

FOR OFFICIAL USE

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Total
Marks

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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

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Scottish candidate number

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Number of seat

- All questions should be attempted.
- Necessary data will be found in the Data Booklet provided for Chemistry at Standard Grade and Intermediate 2.
- 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.
- 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.
- Additional space for answers and rough work will be found at the end of the book.
- 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.
- 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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5. Compounds are formed when elements react together.

A	sodium fluoride	B	potassium sulphite
C	potassium sulphide	D	ammonium carbonate

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

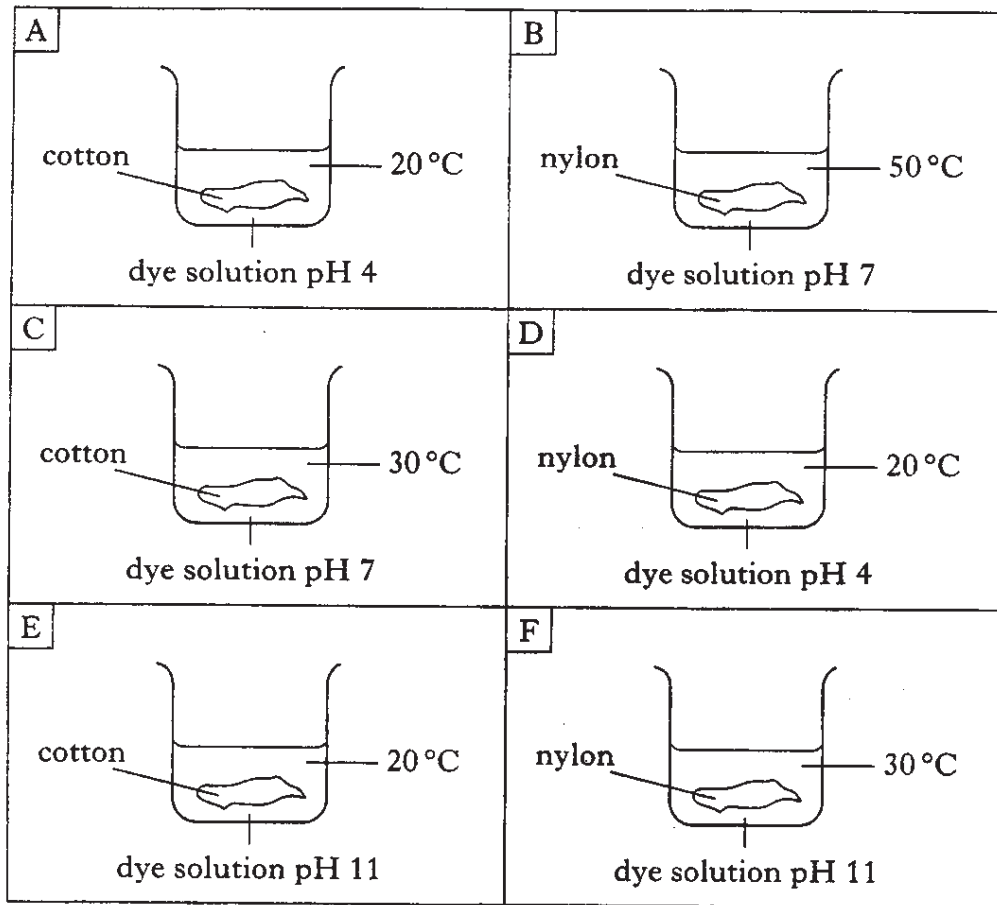
A	B
C	D

(b) Identify the compound which contains nitrogen.

A	B
C	D

[Turn over

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	B
C	D
E	F

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

A	B
C	D
E	F

[Turn over

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

A	It is saturated.
B	It is an alkane.
C	It rapidly decolourises bromine water.
D	It contains two carbon atoms per molecule.
E	It contains a double bond between carbon atoms.

