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	KU	PS
Total Marks		

0500/401

NATIONAL QUALIFICATIONS 2000 MONDAY, 22 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	Town
Forename(s)	Surname
Date of birth	
Day Month Year Scottish candidate number	Number of seat
1 All questions should be attempted.	
2 Necessary data will be found in the Data Book Grade and Intermediate 2.	let provided for Chemistry at Standard
3 The questions may be answered in any order be answer book, and must be written clearly and legible	
4 Rough work, if any should be necessary, as well book.	as the fair copy, is to be written in this
Rough work should be scored through when the fa	ir copy has been written.
5 Additional space for answers and rough work will b	e found at the end of the book.
6 The size of the space provided for an answer shomuch to write. It is not necessary to use all the sp	uld not be taken as an indication of how ace.
7 Before leaving the examination room you must girnot, you may lose all the marks for this paper.	ve this book to the invigilator. If you do

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1.	The periodic table	on pag	e 8	of the	data	booklet	shows	the	names	of	the
	elements.										

Α	В	С
chlorine	copper	oxygen
D	Е	F
lithium	sulphur	bromine

(a) Identify the two elements in the same group as fluorine.

A	В	С
D	E	F

(b) Identify the element which is a transition metal.

A	В	С
D	E	F

(c) Identify the two elements which were discovered in 1774.

A	В	С
D	E	F

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2. Hydrocarbons are compounds containing carbon and hydrogen only.

A	В
H H H	H H H H
С	D
H H H H	H H H-C-C-H H H
H H	H H-C-H
H H	H

(a) Identify the two hydrocarbons which can be used to make plastics.

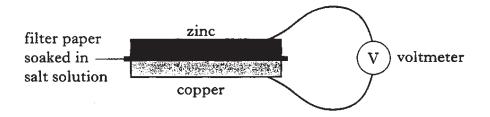
A	В
C	D
E	F

(b) Identify butene.

A	В
С	D
Е	F

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3. Pairs of metals can be used to produce a voltage.



A		В
	magnesium	lead
С		D
	tin	iron

Identify the metal which would produce the **smallest** voltage if used in place of zinc.

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

A	В
С	D

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4. Class 4C made some statements about the effect of adding water to an alkaline solution.

A	The pH of the solution will rise.
В	The solution will become more concentrated.
С	The pH of the solution will fall towards 7.
D	Adding water will have no effect on the solution.

Identify the correct statement.

A	
В	
С	
D	

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5.	Compounds	are for	rmed v	when	elements	react	together.

A	В
sodium fluoride	potassium sulphite
С	D
potassium sulphide	ammonium carbonate

(a) Identify the two compounds which contain only two elements.

A	В	
С	D	

(b) Identify the compound which contains nitrogen.

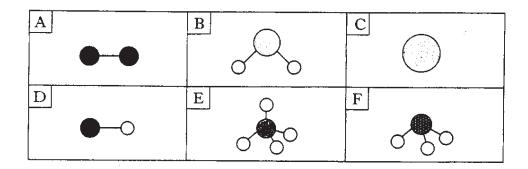
A	В	
С	D	

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6. Many substances can be represented by simple models.



(a) Identify the model which could represent water.

A	В	С
D	E	F

(b) Identify the two models which represent diatomic molecules.

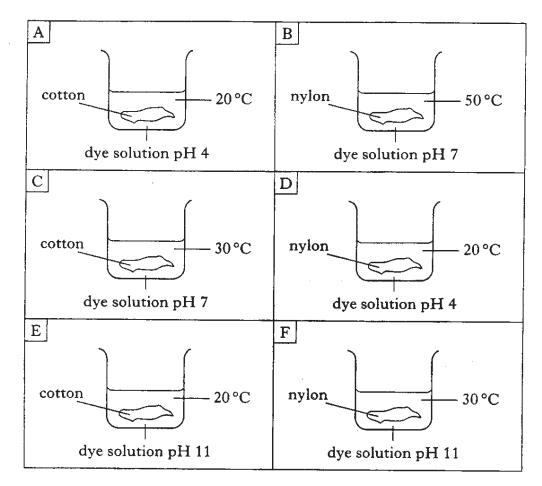
A	В	С
D	Е	F

(c) Identify the two models which represent elements.

