

بسم الله الرحمن الرحيم

مقابل هذا الجهد ارجو منكم الدعاء لي بالمغفرة والابنائى الهداية والنجاح

والتوفيق

أرجو ان يساعد هذا المجهد على مساعدة ابنائنا طلبة ال IGCSE لثانوية البريطانية ونحصيلهم على افضل واحسن واعلى الدرجات انشاء الله .
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ابو احمد

للاستفسار والمساعدة اكتب لي على العنوان البريدي التالي :-
العنوان البريدي : jedeaaa@hotmail.com

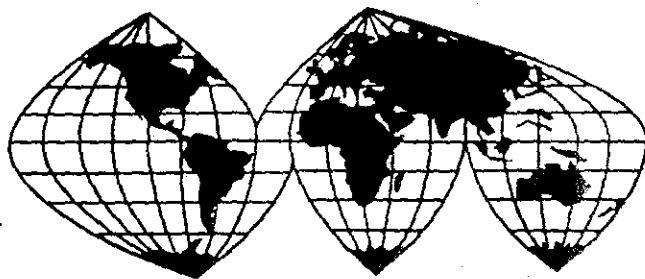
In the name of god

**Pry for me and my sons to success, mitigating and
proselyting**

This is a free past papers exams an answers scanned file's for our IGCSE sun's and daughters. The only thing I need you to do is "pry for me so GOD bless me and pry for my sons to success, mitigating and proselyting.

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IGCSE

CHEMISTRY

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1



UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
INTERNATIONAL EXAMINATIONS

Chemistry O.L

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International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

CHEMISTRY

0620/1

PAPER 1 Multiple Choice

Thursday

19 MAY 1994

Morning

45 minutes

Additional materials:

Mathematical tables

Multiple Choice answer sheet

Soft clean eraser

Soft pencil (Type B or HB is recommended)

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are forty questions on this paper. Answer all questions. For each question there are four possible answers, A, B, C and D. Choose the one you consider correct and record your choice in soft pencil on the separate answer sheet.

Read very carefully the instructions on the answer sheet.

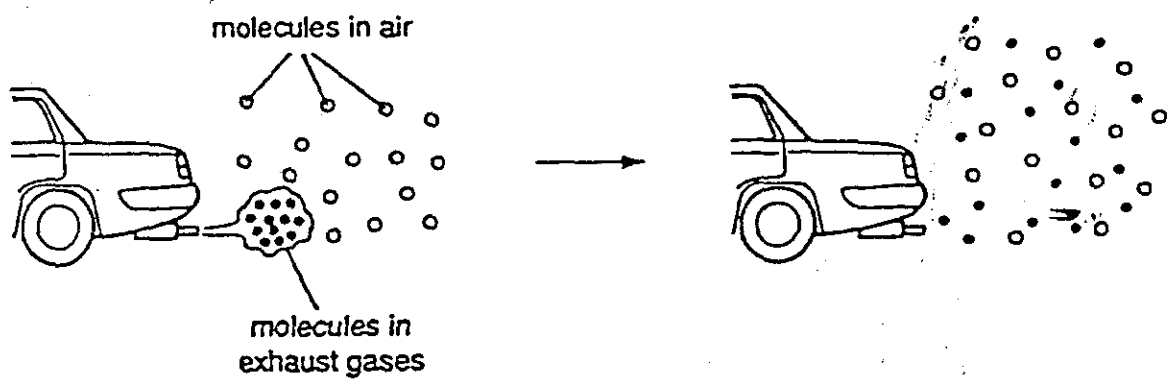
INFORMATION FOR CANDIDATES

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

A copy of the Periodic Table is printed on page 16.

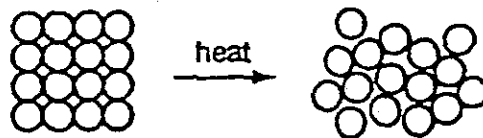
This question paper consists of 16 printed pages.

- 1 The diagram shows what happens to the exhaust gases from a car when they meet the air.



What process does the diagram show?

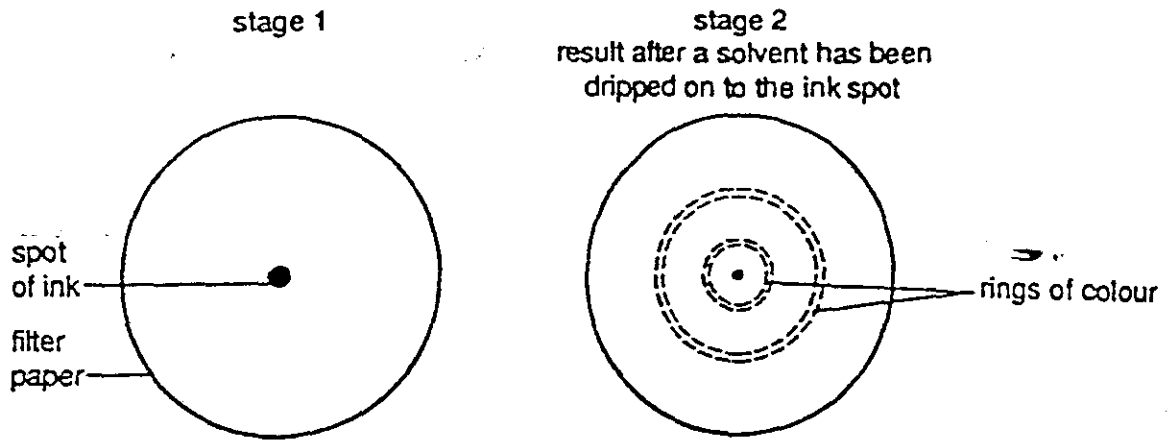
- A cracking
 - B diffusion
 - C distillation
 - D evaporation
- 2 The diagram shows what happens to the particles of a solid when it is heated in air.



Which word describes this change?

- A burning
- B condensing
- C dissolving
- D melting

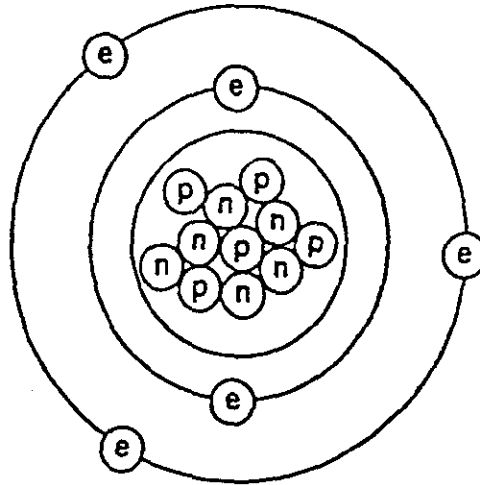
- 3 The diagrams show two stages in an experiment.



What process do the diagrams show?

- A chromatography
 - B condensation
 - C distilling
 - D filtering
- 4 Which observation provides the best evidence that a solid is a pure substance?
- A It all dissolves in water.
 - B It has a crystalline structure.
 - C It is all one colour.
 - D It melts at a fixed temperature.

5 The diagram shows an atom of boron.



key

(e) = electron

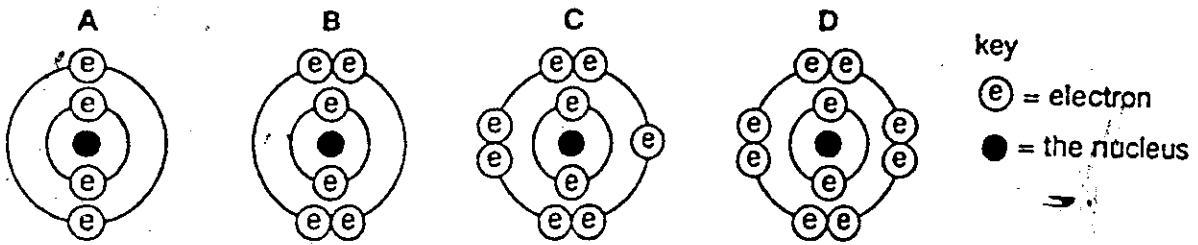
(p) = proton

(n) = neutron

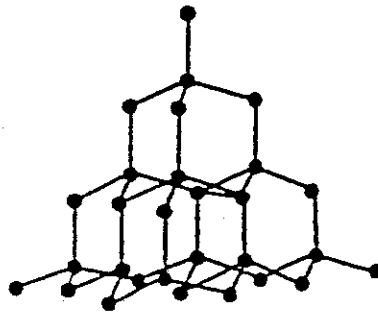
What is the proton (atomic) number and nucleon (mass) number of boron?

	<i>proton number</i>	<i>nucleon number</i>
A	5	6
B	5	11
C	6	5
D	6	11

Questions 6 and 7 refer to the diagrams below which show the electron arrangements in the atoms of four elements.



- 6 Which diagram represents a noble gas?
- 7 Which diagram represents an atom that forms an ion with charge 1-?
- 8 The diagram shows the structure of a macromolecule.



What is represented?

- A diamond
 B graphite
 C petroleum
 D poly(ethene)

- 9 What are the correct symbols for the elements chlorine, nitrogen and bromine?

	<i>chlorine</i>	<i>nitrogen</i>	<i>bromine</i>
A	C	N	B
B	C	Ni	Br
C	Cl	N	Br
D	Cl	Ni	B

- 10 When sodium butanoate (C_3H_7COONa) is heated with sodium hydroxide, a hydrocarbon is formed as one of the products. The incomplete equation is shown below.

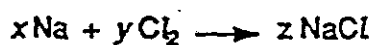


What is needed to complete the equation?

- A C_3H_7 B C_3H_8 C $3CH_2 + H_2O$ D $C_3H_6 + H_2O$
- 11 Water is formed when 48 g of oxygen combine with 6 g of hydrogen.

What mass of oxygen combines with 1.5 g of hydrogen?

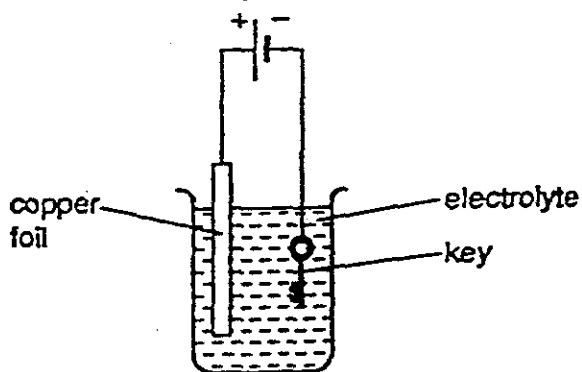
- A 8 g B 12 g C 42 g D 54 g
- 12 The equation represents the formation of sodium chloride.



What numbers correctly balance this equation?

	x	y	z
A	1	1	2
B	1	2	1
C	2	1	1
D	2	1	2

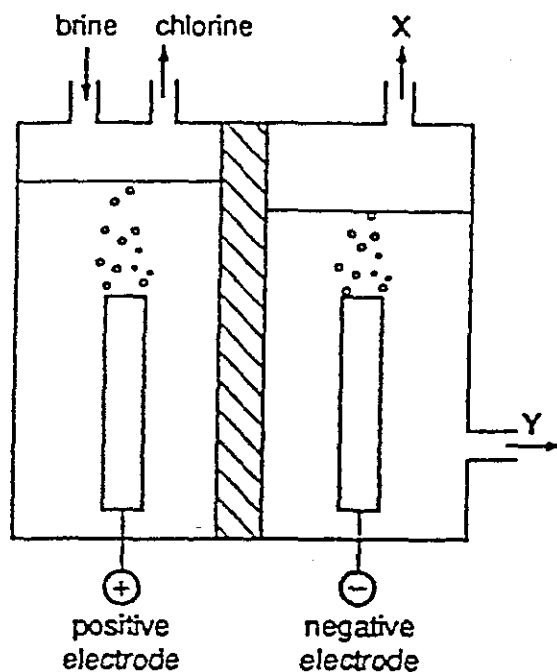
- 13 The diagram shows a method used to electroplate a key with copper.



Which aqueous solution is most suitable for the electrolyte?

- A copper(II) sulphate
 B ethanol
 C sodium hydroxide
 D sulphuric acid

- 14 The diagram represents the electrolysis of brine (aqueous sodium chloride).



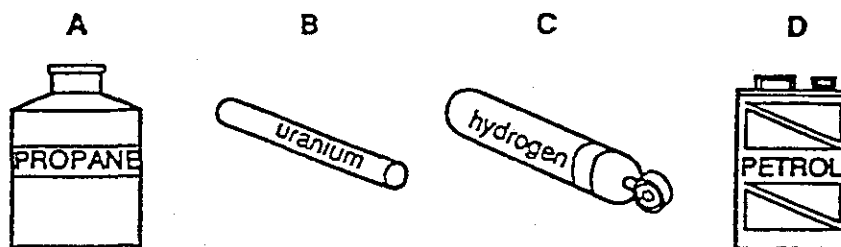
What are the products X and Y?

