.



(a) Identify the element which has the electron arrangement 2, 5.

			-		
A	В	С	D	E	F

(b) Identify the two elements with similar chemical properties.

A	В	С	D	E	F	

(c) Identify the noble gas.

A	В	С	D	E	F

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4.	The grid	contains	the names	of some	chemical	reactions:	and processes.

A	В	С
combustion	neutralisation	polymerisation
D	Е	F
addition	cracking	electrolysis

(a) Identify the chemical reaction in which oxygen is used up.

	A	В	С
į	D	Е	F

(b) Identify the process in which a compound is broken down by electricity.

A	В	С
D	Е	F

(c) Identify the chemical reaction in which glucose molecules join together to form starch.

A	В	С
D	E	F

Standard Grade Complete Papers	Page 5	

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5. Many solutions are used for chemical tests.

A	В	С
iodine solution	Benedict's reagent	lime water
D	Е	F
bromine solution	ferroxyl indicator	pH indicator

(a) Identify the solution which is used to test for glucose.

A	В	С
D	E	F

(b) Identify the solution which is used to test for $Fe^{2+}(aq)$.

A	В	С
D	E	F

(c) Identify the solution which is used to test for a carbon to carbon double bond.

A	В	С
D	E	F

e grid contains the names of some non-metals.		
В	C	
carbon	argon	
Е	F	
sulphur	oxygen	
	B carbon	

(a)	Identify	the	non-metal	element	which	conducts	electricity.
-----	----------	-----	-----------	---------	-------	----------	--------------

A	В	С
D	E	F

(b) Identify the gas which makes up about 20% of air.

A	В	С
D	Е	F

(c) Identify the two gases which exist as diatomic molecules.

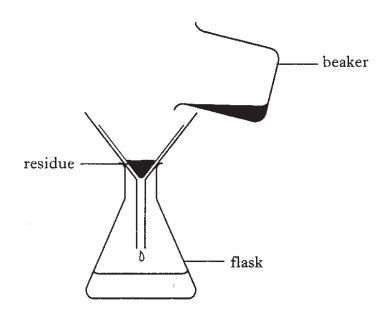
	A	В	С
i	D	E	F

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Excess copper carbonate was added to dilute hydrochloric acid in a beaker. 7.

 $CuCO_3(s) \ + \ 2HCl(aq) \ \boldsymbol{\rightarrow} \ CuCl_2(aq) \ + \ CO_2(g) \ + \ H_2O(\ell)$

When the reaction had finished the contents of the beaker were filtered.



A	copper carbonate (CuCO ₃)
В	hydrochloric acid (HCl)
С	copper chloride (CuCl ₂)
D	carbon dioxide (CO ₂)
E	water (H ₂ O)

(a) Identify the residue.

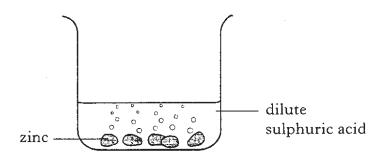
A	
В	
С	
D	
E	

(b) Identify the substance(s) which collected in the flask.

A
В
С
D
E

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8. Zinc reacts with dilute sulphuric acid.



Identify the factor(s) which will speed up the reaction.

A	Using a larger volume of acid
В	Diluting the acid with water
С	Using a larger beaker
D	Heating the acid
Е	Using a catalyst

	A
	В
	С
	D
Γ	Е

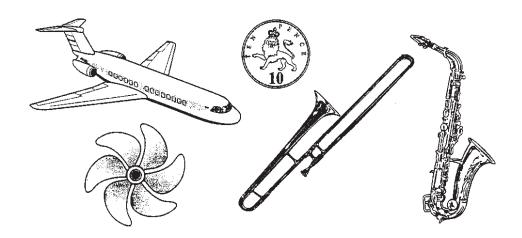
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PART 2

A total of 40 marks is available in this part of the paper.

Copper can be mixed with other metals to produce alloys for different uses.



Aluminium is added to copper to make an alloy suitable for aircraft bodies. Coins are made from a hard wearing alloy which contains copper and nickel. Musical instruments can be made from an alloy of copper and zinc. If tin is added to copper the alloy can be used to make ships' propellers.

(a) Present this information in a table with suitable headings.

(b) Copper metal is a finite resource. What is meant by the term "finite resource"?