A	В	С
D	E	F

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7. Alan and Omid set up experiments to investigate the dyeing of cloth.



(a) Identify the **two** experiments which should be compared to show the effect of pH on the dyeing of cloth.

A	В
, C	D
Е	F

(b) Identify the two experiments carried out under alkaline conditions.

A	В
С	D
E	F

KU	PS

8. Many elements are metals.

A	В	С
zinc	copper	platinum
D	Е	F
tin	iron	potassium

(a) Identify the metal produced in a blast furnace.

A	В	С
· D	E	F

(b) Identify the metal which is used as the catalyst in the manufacture of nitric acid (Ostwald Process).

A	В	С
D	E	F

Here are some statements which might be applied to a hydrocarbon.

A	It is saturated.
В	It is an alkane.
С	It rapidly decolourises bromine water.
D	It contains two carbon atoms per molecule.
Е	It contains a double bond between carbon atoms.

(a) Identify the statement(s) which can be applied to both ethane and propane.

A	A
I	3
	2
Ι)
E	3

(b) Identify the statement(s) which can be applied to propene but not to propane.

A	
В	
С	
D	
E	

10.

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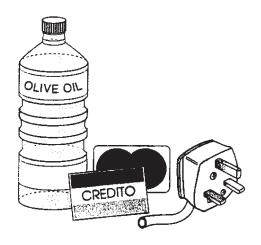
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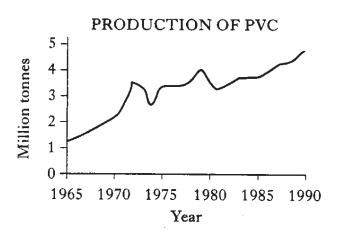
PART 2

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

Many everyday objects are made from a polymer called PVC.



- (a) PVC softens when warmed and can easily be reshaped. What term is used to describe this type of polymer?
- (b) The graph shows the production of PVC in Western Europe.



Describe the general trend in the production of PVC from 1965 to 1990.

10. (continued)

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(c) PVC has many uses because of its different properties. Its strength makes it ideal for bottles. It is used for protective clothing because of its water resistance and, its chemical resistance makes it ideal for food containers. It is used for plugs and cables because it is an electrical insulator.

Present the information shown above as a table with suitable headings.

(4) [Turn over

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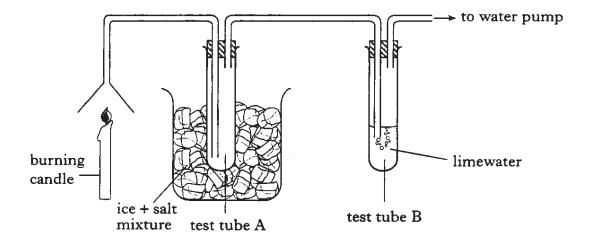
11. Hard water is water which needs a lot of soap to produce a lather. The harder the water, the more soap that is required to produce a lather. Mark and Gillian investigated the effect of boiling on the hardness of four water samples.

	Number of drops of soap needed to produce a lather				
Water sample	Before boiling	After boiling			
A	25	12			
В	30	10			
С	7	4			
D	21	10			

(a) Which water sample was the hardest before boiling?

(b)	What	effect	does	boiling	have o	n the	hardness	of	water
(v)	v v IIa t	CIICCU	uocs	DOMING	nave o	II the	Har diress	Οī	Water:

1 (2) 12. Candle wax is a mixture of hydrocarbons. The apparatus shown below can be used to identify the products formed when a candle burns.



- (a) Name the gas in air which is used up when a candle burns.
- (b) Name two products formed when a candle burns.
- (c) Why is test tube A cooled?

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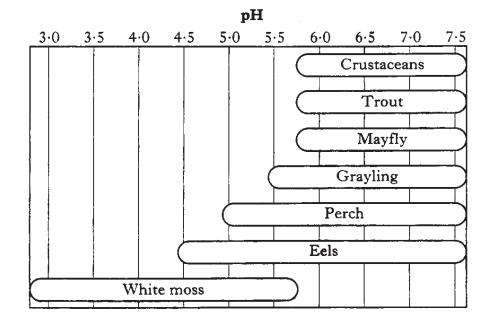
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The chart shows the pH ranges of water in which different organisms can 13. survive.