- | X | Y |
|----------------|--------------------------|
| A hydrogen gas | aqueous sodium hydroxide |
| B hydrogen gas | hydrochloric acid |
| C oxygen gas | aqueous sodium hydroxide |
| D oxygen gas | hydrochloric acid |
- 15 In the electrolytic manufacture of aluminium, which substance is used to dissolve aluminium oxide?
- A acid
 B alkali
 C cryolite
 D graphite
- 16 A television news programme showed an explosion at a flour mill.
- What could have increased the risk of such an explosion?
- A adding salt to the flour
 B employing more staff in the mill
 C grinding the flour more finely
 D opening the windows

17 In which of the following reactions is the underlined substance being reduced?

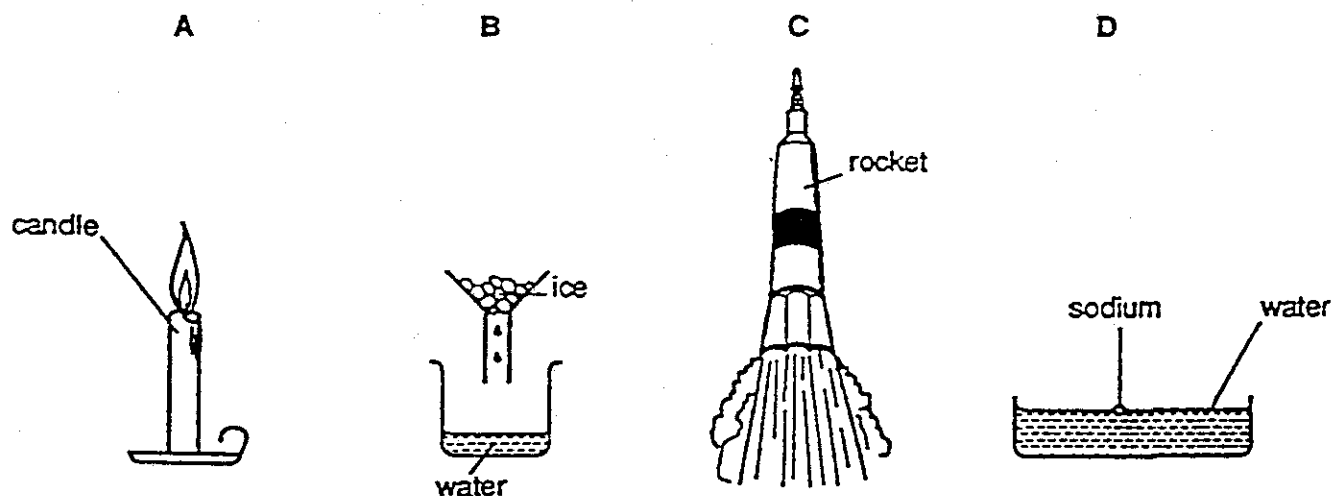
- A copper(II) oxide + carbon \longrightarrow copper + carbon dioxide
 B iron + sulphur \longrightarrow iron(II) sulphide
 C sodium chloride + silver nitrate \longrightarrow sodium nitrate + silver chloride
 D zinc + sulphuric acid \longrightarrow zinc sulphate + hydrogen

18 The diagrams show fuels which can be used to produce energy.

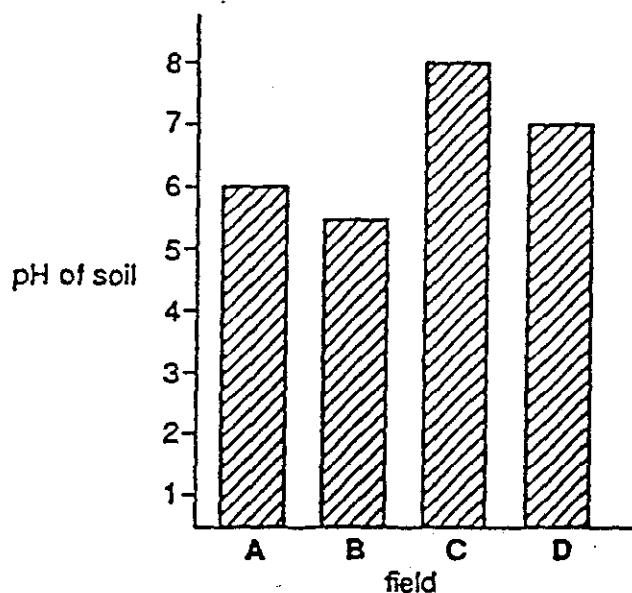


Which fuel does not need oxygen to produce energy?

19 Which diagram shows a process in which an endothermic change is taking place?



20 A farmer tested the pH of the soil in four fields. The chart shows the results.



Beans grow best in a soil that is either slightly acidic or neutral.

Which field should the farmer not use for growing beans?

- 21 A salt is formed when there is a reaction between
- A copper(II) oxide and carbon.
 - B hydrogen and oxygen.
 - C magnesium and steam.
 - D sodium hydroxide and hydrochloric acid.
- 22 Which type of compound reacts with an acid to give off a gas that turns limewater milky?
- A carbonates
 - B hydroxides
 - C oxides
 - D sulphates
- 23 A solid element is easily cut with a knife. It reacts violently with cold water.
- To which group of the Periodic Table does the element belong?
- A Group 0
 - B Group I
 - C Group VI
 - D Group VII

24 Given that copper is a transition metal, what are the likely properties of copper?

	<i>density</i>	<i>appearance of compounds</i>
A	0.89 g/cm ³	coloured
B	0.89 g/cm ³	white
C	8.9 g/cm ³	coloured
D	8.9 g/cm ³	white

25 The table shows some information about elements in Group VII of the Periodic Table.

<i>name</i>	<i>state at room temperature</i>	<i>colour</i>
fluorine	gas	yellow
chlorine	gas	green
bromine	liquid	brown
iodine	?	?
astatine	solid	grey

What information for iodine completes the table?

- A liquid black
- B liquid green
- C solid grey
- D solid red

26 A metal X is placed in aqueous copper(II) sulphate. Metal X reacts and a brown deposit is formed.

When metal X is placed in aqueous zinc sulphate, there is no reaction.

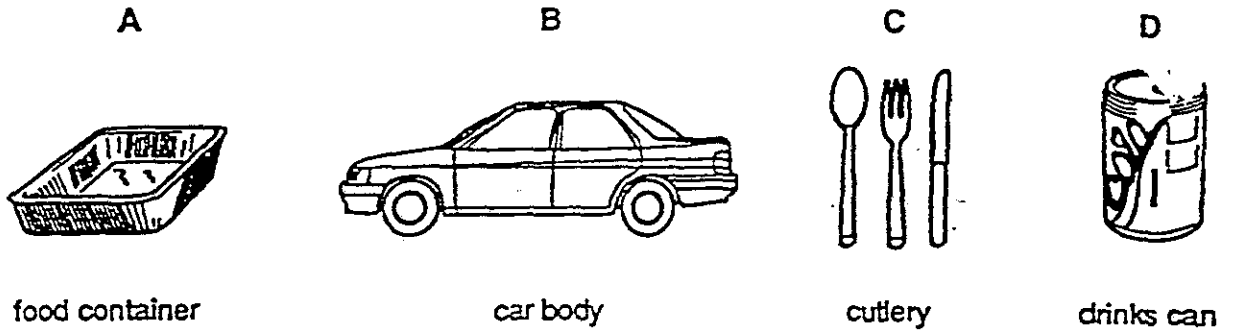
What is the order of reactivity of the three metals?

	most reactive	—————→	least reactive
A	copper	X	zinc
B	X	copper	zinc
C	zinc	copper	X
D	zinc	X	copper

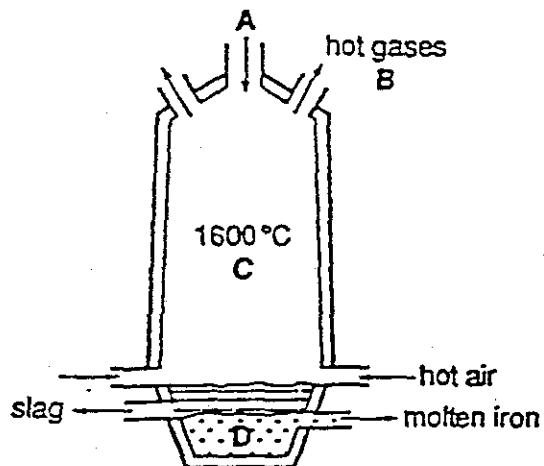
27 Which property is important for metal food containers?

- A good conductor of electricity
- B high density
- C low melting point
- D slow to corrode

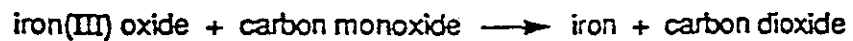
28 Which item is usually made from stainless steel?



29 The diagram shows a section through a blast furnace.

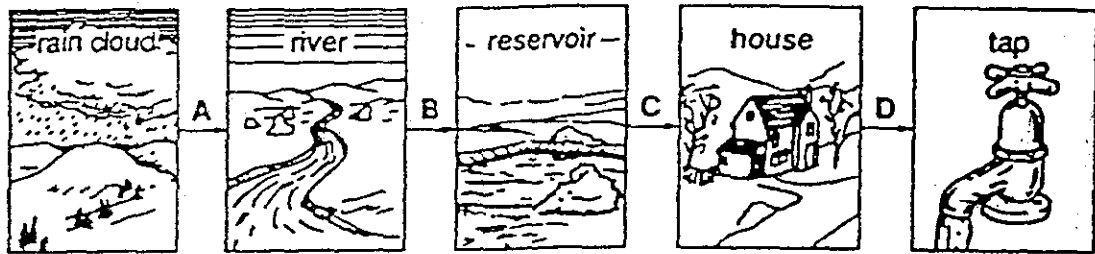


At which position does the following reaction take place?



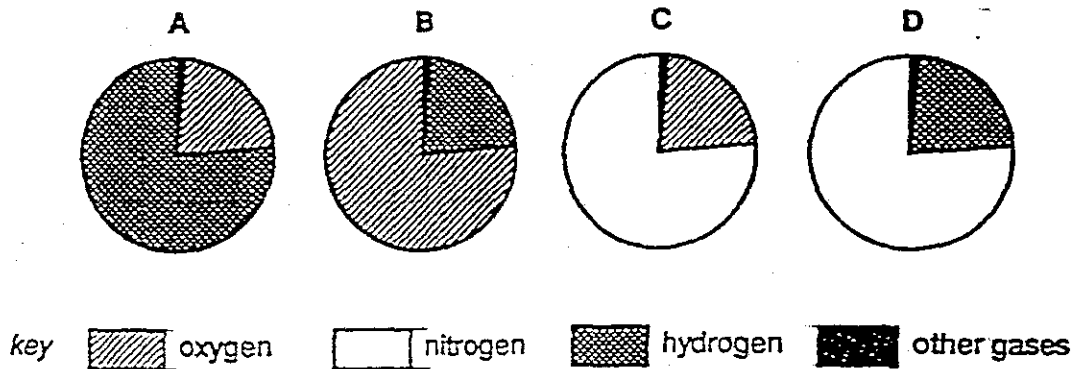
- 30 Chlorine is added to water to make it safe to drink.

The diagrams show how water reaches the domestic water supply.



At what stage do the water authorities add the chlorine to the water?

- 31 Which chart represents the composition of air?

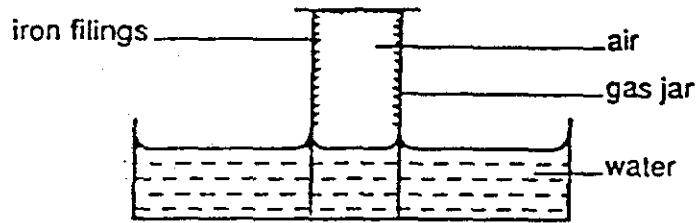


- 32 The table shows the composition of natural gas from four different countries.

natural gas	methane%	nitrogen%	sulphur compounds%
A	89	10	1
B	85	15	0
C	83	15	2
D	81	11	8

Which natural gas would cause the most pollution when burned?

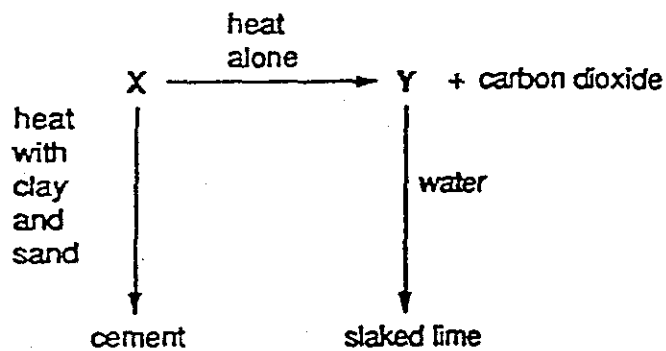
- 33 The diagram shows how iron filings were put inside a gas jar placed over water.



After several days, the water rose in the gas jar.

Why did the water rise?

- A The air in the gas jar dissolved.
 B The iron reacted with oxygen in the water.
 C The iron reacted with oxygen in the air.
 D The water vapour in the gas jar condensed.
- 34 What gas is produced by heating limestone?
- A carbon dioxide
 B carbon monoxide
 C nitrogen
 D oxygen
- 35 The diagram represents the reactions involved in making cement and slaked lime.



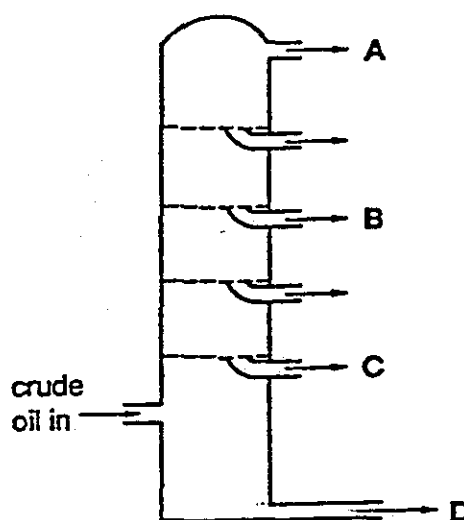
What are X and Y?