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

A
B
C
D
E

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

A
B
C
D
E

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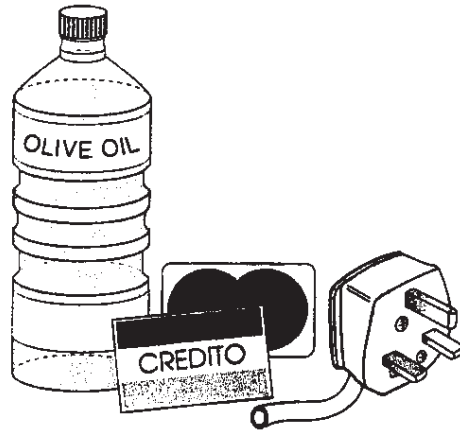
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PART 2

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

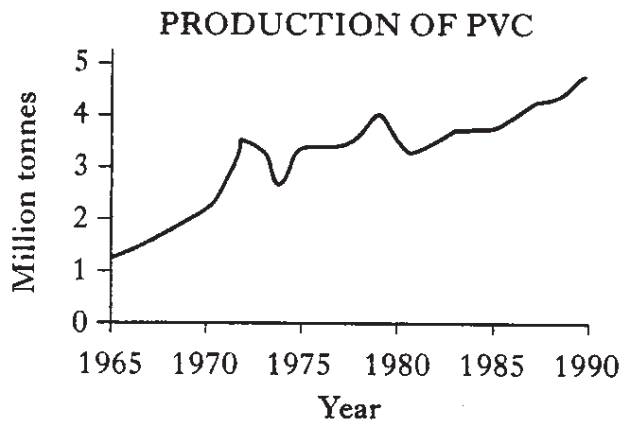
10. Many everyday objects are made from a polymer called PVC.



(a) PVC softens when warmed and can easily be reshaped.
What term is used to describe this type of polymer?

1

(b) The graph shows the production of PVC in Western Europe.



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

1

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10. (continued)

(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.

2

(4)

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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.

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

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

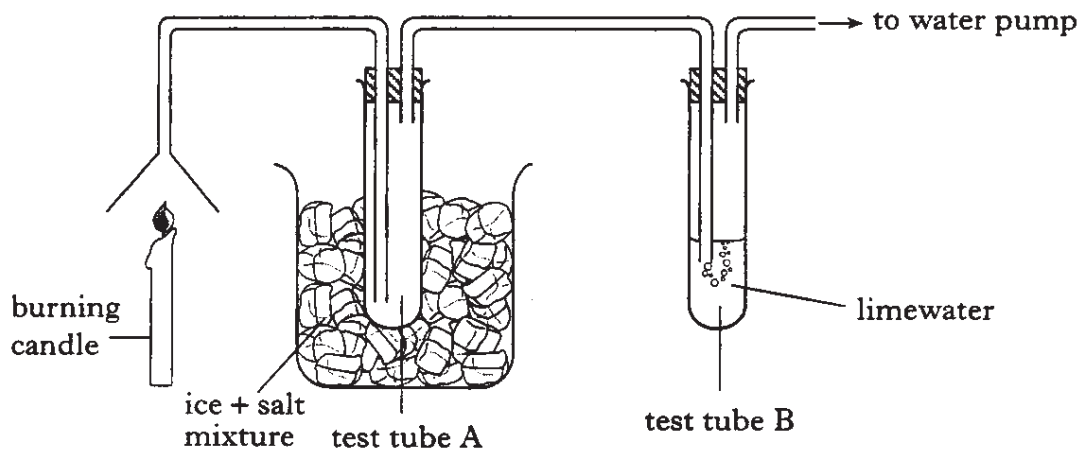
1

- (b) What effect does boiling have on the hardness of water?

1
(2)

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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.

1

- (b) Name **two** products formed when a candle burns.

1

- (c) Why is test tube A cooled?

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?

1

- (b) Predict what would be seen when hot magnesium reacts with fluorine.

1

- (c) Write an equation, using symbols and formulae, for the reaction of magnesium with bromine.
(There is no need to balance the equation.)