DO NOT WRITE IN THIS MARGIN Marks KU PS 10. (a) The diagram shows the names and boiling ranges of some of the fractions which are obtained from crude oil. gases boil below 20°C naphtha 20−175°C flammability viscosity boiling range kerosene decreasing 150-240°C gas oils 220-350°C crude oil residue boils above 350°C (i) Name the process which is used to separate the crude oil into fractions. 1 (ii) On the diagram, label the arrows for flammability and viscosity as either increasing or decreasing. 1 (iii) In which fraction is propane found? You may wish to use page 6 of the data booklet. 1

10	(4.°		Marks	KU	PS
10.			ane is a compound found in the kerosene fraction. which family of hydrocarbons does decane belong?	1	-	**************************************
	(c)		ane can be broken down into a mixture of saturated and unsaturated ocarbons. catalyst			ļ
	ked i		heat bromine water decolourises			
		(i)	What is meant by a saturated hydrocarbon?	1		
		(ii)	Decane can break down in the following way: $C_{10}H_{22} \rightarrow C_{7}H_{16} + \mathbf{X}$ Write down the molecular formula for \mathbf{X} .	1 (6)		
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11.	Fish cannot	survive in	lochs if	acid rain	makes the nH	of the water too low	



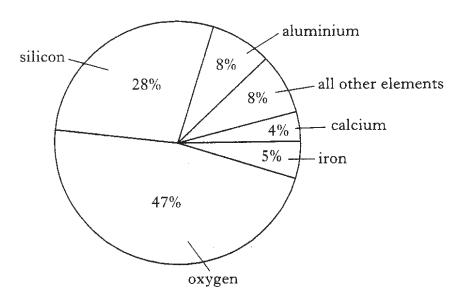
- (a) Name the gas which causes acid rain.
- (b) Which ion causes the water in the loch to be acidic?
- (c) Name a substance which could be added to the loch to increase the pH of the water.

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12. The pie chart shows the composition of the Earth's crust.

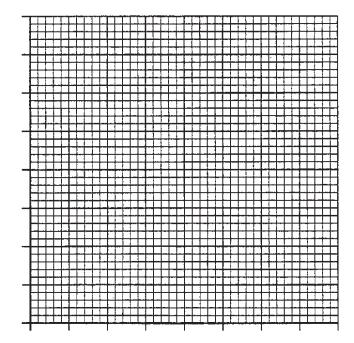
Composition of the Earth's crust



(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 25.)



(b) Sand is a compound made from the two most common elements in the Earth's crust.

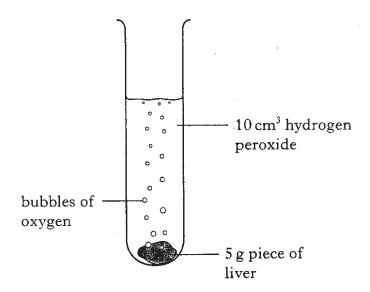
Write the chemical formula for sand.

2

(a) What is meant by the term "enzyme"?

(b) State the test for oxygen.

(c) Sandy carried out the following experiment.



Sandy repeated the experiment using the same volume of hydrogen peroxide and 5 g of **chopped** liver.

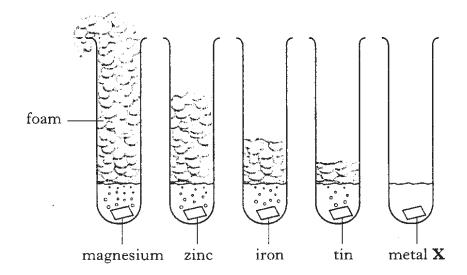
What would have happened to the rate of the reaction?

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1111	α	rcs.

14. The reactivity of metals can be compared by adding them to a mixture of hydrochloric acid and detergent.

Amy set up five test tubes each containing a different metal.



(a) Name the gas produced when a metal reacts with hydrochloric acid.

(b) Suggest a name for metal X.

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

(c) Name one factor which Amy would have kept the same to ensure a fair comparison.

comparison.

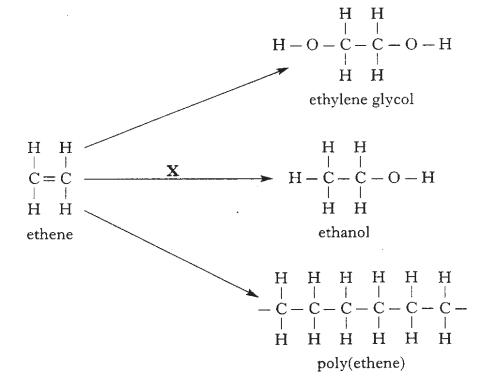
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15. Ethene is used to make a variety of products. Some of these are shown below.



- (a) Write the molecular formula for ethylene glycol.
- (b) Name substance X.
- (c) Poly(ethene) is a **synthetic** polymer. What does **synthetic** mean?