- | X | Y |
|---------------------|-------------------|
| A calcium carbonate | calcium hydroxide |
| B calcium carbonate | calcium oxide |
| C calcium hydroxide | calcium carbonate |
| D calcium hydroxide | calcium oxide |

36 Which of the following organic compounds contains oxygen?

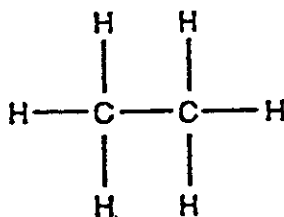
- A ethane
- B ethanol
- C ethene
- D poly(ethene)

37 The diagram represents the fractional distillation of crude oil.



At which level is bitumen collected?

Questions 38 and 39 refer to the structure of an organic compound below.



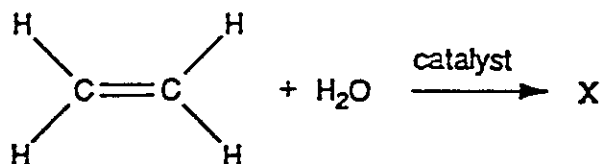
38 To which group of compounds does the compound belong?

- A alcohols
- B alkanes
- C alkenes
- D polymers

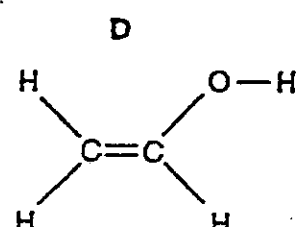
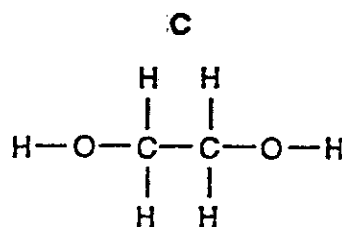
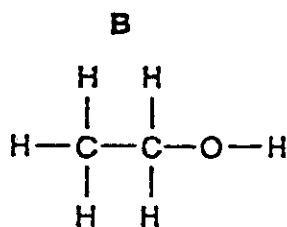
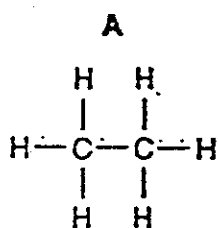
39 Which property does the compound have?

- A It burns.
- B It dissolves in water.
- C It polymerises.
- D It undergoes addition reactions.

40. The equation represents the reaction between a hydrocarbon and steam.



What is the structure of X?



International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

CHEMISTRY
PAPER 1 Multiple Choice

0620/1

Tuesday 15 NOVEMBER 1994 Afternoon 45 minutes

Additional materials:

- Mathematical tables
- Multiple Choice answer sheet
- Soft clean eraser
- Soft pencil (Type B or HB is recommended)

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are forty questions on this paper. Answer all questions. For each question there are four possible answers, A, B, C and D. Choose the one you consider correct and record your choice in soft pencil on the separate answer sheet.

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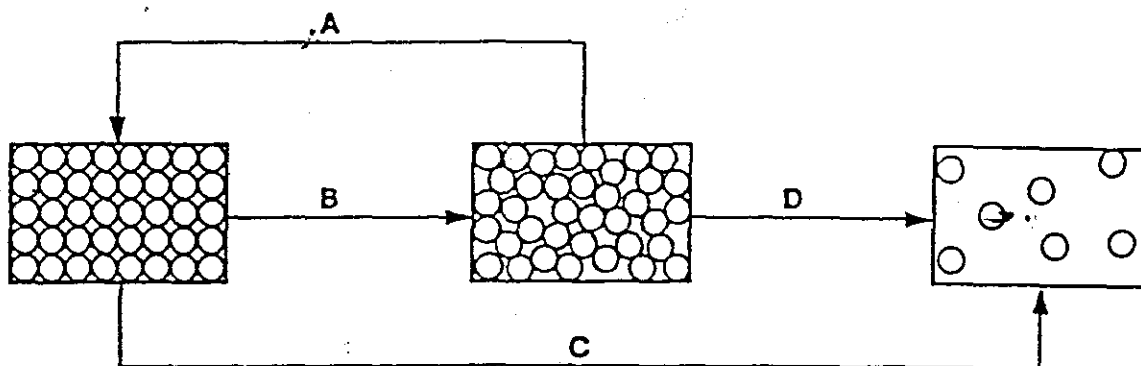
INFORMATION FOR CANDIDATES

Each correct answer will score one mark. A mark will not be deducted for a wrong answer. A copy of the Periodic Table is printed on page 16.

This question paper consists of 16 printed pages.

- 1 The diagram shows particles in a solid, a liquid and a gas.

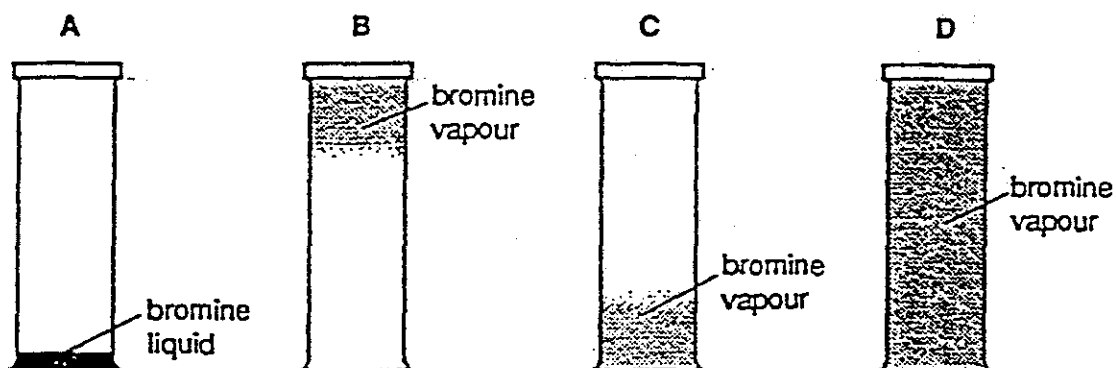
Which arrow could represent water boiling?



- 2 Bromine vapourises easily at room temperature.

Liquid bromine is placed at the bottom of a sealed gas-jar.

Which diagram shows the appearance of the jar after several hours?



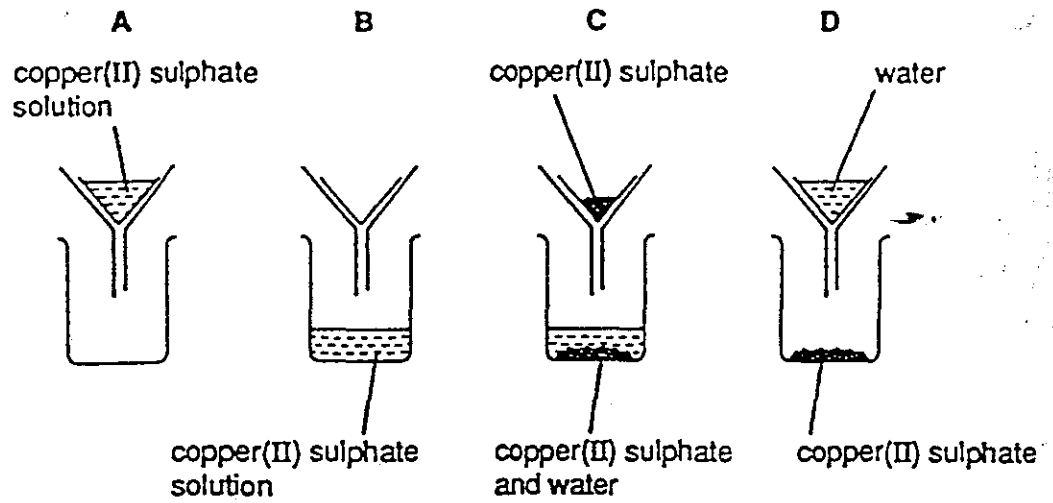
- 3 Sodium chloride dissolves in water.

Which method is used to recover all the sodium chloride from the solution?

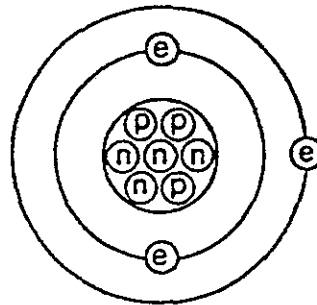
- A chromatography
- B evaporation
- C filtration
- D precipitation

- 4 A solution of copper(II) sulphate in water is poured into a funnel containing filter paper.

Which diagram shows the final result?



- 5 The diagram represents an atom.



key

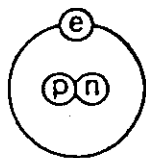
- (p) proton
- (n) neutron
- (e) electron

What is the atomic number of this atom?

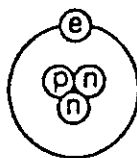
- A 3 B 4 C 7 D 10

- 6 Deuterium and tritium are isotopes of hydrogen.

deuterium



tritium



key

Ⓟ proton

Ⓝ neutron

ⓔ electron

isotope	number of protons	number of neutrons	number of electrons	nucleon (mass) number
deuterium	1	1	1	X
tritium	1	2	1	Y

- What are the correct numbers for X and Y?

	X	Y
A	1	1
B	1	2
C	2	3
D	3	4

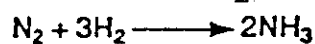
- 7 Which element is a metal?

- A carbon
- B helium
- C sulphur
- D zinc

- 8 An ionic compound is likely to

- A be a gas.
- B be coloured.
- C conduct electricity when molten.
- D react vigorously with water.

- 9 Nitrogen and hydrogen react together to form ammonia.



When completely converted, 7 tonnes of nitrogen gave 8.5 tonnes of ammonia.

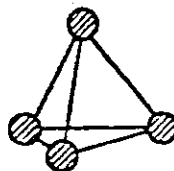
How much nitrogen would be needed to produce 34 tonnes of ammonia?

- A 7 tonnes B 8.5 tonnes C 28 tonnes D 34 tonnes
- 10 A molecule of glucose has 6 atoms of carbon, 12 atoms of hydrogen and 6 atoms of oxygen.

Which of the following represents two molecules of glucose?

- A $\text{C}_6\text{H}_{12}\text{O}_6$
 B $2\text{C}_6\text{H}_{12}\text{O}_6$
 C $2\text{C}_6(\text{H}_{12}\text{O}_6)_2$
 D $\text{C}_{12}(\text{H}_2\text{O})_{12}$

- 11 The diagram shows a molecule of phosphorus.



What is the formula of this molecule?

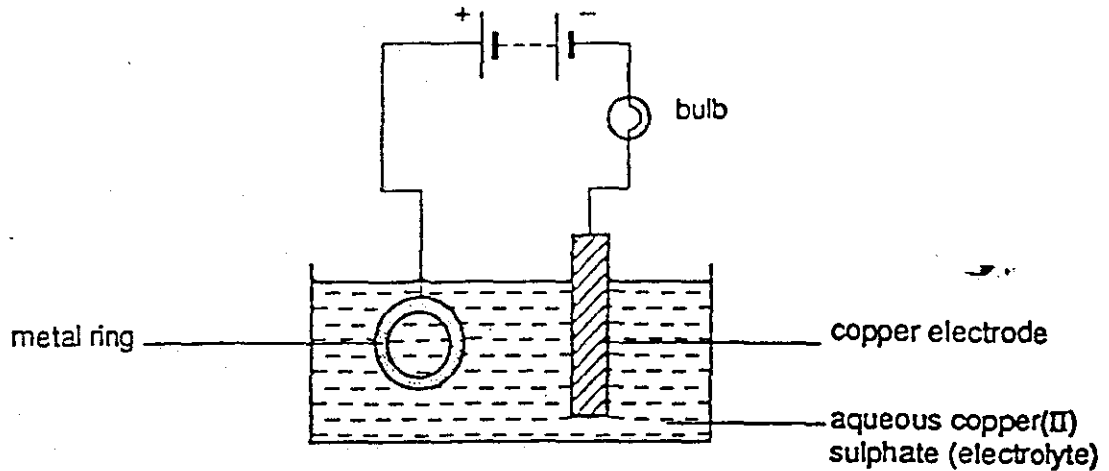
- A P B P_4 C 2P_2 D 4P
- 12 Sulphur dioxide and oxygen react together to form sulphur trioxide.



What values for x , y and z balance the equation?

	x	y	z
A	1	1	2
B	1	2	2
C	2	1	2
D	2	2	1

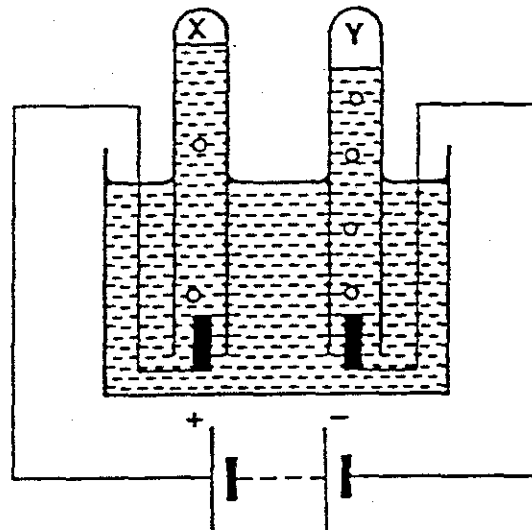
- 13 The diagram shows apparatus used in an attempt to electroplate a metal ring with copper.



The experiment did not work.

What change is needed in the experiment to make it work?

- A add solid copper(II) sulphate to the electrolyte
 - B increase the temperature of the electrolyte
 - C replace the copper electrode by a carbon electrode
 - D reverse the connections to the battery
- 14 The diagram shows the electrolysis of concentrated hydrochloric acid.