(a) The water in a healthy loch has a pH of 6.5.

Name the organism which would not be found in this loch.

(b) Give a reason why the pH of the water has decreased in many lochs.

(c) A loch had no trout but contained perch. Suggest a pH value for the water in this loch.

> 1 (3)

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14. The table contains information about the reaction of magnesium with some of the elements in Group 7.

Element	Observation when element reacts with hot magnesium	Product
chlorine	magnesium glows brightly	magnesium chloride
bromine	magnesium glows red hot	magnesium bromide
iodine	magnesium gives a dull glow	magnesium iodide

(a)	What	is	the	family	name	for	the	Group	7	elements?
-----	------	----	-----	--------	------	-----	-----	-------	---	-----------

(b)	Predict what would be	seen when	hot magnesium	reacts with	fluorine.
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(c) Write an equation, using symbols and formulae, for the reaction of magnesium with bromine.

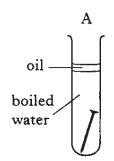
(There is no need to balance the equation.)

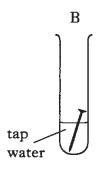
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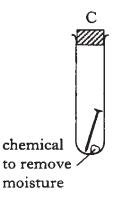
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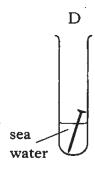
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- Aileen was investigating the rusting of iron. 15.
 - (a) She set up four test tubes each containing a clean iron nail.







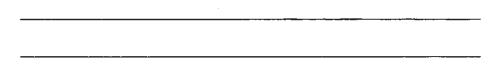


Tube	Observations after 1 week
A	Nail still bright
В	Nail rusted
С	Nail still bright
D	Nail badly rusted

(i) Suggest why the nail in tube A did not rust.

1

(ii) Why did the nail in sea water rust more than the nail in tap water?



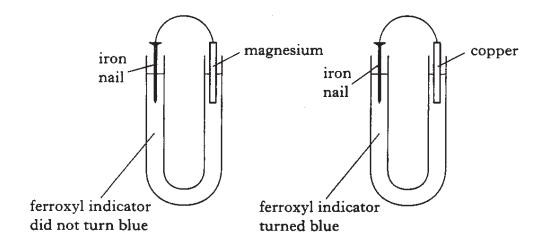


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15. (continued)

(b) Aileen also set up two U-tubes containing water and ferroxyl indicator. Clean iron nails connected to different metals were placed in the U-tubes.



(i) Write the symbol for the ion which turns ferroxyl indicator blue.

(ii) Explain why the iron nail connected to magnesium did not rust.

[Turn over

1

1 (4)

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16. Jack and Iona measured the pH of some fizzy drinks.

Drink	pН
Just Fizz	5
Fizz Alive	3
Jupiter	4

(a)	Describe h	now you	would	use	Universal	Indicator	or	pН	paper	to
	measure th	e pH of a	fizzy d	rink.						

(b) The more acidic the drink the more likely it is to increase tooth decay.

Name the fizzy drink which would be most likely to increase tooth decay.

(c) Some fizzy drinks also contain a sugar called fructose.

(i) Suggest why fructose is added to some fizzy drinks.

(ii) Fructose is a carbohydrate.

Name the three elements present in fructose.

1

1

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16. (continued)

(d) Teeth which have decayed can be repaired with dental fillings.

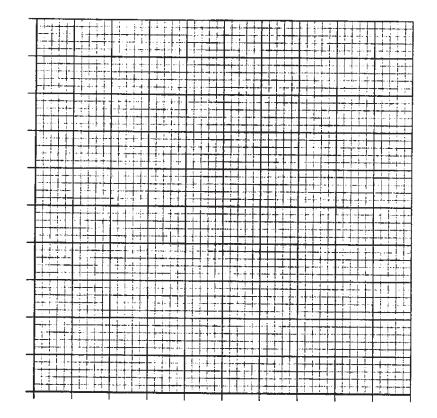
Dental fillings are made by mixing powdered metals with liquid mercury to make dental amalgam.