(3)

1

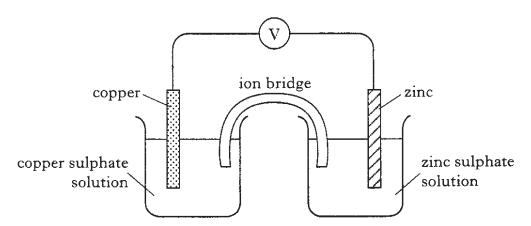
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hydrogen burning magnesium ceramic wool		
soaked in water		
heat heat		
Hot magnesium ribbon reacts vigorously with steam. It glows very brightly and the products are magnesium oxide and hydrogen gas.		
(a) Write an equation, using symbols and formulae, for the reaction taking place in the test tube.There is no need to balance the equation.		
(b) The magnesium oxide which is formed will react with dilute hydrochloric acid. Name the type of chemical reaction which takes place.		
(c) Name the product formed when hydrogen burns.		
(3	•	

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17. The diagram shows a copper/zinc cell.



(a) In the cell, the electricity flows through the wires from the zinc to the copper.

Name the type of charged particle that flows through the wires.

(b) What is the purpose of the ion bridge?

(c) Eventually the cell would stop producing electricity. Give a reason for this.

(d) Name a metal which could replace zinc to produce a larger voltage. You may wish to use page 7 of the data booklet.

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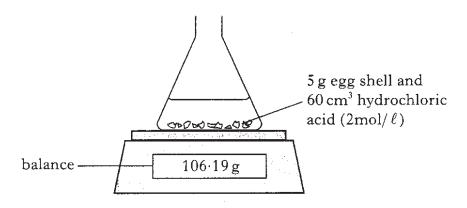
18. Egg shells and sea shells contain calcium carbonate.

Calcium carbonate reacts with dilute hydrochloric acid to produce carbon dioxide gas.

(a) State the test for carbon dioxide.

(b) Adam wanted to find out which type of shell contained the most calcium carbonate.

He set up the experiment shown below.



- (i) State **two** ways in which Adam would know when the reaction had finished.
- (ii) Adam repeated the experiment using 5 g sea shell. His results are shown in the table.

	Sea shell	Egg shell
Balance reading at start/g	106.19	106.19
Balance reading at end/g	104.22	104.01

Which type of shell contained the most calcium carbonate?

(4)

2

19.

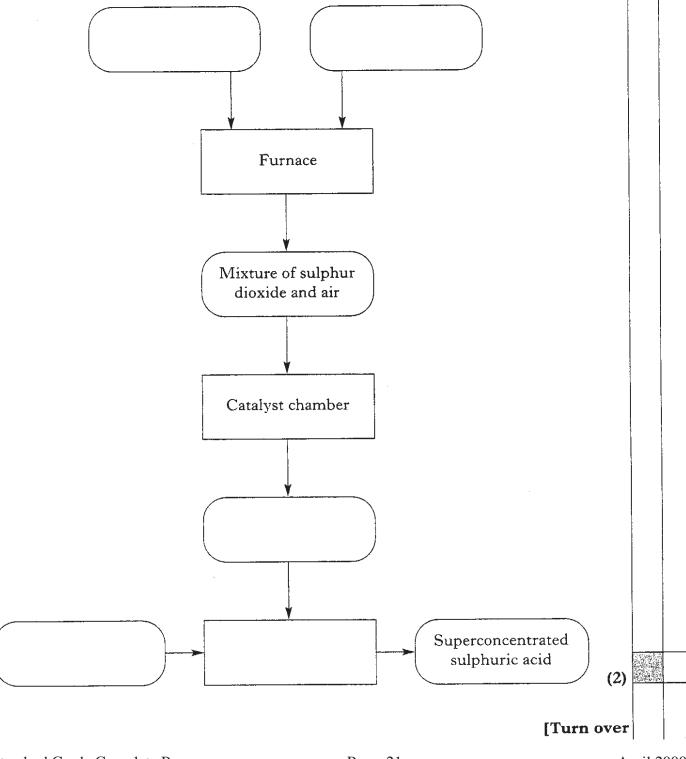
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Marks | KU | PS

The Manufacture of Sulphuric Acid

Molten sulphur is sprayed into a furnace and burned in air. This produces a mixture of sulphur dioxide and air which then passes into a catalyst chamber where sulphur trioxide is formed. The sulphur trioxide is reacted with concentrated sulphuric acid in an absorber to produce superconcentrated sulphuric acid.

Use this information to complete the flow diagram.



Marks | KU | PS The bar chart shows the boiling points of some alcohols. 160 140 120 -100 -80 oiling point/°C $60 \cdot$ 40 -20: Number of carbon atoms per molecule (a) Describe the relationship between the number of carbon atoms and the boiling point. (b) Predict the boiling point of the alcohol with five carbon atoms per molecule. ____°C 1 (2) [END OF QUESTION PAPER]