What are the gaseous products?

- | | X | Y |
|---|----------|----------|
| A | chlorine | hydrogen |
| B | hydrogen | chlorine |
| C | hydrogen | oxygen |
| D | oxygen | hydrogen |

15 Sacks of calcium hydroxide, sodium chloride and sugar have lost their labels.

Students tested a sample from each sack. Their results are shown in the table.

sack	addition of water	conductivity of solution
1	forms an alkaline solution	conducts electricity
2	forms a neutral solution	conducts electricity
3	forms a neutral solution	does not conduct electricity

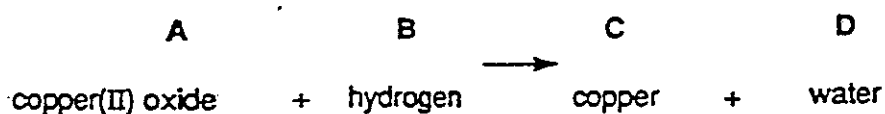
What are the correct labels for each sack?

sack 1	sack 2	sack 3
A calcium hydroxide	sodium chloride	sugar
B calcium hydroxide	sugar	calcium hydroxide
C sodium chloride	sugar	calcium hydroxide
D sugar	calcium hydroxide	sodium chloride

16 Which of the following is not used as a fuel?

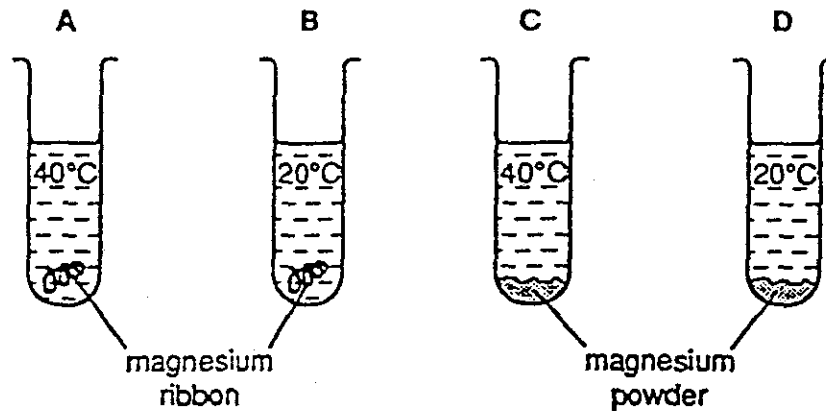
- A hydrogen
- B methane
- C oxygen
- D uranium

17 Which substance is reduced in the following reaction?

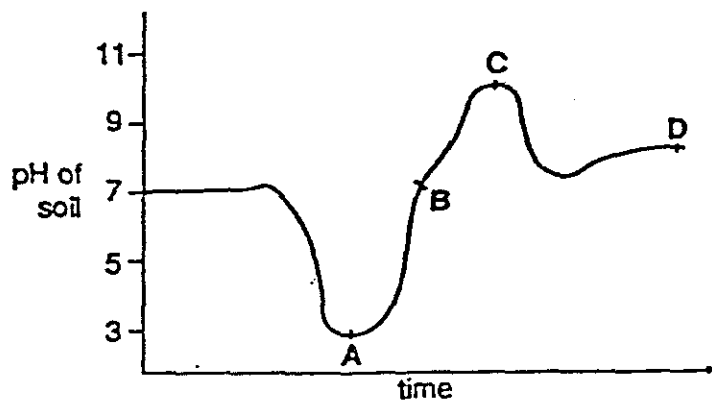


Questions 18 and 19 refer to the diagrams below.

Equal masses of magnesium ribbon and magnesium powder were reacted with dilute hydrochloric acid at the temperatures shown.



- 18 In which test-tube was the reaction fastest?
- 19 Which gas is released when magnesium reacts with hydrochloric acid?
- A carbon dioxide
 - B chlorine
 - C hydrogen
 - D oxygen
- 20 The graph shows how the pH value of the soil in a field changed over time.
- At which point was the soil most acidic?



21 Acidity in the stomach causes indigestion which can be cured by an anti-indigestion tablet.

What could the tablet contain to remove the acidity?

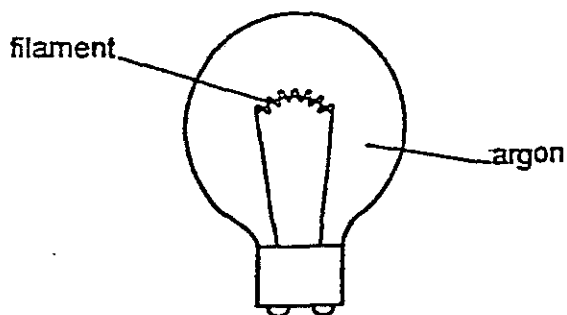
- A an acidic substance
- B an alkaline substance
- C an indicator
- D a neutral substance

22 acid + alkali \longrightarrow salt + ?

Which word is missing from the above equation?

- A hydrogen
- B nitrogen
- C oxygen
- D water

23 The diagram shows an electric lamp.



Why is argon used?

- A It is an unreactive gas.
- B It is cheaper than air.
- C It is less dense than air.
- D It makes the filament glow.

24 The table gives information about some metals and their iodides.

Which metal is most likely to be a transition metal?

<i>metal</i>	<i>density of metal</i>	<i>melting point of metal</i>	<i>colour of iodide</i>
A	low	low	white
B	low	high	white
C	high	high	yellow
D	high	low	red

25 Which property of the elements fixes their order in the Periodic Table?

- A atomic mass
- B atomic number
- C boiling point
- D number of neutrons

26 Which element below is a metal?

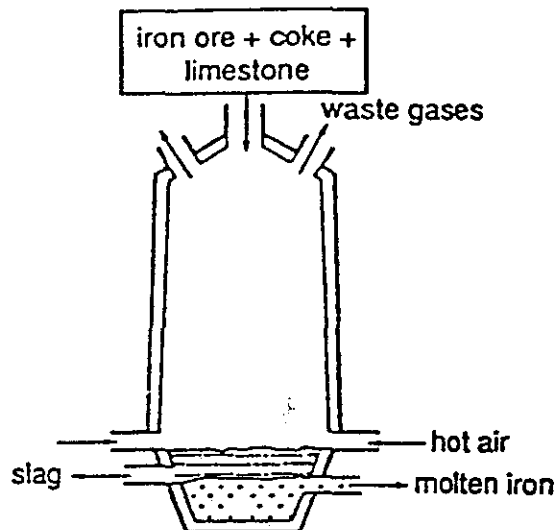
<i>element</i>	<i>electrical conductivity</i>	<i>type of oxide</i>
A	good	basic
B	good	acidic
C	poor	basic
D	poor	acidic

27 The table gives information about the reactivity of some metals with water and with hydrochloric acid.

Which metal is the most reactive?

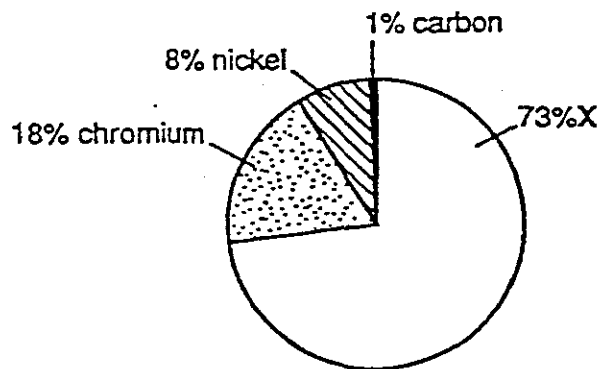
<i>metal</i>	<i>reaction with water</i>	<i>reaction with acid</i>
A	reacts only with steam	reacts quite well with dilute acid
B	no reaction	slow reaction with concentrated acid
C	reacts violently in cold water	violent reaction with dilute acid
D	reacts only with steam	slow reaction with concentrated acid

- 28 The diagram shows a blast furnace used for the extraction of iron from iron ore.



Why is limestone added to the furnace?

- A to convert the ore into iron
 - B to heat the furnace
 - C to produce oxygen for the coke to burn
 - D to remove impurities in the ore as slag
- 29 The diagram shows the composition of a stainless steel.



What is X?

- A aluminium
- B iron
- C manganese
- D tungsten

30 Which of the following shows the main stages in the purification of drinking water?

- A reservoir → filtration → river → chlorination
 B river → chlorination → filtration → reservoir
 C river → chlorination → reservoir → filtration
 D river → reservoir → filtration → chlorination

31 The following substances are formed when petrol is burnt in a car engine.

Which is the main cause of acid rain?

- A carbon
 B carbon monoxide
 C nitrogen dioxide
 D water

32 The table gives information about the percentage composition of different samples of air.

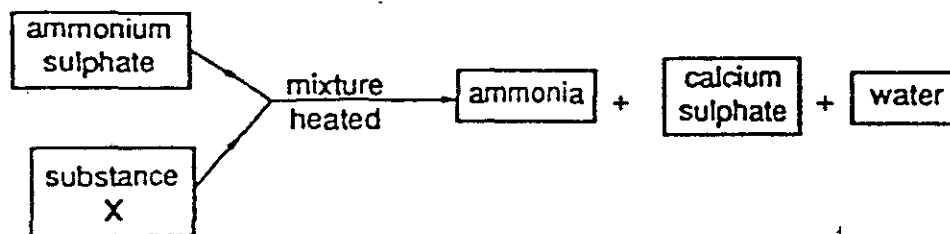
Which sample could have been obtained by a student breathing out into a plastic bag?

sample	nitrogen %	oxygen %	carbon dioxide %
A	77	21	0.01
B	78	16	4.00
C	76	21	1.10
D	78	20	0.03

33 Which of the following does not use oxygen?

- A breathing apparatus in a hospital
 B burning natural gas
 C heating a room with an electric fire
 D welding apparatus

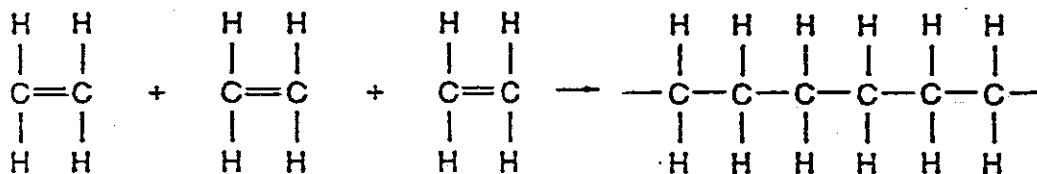
34 A student attempted to prepare ammonia gas using the reaction scheme below.



What is substance X likely to be?

- A ammonium chloride
- B calcium hydroxide
- C sodium nitrate
- D water

35 Molecules of a substance reacted together as shown below.



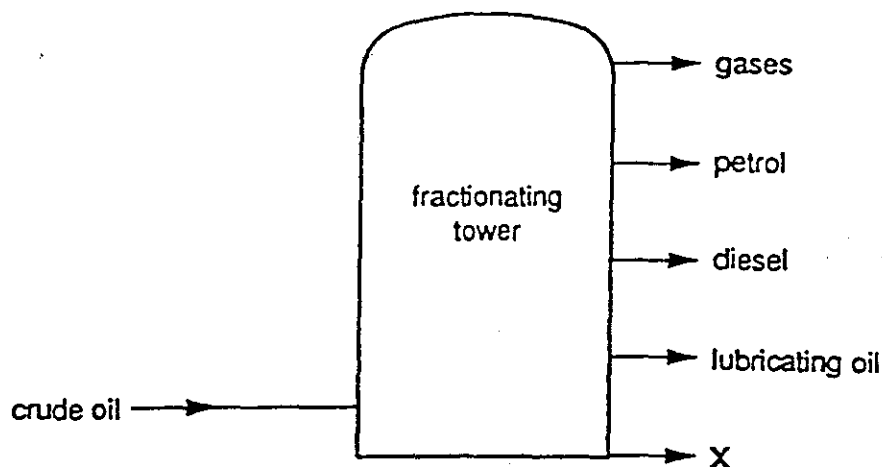
Which type of reaction took place?

- A cracking
- B oxidation
- C polymerisation
- D reduction

36 Which of the following contains only hydrogen and carbon?

- A ethanoic acid
- B ethanol
- C graphite
- D methane

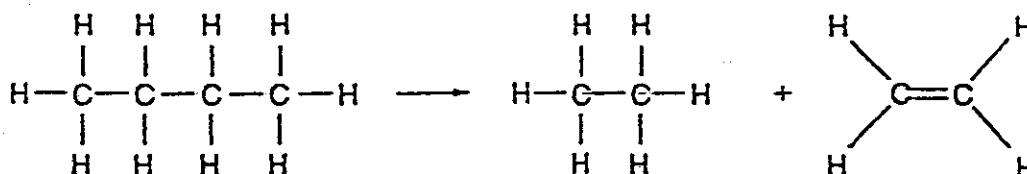
37 The diagram shows the fractional distillation of crude oil (petroleum).



Which of the following is a use of fraction X?

- A aircraft fuel
- B fuel for cooking stoves
- C road making
- D waxes

38 The equation represents a reaction in which butane is converted into smaller molecules.



This reaction is an example of

- A addition.
- B cracking.
- C fermentation.
- D polymerisation.