The powdered metals used are silver (70%), tin (26%), copper (3%) and zinc (1%).

(i) What name is given to a mixture of metals like dental amalgam?

(ii) Draw a bar graph to show the percentages of the powdered metals in the amalgam.

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



2 **(7)**

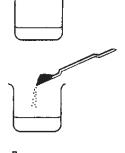
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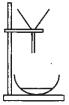
17.

WORKCARD

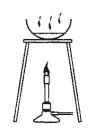
Preparation of Zinc Sulphate Crystals



- Measure 20 cm³ dilute sulphuric acid into a small beaker.
- 2 Add one spatulaful of zinc carbonate to the acid and stir.
- Repeat step 2 until no more gas is given off.



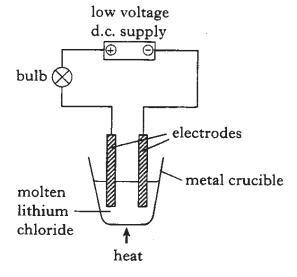
Filter your mixture into a clean evaporating basin.



- 5 Boil the solution for 30 seconds then leave it to cool and crystallise.
- (a) Name the type of chemical reaction taking place between the zinc carbonate and the dilute sulphuric acid.
- (b) Name the gas produced during this reaction.
- (c) Why is zinc carbonate added until no more gas is given off?

	MARGIN		
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18. The apparatus shown below was used to electrolyse molten lithium chloride.



(a)	State	what	is	meant	by	electrolysis.
-----	-------	------	----	-------	----	---------------

(b)	Why does lith:	ium chloride no	t conduct elec	ctricity when	solid?
• /	•			00110103 1111011	SOLLER,

(c) After the heat was removed the lithium chloride changed into a solid but the bulb did not go out.Suggest a reason for this.

[Turn over

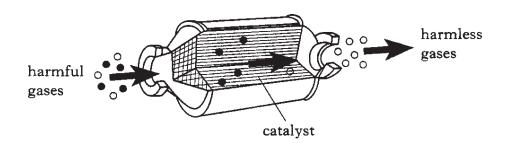
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19. Many cars are fitted with catalytic converters. They change harmful gases produced in the engine into harmless gases.



(a) Oxides of nitrogen react with carbon monoxide in the converter.

Name the **two** harmless gases produced.

.

(b) Name a metal which is used as a catalyst in a catalytic converter.

(c) State another way of reducing pollution from a petrol engine.

1 (3)

1

1 (3)

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20.	The Millennium Dome is one of the largest exhibition centres in the world. The diagram shows some of the materials used in its construction.			
	galvanised steel cables			
	teflon coated glass fibre dome (a) Which metal is used to galvanise the steel cables?			
	(,) control to about to garvanino the other cables.			
	(b) Teflon is a brand name for the plastic poly(tetrafluoroethene).(i) Name the type of chemical reaction used to make plastics.	1		A Addis
				وبوكار يعتاس

(ii) Name the monomer used to make poly(tetrafluoroethene).

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21. The analysis of salts is important in forensic science. Salts connected with certain occupations are shown below.

Occupation	Salt(s)
plasterer	calcium sulphate
farmer	ammonium nitrate ammonium sulphate

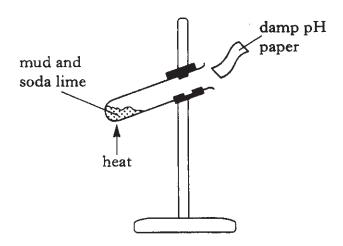
(a) A forensic scientist carried out a flame test on some powder scraped from a plasterer's work clothes.

What colour of flame would have been seen?

You may wish to use page 4 of your data booklet.

(b) A crime suspect was thought to have been in a field on which a farmer had recently sprayed ammonium fertiliser.

The forensic scientist heated mud from the suspect's shoe with an alkali called soda lime. She tested to see if ammonia gas was given off.



How would she know if ammonia gas was produced?

(2)

[END OF QUESTION PAPER]