1

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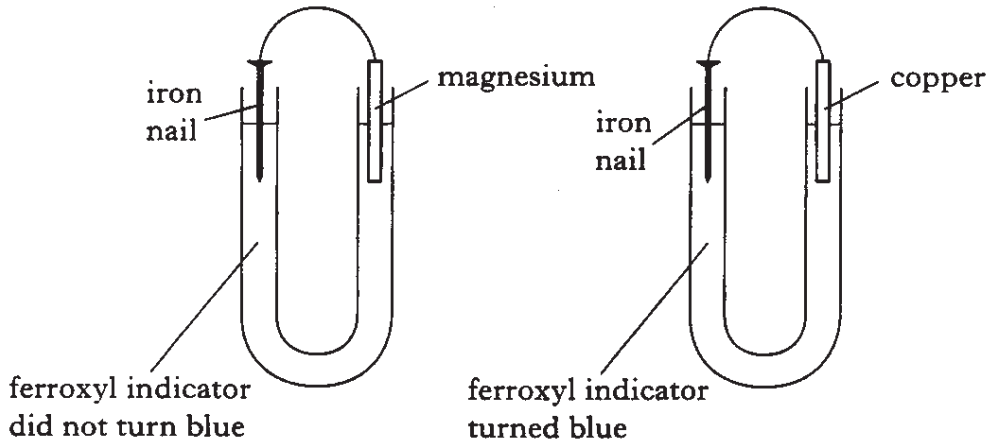
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15. (continued)

(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.

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

Drink	pH
Just Fizz	5
Fizz Alive	3
Jupiter	4

(a) Describe how you would use Universal Indicator or pH paper to measure the pH of a fizzy drink.

(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.

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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.

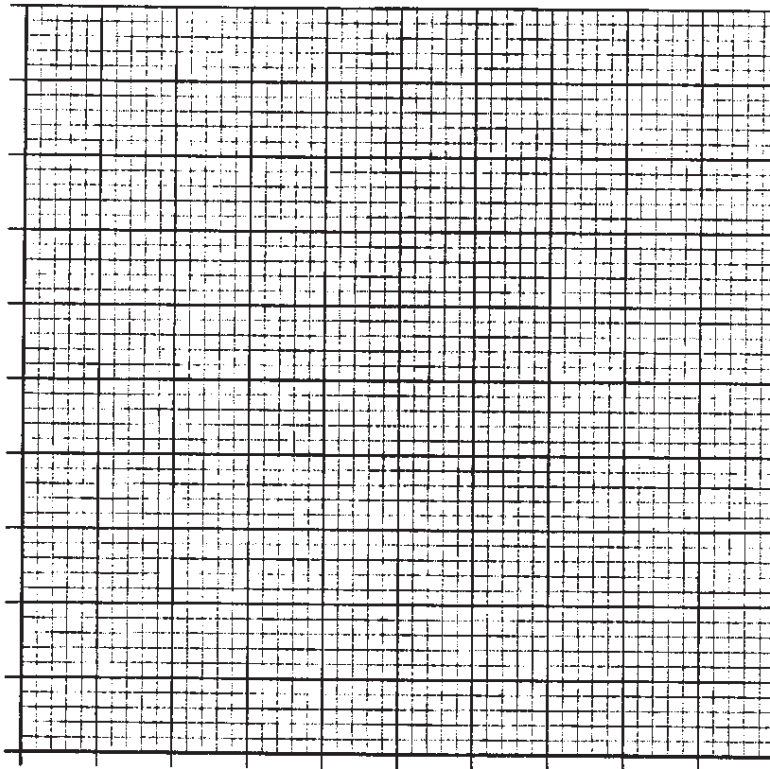
The powdered metals used are silver (70%), tin (26%), copper (3%) and zinc (1%).

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

1

(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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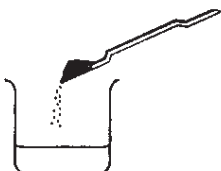
17.

WORKCARD

Preparation of Zinc Sulphate Crystals

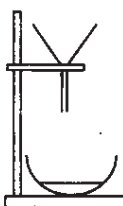


1 Measure 20 cm³ dilute sulphuric acid into a small beaker.



2 Add one spatulaful of zinc carbonate to the acid and stir.

3 Repeat step 2 until no more gas is given off.



4 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.

1

(b) Name the gas produced during this reaction.