39 Which table shows a homologous series?

A *name* *formula*

ethane C_2H_6

propane C_3H_8

butane C_4H_{10}

B *name* *formula*

lithium Li

sodium Na

potassium K

C *name* *formula*

ice H_2O

water H_2O

steam H_2O

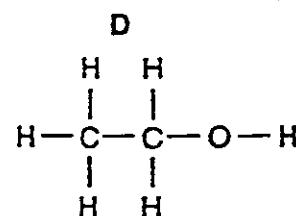
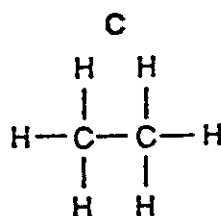
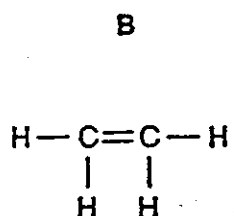
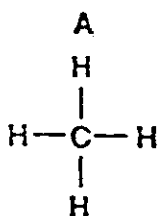
D *name* *formula*

oxygen O_2

argon Ar

nitrogen N_2

40 What is the structure of ethanol?



International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

CHEMISTRY

0620/1

PAPER 1 Multiple Choice

Thursday

18 MAY 1995

Morning

45 minutes

Additional materials:

Mathematical tables

Multiple Choice answer sheet

Soft clean eraser

Soft pencil (type B or HB is recommended)

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are forty questions in this paper. Answer all questions. For each question there are four possible answers, A, B, C and D. Choose the one you consider correct and record your choice in soft pencil on the separate answer sheet.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

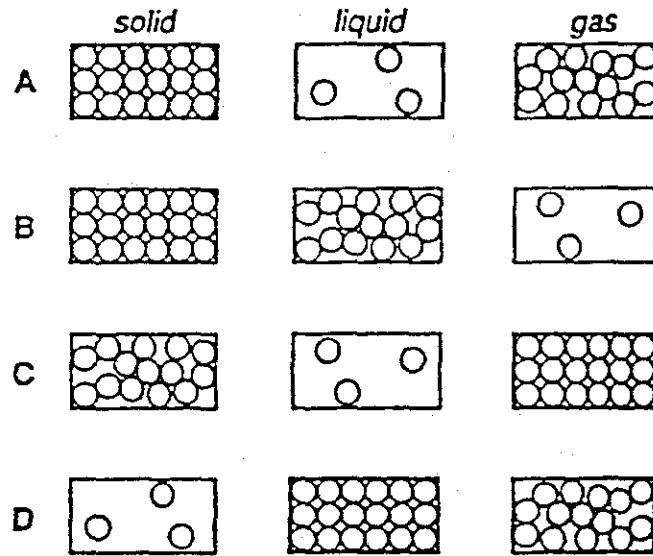
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

A copy of the Periodic Table is printed on page 16.

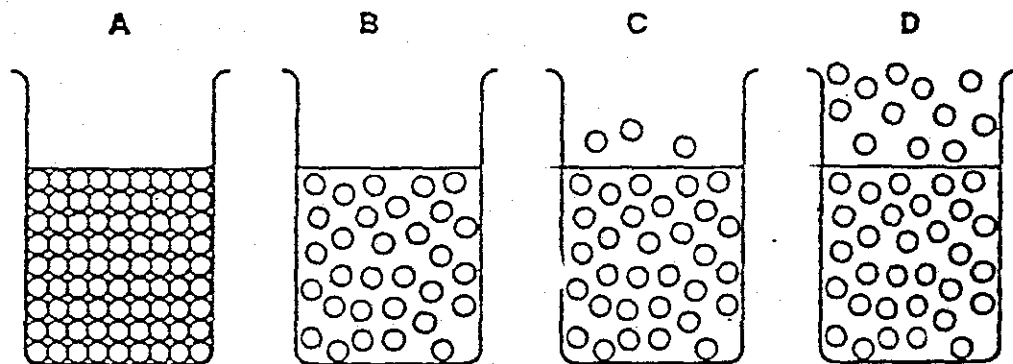
Any rough working should be done in this booklet.

This question paper consists of 16 printed pages.

- 1 Which set of diagrams shows the arrangement of particles in a solid, a liquid and a gas?



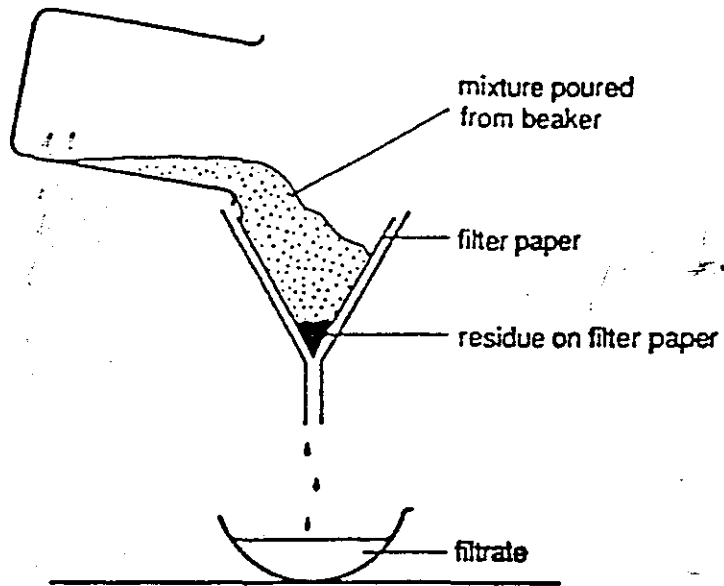
- 2 The diagrams show four beakers of water. Each circle (○) represents one molecule of water. In which beaker is there most water vapour?



- 3 Which method is used to obtain a sample of pure water from a salt solution?

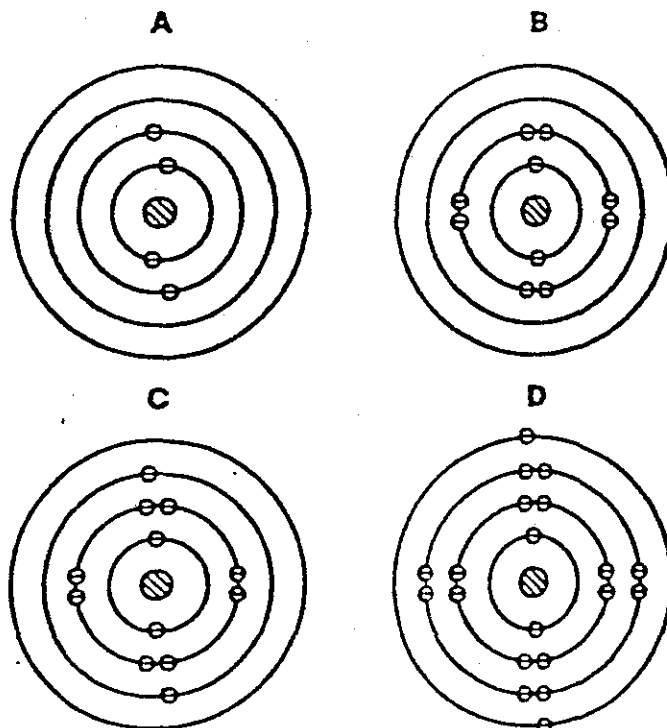
- A chromatography
- B cracking
- C distillation
- D filtration

- 4 The diagram shows a method for separating a mixture.



This method could be used to separate

- A chalk from a mixture of chalk and water.
 - B ethanol from a mixture of ethanol and water.
 - C pure water from sea water.
 - D sodium chloride from sea water.
- 5 Which diagram shows the electronic structure of a noble gas?



key

e electron

⊙ nucleus

6 What are the electrical charges on an electron and a proton?

- | | | |
|---|-----------------|---------------|
| | <i>electron</i> | <i>proton</i> |
| A | negative | neutral |
| B | negative | positive |
| C | positive | negative |
| D | positive | neutral |

7 The table shows some properties of four materials.

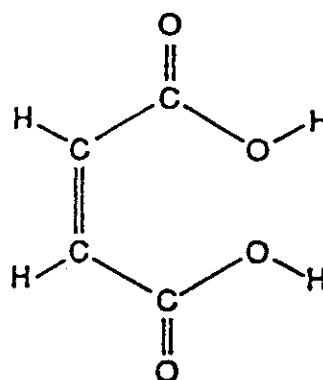
Which material is a metal?

<i>material</i>	<i>density</i>	<i>electrical conductivity</i>	<i>sound made when hit</i>	<i>colour</i>
A	low	poor	dull thud	yellow
B	low	good	dull thud	black
C	high	poor	rings	colourless
D	high	good	rings	silver

8 The atoms of the isotopes of an element all contain the same number of

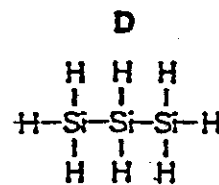
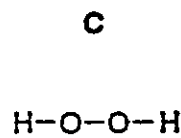
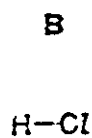
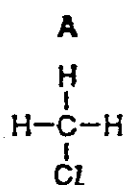
- A protons.
- B neutrons.
- C electrons and neutrons.
- D protons, neutrons and electrons.

- 9 Butenedioic acid has the structure shown.

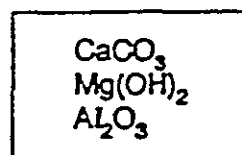


What is the molecular formula of butenedioic acid?

- A CHO B $C_4H_4O_2$ C $C_4H_4O_4$ D $C_6H_4O_6$
- 10 Which molecule contains the most elements?



- 11 A medicine bottle has the following formulae on its label.

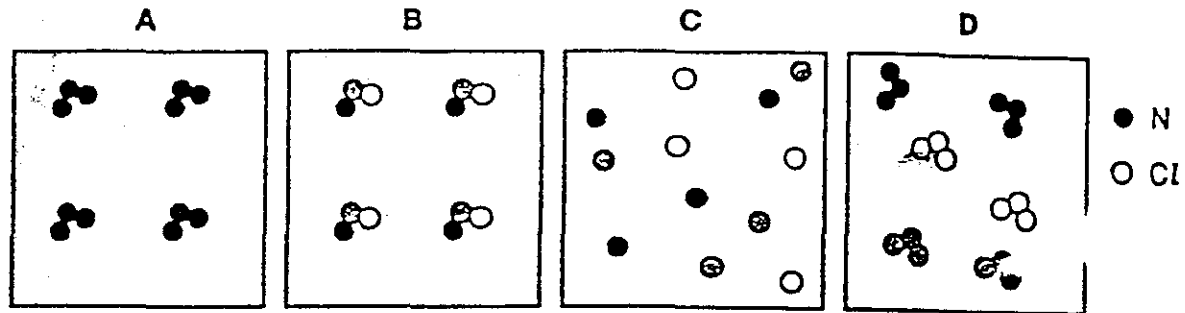


Which element is not present in the medicine?

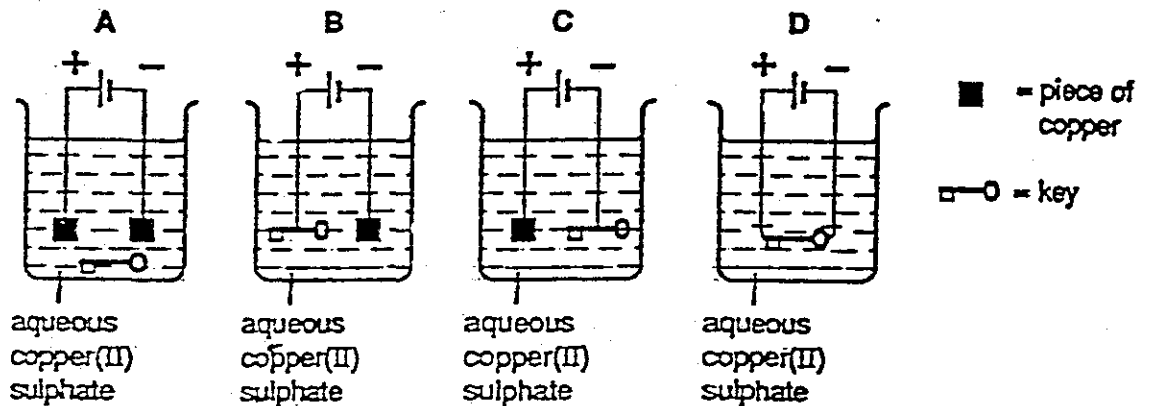
- A calcium
B carbon
C hydrogen
D manganese

12 A gas has the molecular formula NOCl

Which diagram shows molecules of the gas NOCl?



13 In which set of apparatus would the metal key be electroplated with copper?



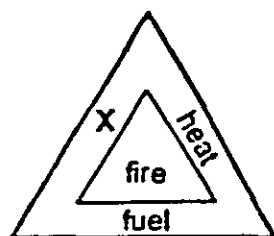
14 Which gas is produced at the negative electrode during the electrolysis of an acid?

- A chlorine
- B hydrogen
- C nitrogen
- D oxygen

15 Which method is used to obtain pure aluminium from aluminium oxide?

- A dissolving the oxide in an acid
- B electrolysis of the oxide
- C heating the oxide in air
- D heating the oxide with carbon

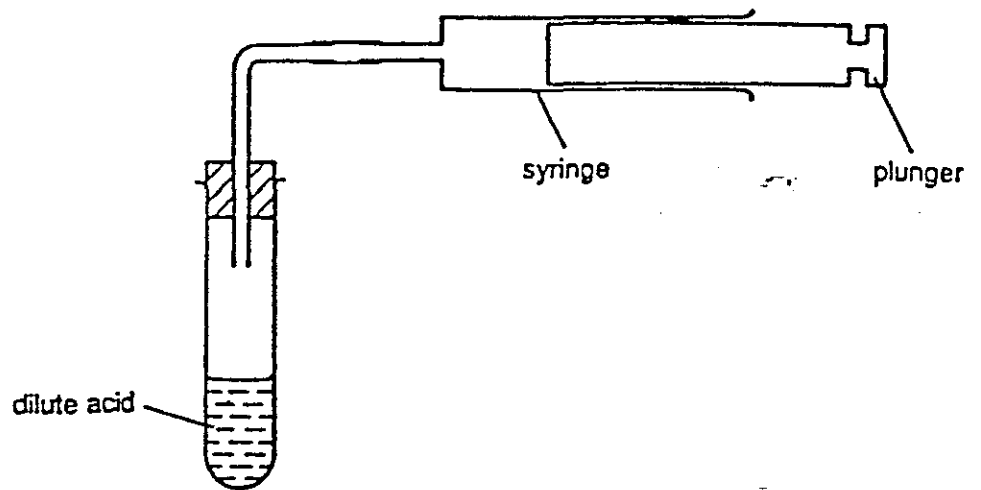
- 16 The diagram shows what is needed for a fire.