1

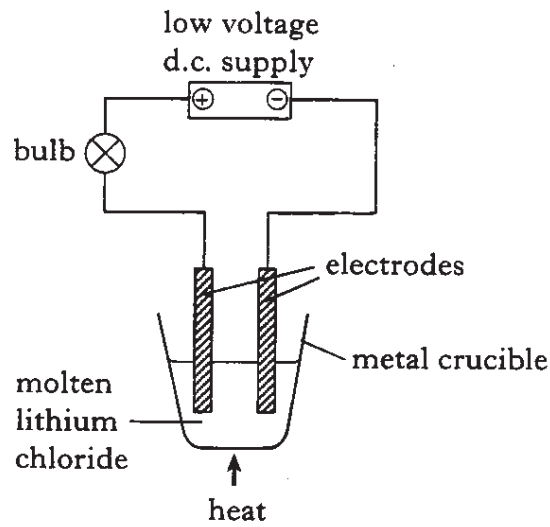
(c) Why is zinc carbonate added until no more gas is given off?

1

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



(a) State what is meant by electrolysis.

1

(b) Why does lithium chloride **not** conduct electricity when **solid**?

1

(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.

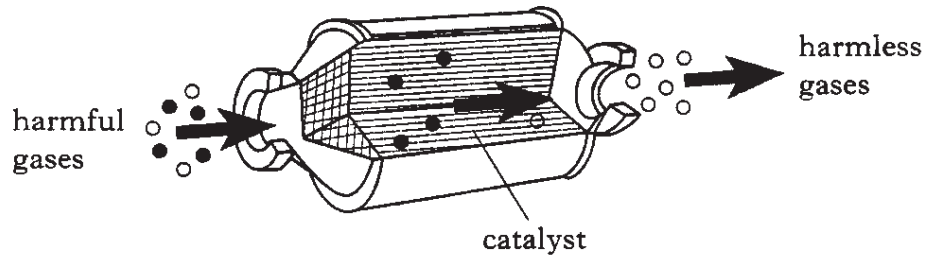
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19. Many cars are fitted with catalytic converters. They change harmful gases produced in the engine into harmless gases.



- (a) Oxides of nitrogen react with carbon monoxide in the converter.
Name the **two** harmless gases produced.

1

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

1

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

1

(3)

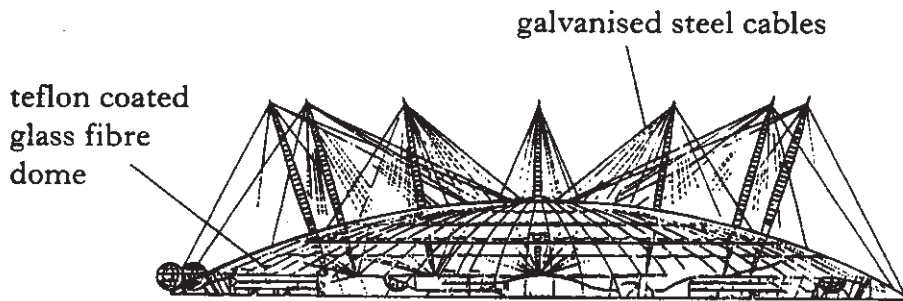
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20. The Millennium Dome is one of the largest exhibition centres in the world. The diagram shows some of the materials used in its construction.



- (a) Which metal is used to galvanise the steel cables?

- (b) Teflon is a brand name for the plastic poly(tetrafluoroethene).

- (i) Name the type of chemical reaction used to make plastics.

- (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.

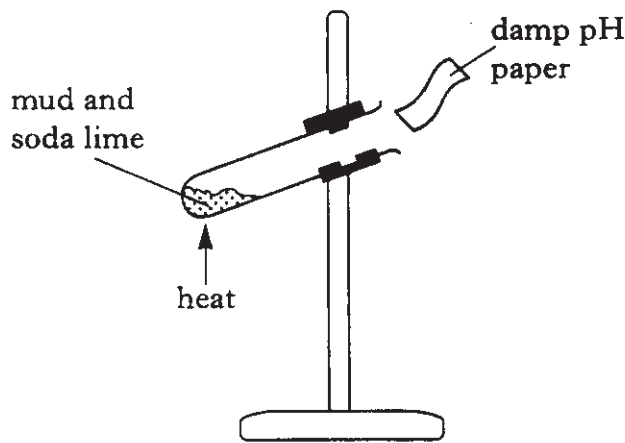
What colour of flame would have been seen?

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

1

- (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?

1

(2)

[END OF QUESTION PAPER]