What is X?

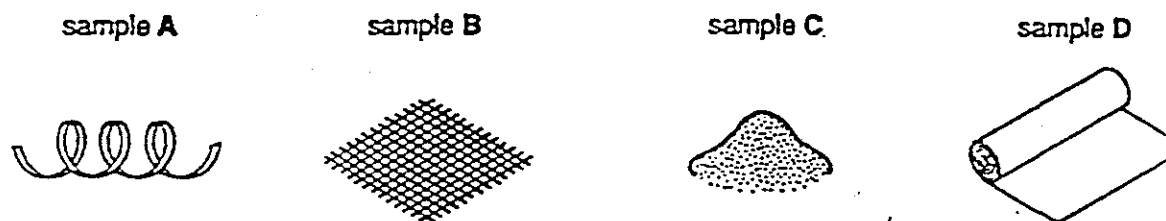
- A catalyst
 - B flame
 - C nitrogen
 - D oxygen
- 17 How can the speed of reaction between marble chips (calcium carbonate) and dilute nitric acid be increased?
- A by adding water to the acid
 - B by making the acid more concentrated
 - C by using a larger volume of acid
 - D by using larger limestone chips

- 18 A sample of magnesium was added to dilute acid in a test-tube connected to a syringe.



The experiment was repeated with different samples of magnesium.

Which sample caused the plunger of the syringe to move out most quickly?

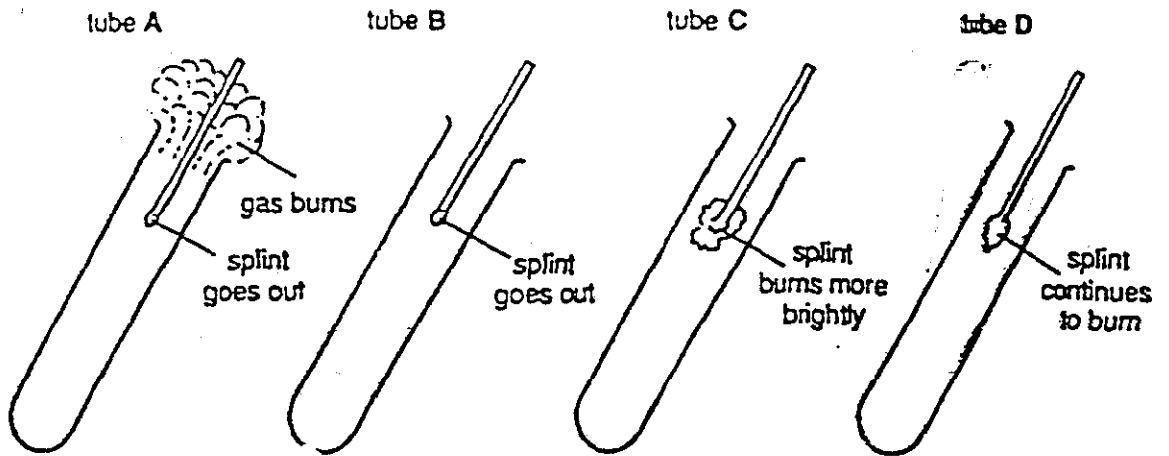


- 19 In which of the following does a chemical change take place?

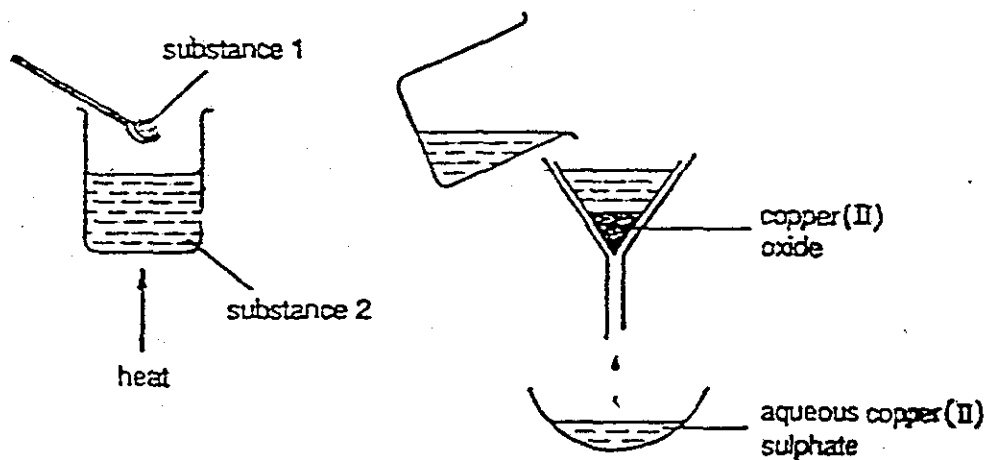
- A distillation
- B evaporation
- C filtration
- D neutralisation

20 A wooden splint is lit and used to test four gases as shown.

Which test-tube contained pure hydrogen?



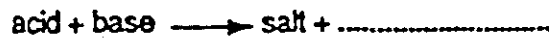
21 The diagrams show the stages in making a sample of aqueous copper(II) sulphate.



What are substances 1 and 2?

- | <i>substance 1</i> | <i>substance 2</i> |
|--------------------|--------------------------|
| A copper | dilute hydrochloric acid |
| B copper | dilute sulphuric acid |
| C copper(II) oxide | dilute hydrochloric acid |
| D copper(II) oxide | dilute sulphuric acid |

22 What is missing from the equation?



- A carbon dioxide
- B hydrogen
- C oxygen
- D water

23 A data book gives the following information about an element:

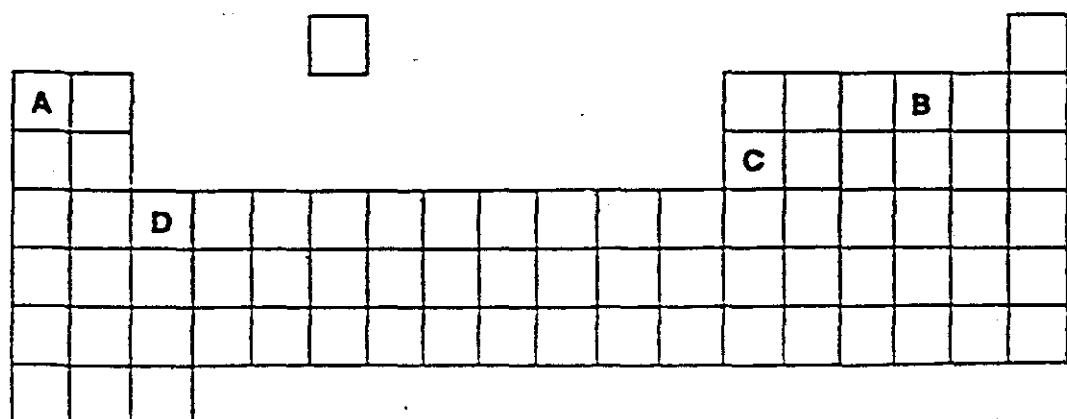
appearance	silver-grey solid
melting point	63 °C
density	0.86 g/cm ³
reaction with water.	vigorous reaction with cold water

Where is the element likely to be found in the Periodic Table?

- A Group 0
- B Group I
- C Group VII
- D transition elements

24 The diagram is an outline of the Periodic Table.

Which element is a non-metal?



25 Why is argon gas used to fill electric lamps?

- A It glows when heated.
- B It is less dense than air.
- C It is not reactive.
- D It occurs in the atmosphere.

26 The table shows the results of adding three metals to dilute hydrochloric acid and to water.

<i>metal</i>	<i>dilute hydrochloric acid</i>	<i>water</i>
<i>P</i>	hydrogen produced	hydrogen produced
<i>Q</i>	hydrogen produced	no reaction
<i>R</i>	no reaction	no reaction

What is the order of reactivity of the metals?

most reactive —————> *least reactive*

- A *P* *Q* *R*
- B *Q* *P* *R*
- C *Q* *R* *P*
- D *R* *Q* *P*

27 Which of the following is a property of all metals?

- A They conduct electricity.
- B They have a grey or silver colour.
- C They have high melting points.
- D They have low densities.

28 The table lists three ways of extracting metals.

<i>metal</i>	<i>description of extraction</i>
1	metal occurs naturally - purify only
2	electrolyse molten metal chloride
3	heat metal ore with carbon

Which of the following are the metals 1, 2 and 3?

- | | | |
|-------------|-----------|-----------|
| 1 | 2 | 3 |
| A gold | magnesium | iron |
| B iron | gold | magnesium |
| C iron | magnesium | gold |
| D magnesium | iron | gold |

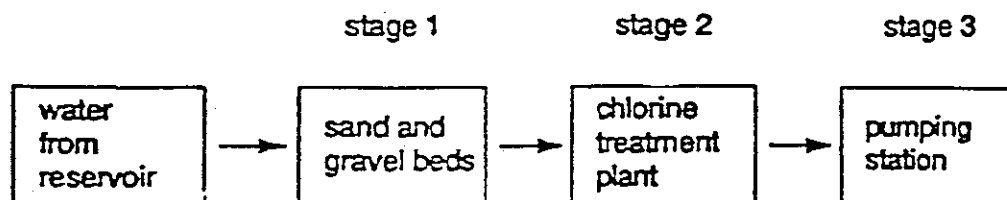
29 Three of the properties of aluminium alloys are shown.

- 1 low density
- 2 good electrical conductivity
- 3 high strength

Which properties are required for making aircraft?

- A 1 only B 2 only C 1 and 2 only D 1 and 3 only

30 The diagram shows stages in the purification of water.



Which process takes place in stage 1?

- A distillation
- B fermentation
- C filtration
- D neutralisation

- 31 The table shows the composition of air samples taken from four different sites.
Which site was closest to an oil-fired power station?

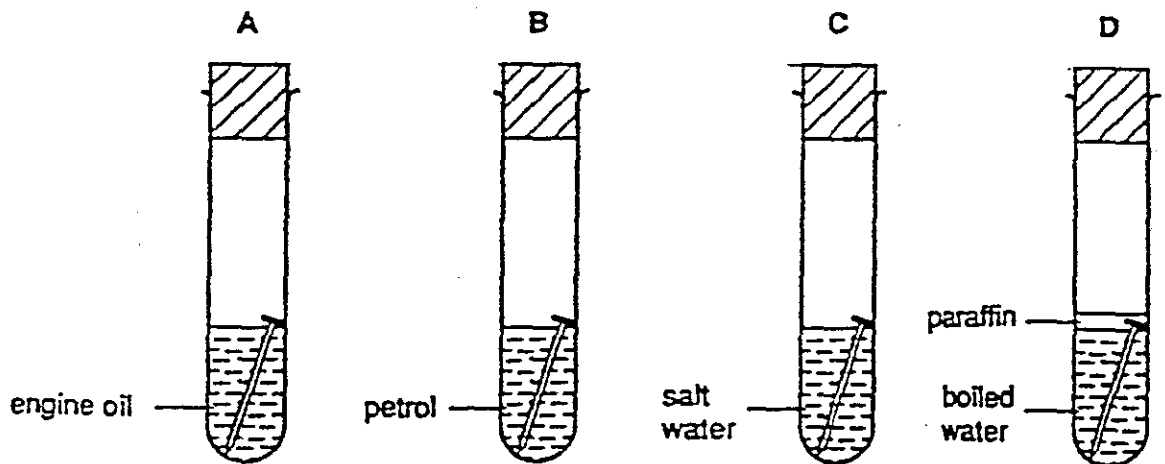
	<i>substance, percent by volume</i>		
<i>site</i>	<i>nitrogen</i>	<i>oxygen</i>	<i>other gases</i>
A	79	20	1
B	78	21	1
C	77	19	4
D	77	21	2

- 32 Which substance is not an atmospheric pollutant?

- A argon
- B carbon monoxide
- C an oxide of nitrogen
- D sulphur dioxide

- 33 Four iron nails were put into test-tubes as shown.

In which test-tube will the nail rust most in a week?

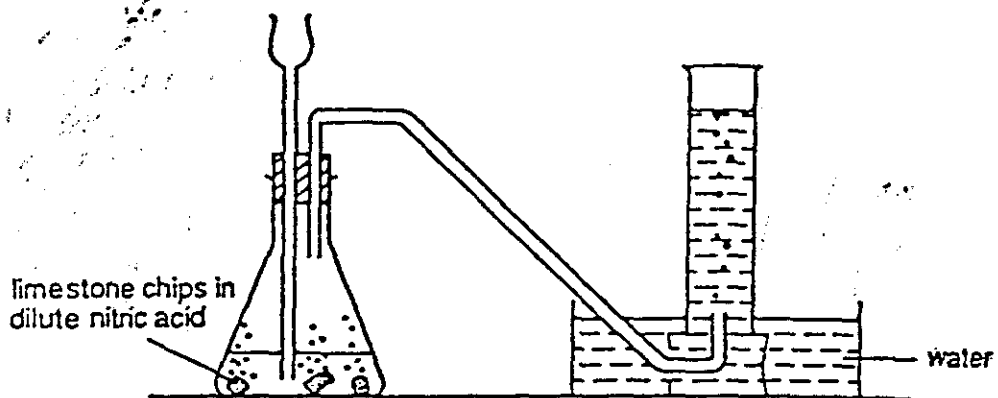


- 34 Nitrogen and phosphorus are plant nutrients.

Which fertiliser contains both these nutrients?

- A ammonium nitrate
- B ammonium phosphate
- C sodium nitrate
- D sodium phosphate

35 A student set up the apparatus as shown.

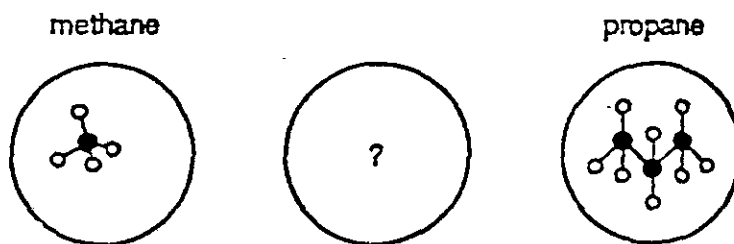


Which gas collects in the gas jar?

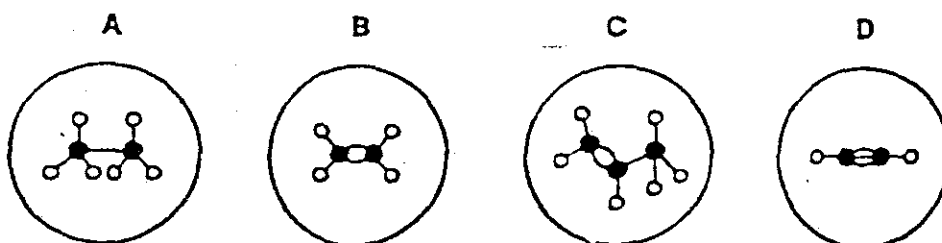
- A ammonia
 - B carbon dioxide
 - C hydrogen
 - D nitrogen
- 36 Both lime (calcium oxide) and cement are made from

- A clay.
- B haematite.
- C limestone.
- D sand.

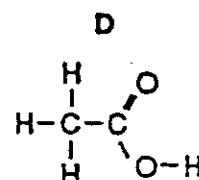
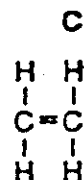
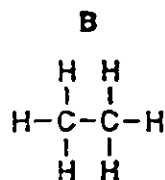
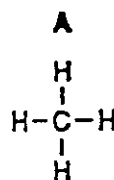
37 The diagram shows models for part of the series of hydrocarbons called the alkanes.



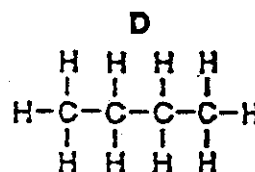
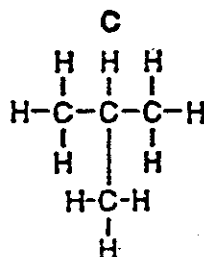
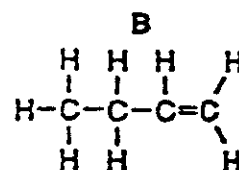
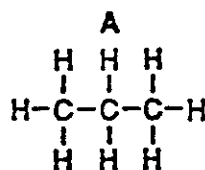
Which of the following is the missing model?



38 Which diagram shows the structure of the main gas present in natural gas?



39 Which hydrocarbon is unsaturated?



40 Which of the following shows all the elements present in ethanol?

- A carbon, hydrogen
- B carbon, hydrogen, nitrogen
- C carbon, hydrogen, oxygen
- D carbon, nitrogen, oxygen

19
DATE OF EXAM PAPER

IGCSE CHEMISTRY PAPER 1

CORRECT ANSWERS
48

%
SCORE

OBJECTIVE TEST

PRACTICE ANSWER SHEET

Your name _____

Time : 45 minutes

Date / / 199

- | | | | |
|----|-------------------------|----|-------------------------|
| 1 | < A > < B > < C > < D > | 21 | < A > < B > < C > < D > |
| 2 | < A > < B > < C > < D > | 22 | < A > < B > < C > < D > |
| 3 | < A > < B > < C > < D > | 23 | < A > < B > < C > < D > |
| 4 | < A > < B > < C > < D > | 24 | < A > < B > < C > < D > |
| 5 | < A > < B > < C > < D > | 25 | < A > < B > < C > < D > |
| 6 | < A > < B > < C > < D > | 26 | < A > < B > < C > < D > |
| 7 | < A > < B > < C > < D > | 27 | < A > < B > < C > < D > |
| 8 | < A > < B > < C > < D > | 28 | < A > < B > < C > < D > |
| 9 | < A > < B > < C > < D > | 29 | < A > < B > < C > < D > |
| 10 | < A > < B > < C > < D > | 30 | < A > < B > < C > < D > |
| 11 | < A > < B > < C > < D > | 31 | < A > < B > < C > < D > |
| 12 | < A > < B > < C > < D > | 32 | < A > < B > < C > < D > |
| 13 | < A > < B > < C > < D > | 33 | < A > < B > < C > < D > |
| 14 | < A > < B > < C > < D > | 34 | < A > < B > < C > < D > |
| 15 | < A > < B > < C > < D > | 35 | < A > < B > < C > < D > |
| 16 | < A > < B > < C > < D > | 36 | < A > < B > < C > < D > |
| 17 | < A > < B > < C > < D > | 37 | < A > < B > < C > < D > |
| 18 | < A > < B > < C > < D > | 38 | < A > < B > < C > < D > |
| 19 | < A > < B > < C > < D > | 39 | < A > < B > < C > < D > |
| 20 | < A > < B > < C > < D > | 40 | < A > < B > < C > < D > |

EXAM28AC

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

CHEMISTRY

0620/1

PAPER 1 Multiple Choice

Tuesday 14 NOVEMBER 1995 Afternoon 45 minutes

Additional materials:

Mathematical tables

Multiple Choice answer sheet

Soft clean eraser

Soft pencil (type B or HB is recommended)

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are forty questions in this paper. Answer all questions. For each question there are four possible answers, A, B, C and D. Choose the one you consider correct and record your choice in soft pencil on the separate answer sheet.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

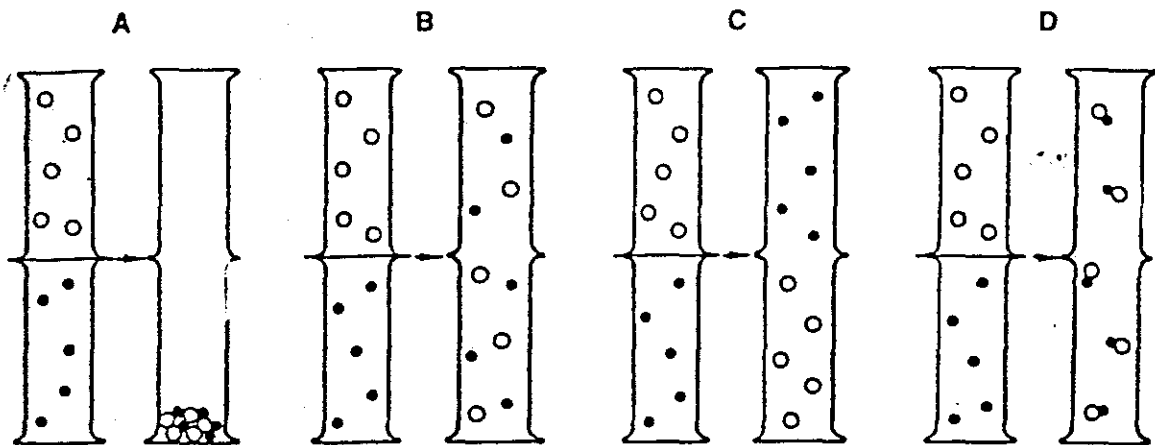
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

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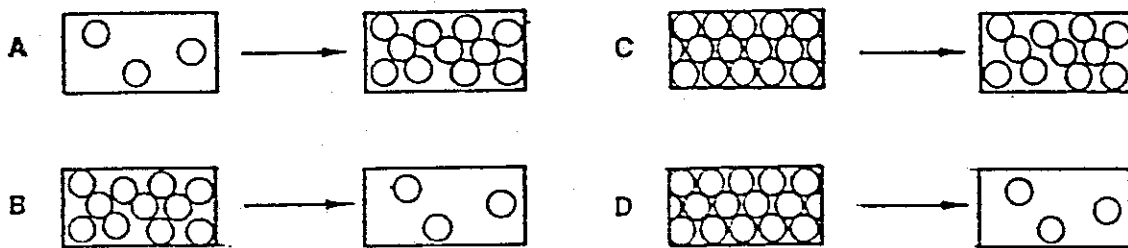
A copy of the Periodic Table is printed on page 16.

This question paper consists of 16 printed pages.

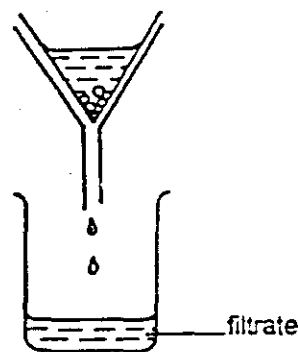
1 Which diagram shows the mixing of two gases by diffusion?



2 Which diagram best represents melting?



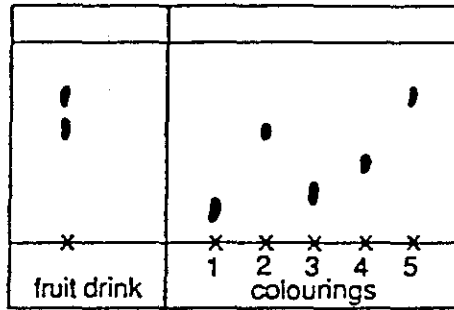
3 A student separated sugar from pieces of broken glass by dissolving the sugar in water and filtering off the broken glass.



What is the filtrate?

- A broken glass
- B broken glass and sugar solution
- C pure water
- D sugar solution

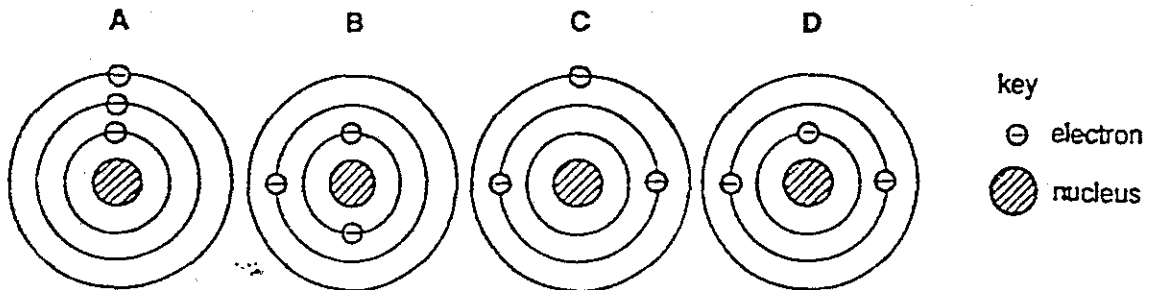
4 The diagram shows a chromatogram used to find out which colourings are in a fruit drink.



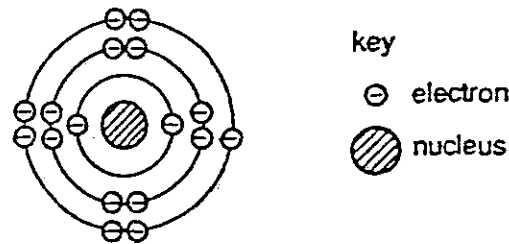
Which two colourings are in the fruit drink?

- A 1 and 4 B 1 and 5 C 2 and 3 D 2 and 5

5 Which diagram represents the electronic structure of an atom of lithium?



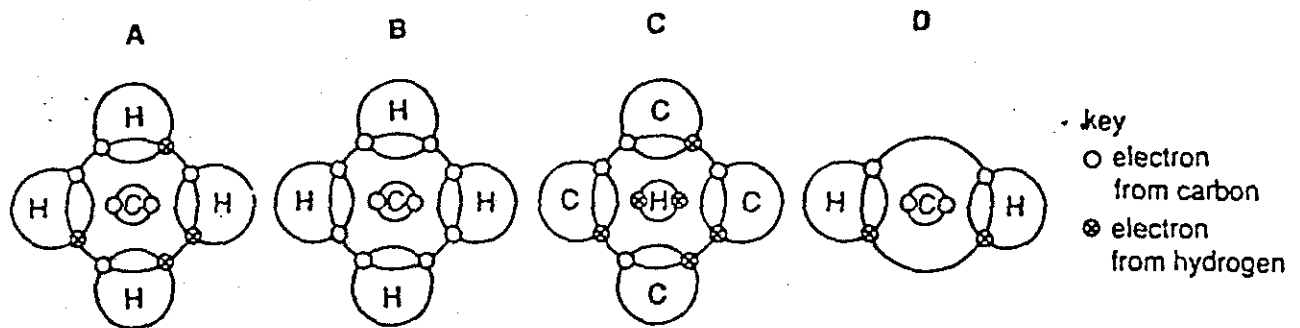
6 An atom of element, X, has the electronic structure shown.



In which Group of the Periodic Table is X found?

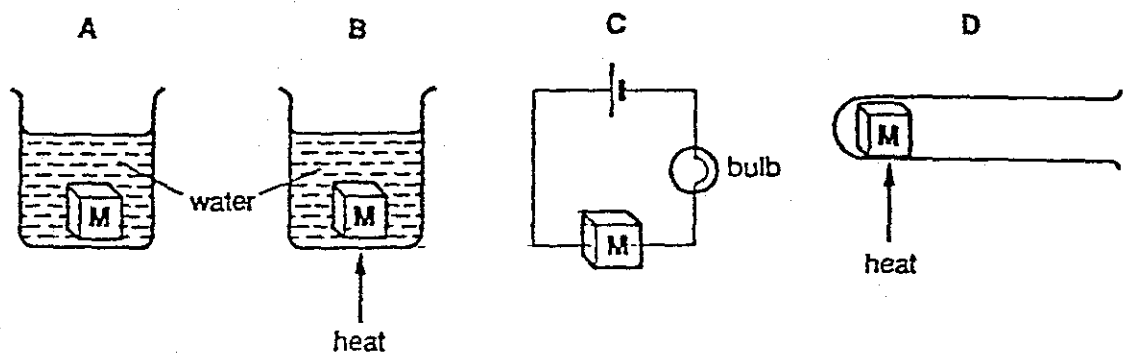
- A I B II C III D VII

7 Which diagram represents methane?



8 A cube of substance *M* has a silvery surface.

Which diagram shows a method to prove that *M* is a metal?

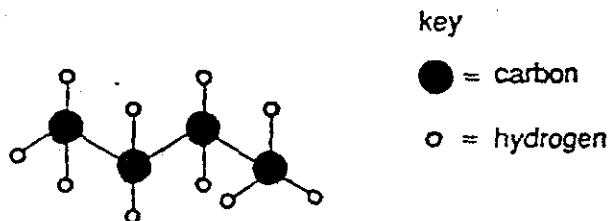


9 A molecule contains one atom of arsenic, As, and three atoms of hydrogen.

What is the formula of this molecule?

- A AsH_3 B As_3H C 3AsH D $(\text{AsH})_3$

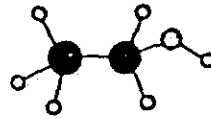
10 The diagram shows a model of a molecule.



What is the formula of the molecule?

- A C_2H_5 B C_4H_{10} C C_8H_4 D C_{10}H_4

- 11 The model shown represents ethanol.



key

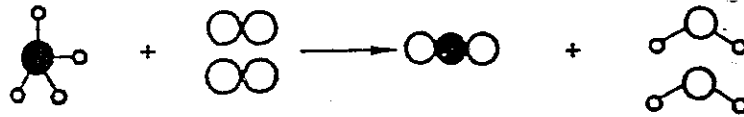
● = carbon

○ = oxygen

○ = hydrogen

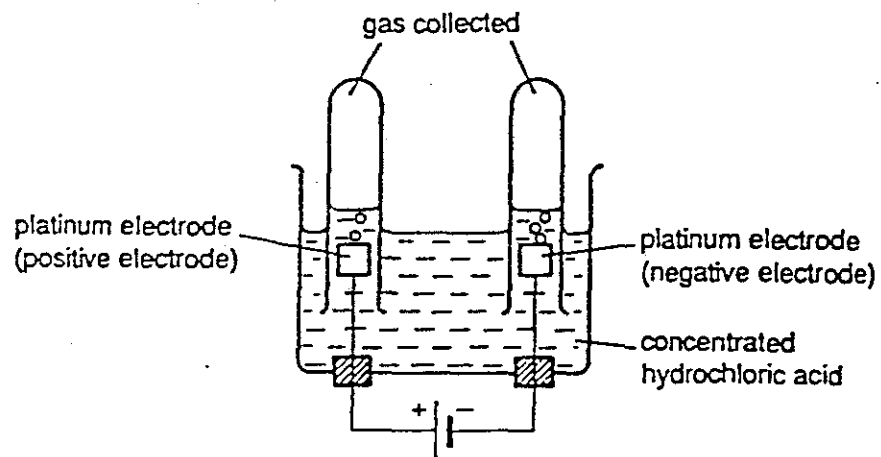
What is the relative molecular mass, M_r , of ethanol?

- A 9 B 26 C 40 D 46
- 12 The diagram represents methane burning in oxygen.



Which equation represents this reaction?

- A $\text{CH}_4 + \text{O}_2 \longrightarrow \text{CO}_2 + \text{H}_2\text{O}$
- B $\text{CH}_4 + 2\text{O}_2 \longrightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
- C $\text{CH}_4 + \text{CO}_2 \longrightarrow 2\text{C} + 2\text{H}_2\text{O}$
- D $\text{CH}_4 + 2\text{H}_2\text{O} \longrightarrow \text{CO}_2 + \text{H}_2$
- 13 The diagram shows the electrolysis of concentrated hydrochloric acid.



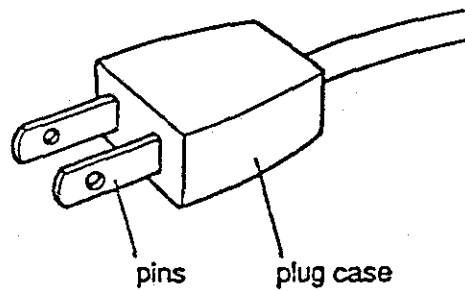
Which gas is produced at the positive electrode?

- A chlorine
- B hydrogen
- C hydrogen chloride
- D oxygen

14 The table shows some properties of four materials.

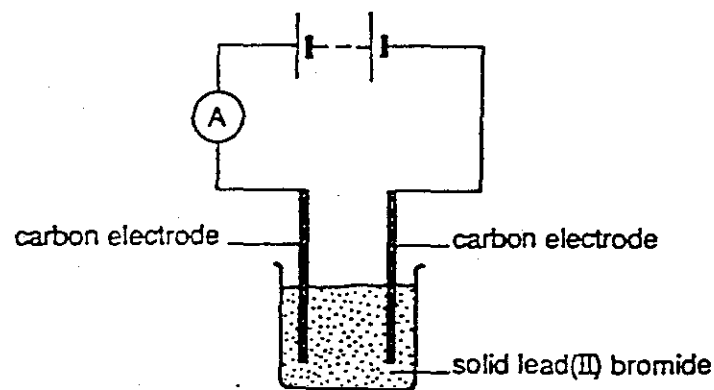
material	melting point / °C	electrical conductivity when solid
W	-39	good
X	-20 to -10	poor
Y	170 to 220	poor
Z	1083	good

Which of these materials are most suitable to make the pins and case of an electric plug?



	<i>pins</i>	<i>case</i>
A	W	X
B	X	Z
C	Y	W
D	Z	Y

15 The diagram shows apparatus used to test whether lead(II) bromide can conduct electricity.



Using the apparatus as shown, there was no electric current in the circuit.

What is the most likely explanation for this?

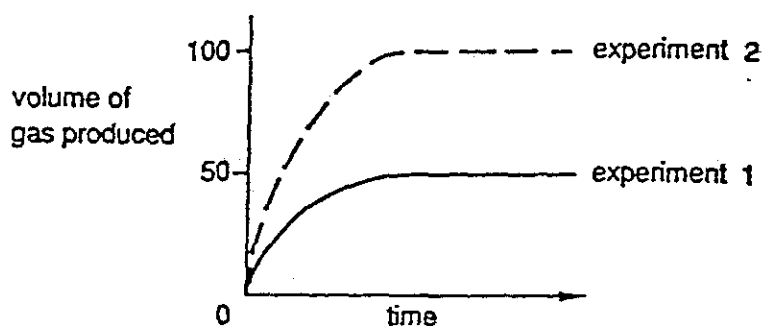
- A Carbon does not conduct electricity.
- B The battery is incorrectly connected.
- C The lead(II) bromide is in the solid state.
- D There is not enough lead(II) bromide.

16 Which gas is released when magnesium reacts with hydrochloric acid?

- A carbon dioxide
- B chlorine
- C hydrogen
- D oxygen

17 Excess acid was added to calcium carbonate in two experiments and the volume of carbon dioxide gas produced was measured every minute.

The graph shows the results.



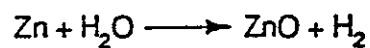
Compared with experiment 1, experiment 2 was carried out using

- A a lower temperature.
- B larger pieces of calcium carbonate.
- C twice as much acid.
- D twice as much calcium carbonate.

18 Which gas burns in air?

- A argon
- B carbon dioxide
- C hydrogen
- D oxygen

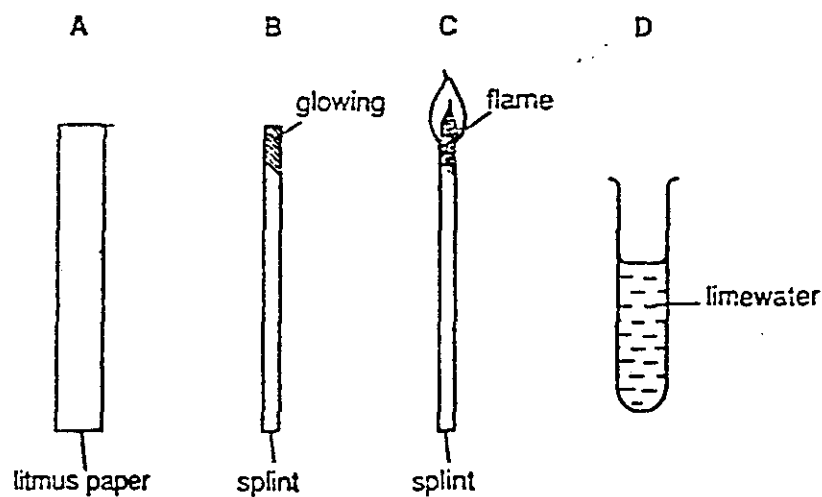
19 Zinc reacts with steam to form zinc oxide and hydrogen.



Which substance has been oxidised?

- A hydrogen
- B water
- C zinc
- D zinc oxide

20 Which piece of equipment can be used to show that a gas is oxygen?



21 Which substance can neutralise hydrochloric acid?

- A ammonia
- B carbon dioxide
- C litmus solution
- D water

22 Which aqueous metal ion gives a blue precipitate with aqueous sodium hydroxide?

- A Al^{3+} B Ca^{2+} C Cu^{2+} D Fe^{3+}

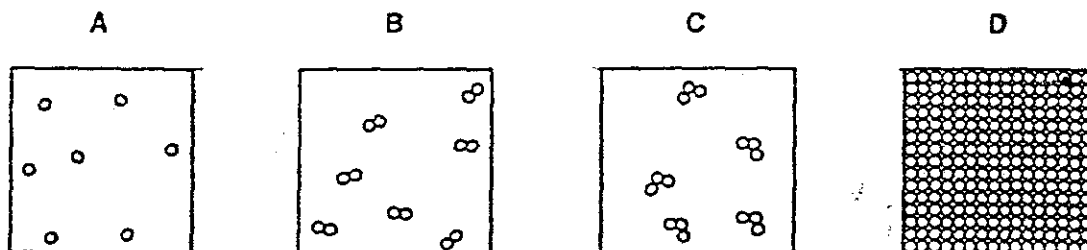
23 The table gives information about four elements.

Which element is a transition metal?

element	melting point / °C	density / g per cm ³	electrical conductivity
A	-7	3.12	poor
B	98	0.97	good
C	1410	2.33	poor
D	1535	7.86	good

24 In the diagrams, each circle represents one atom.

Which diagram could represent molecules of chlorine gas?

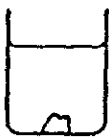

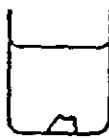

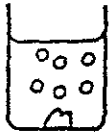



25 The table shows some properties of four gases.

Which gas is most suitable for filling weather balloons?

gas	density compared with air	chemical reactivity
A	less dense than air	explosive
B	less dense than air	unreactive
C	more dense than air	explosive
D	more dense than air	unreactive

- 26 The diagrams show what happens when metals X, Y and Z are placed in cold water and in dilute hydrochloric acid.

liquid	metal X	metal Y	metal Z
water			
dilute hydrochloric acid			

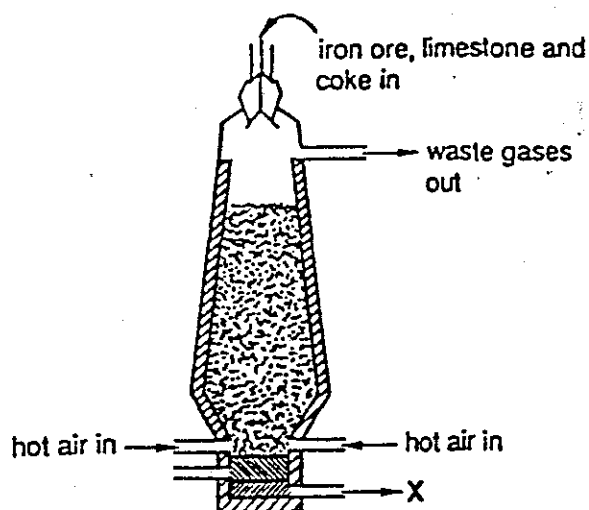
What is the order of reactivity of the metals?

most reactive \longrightarrow least reactive

- A X Y Z
 B X Z Y
 C Y X Z
 D Y Z X
- 27 Which of the following is a list of three non-metals?
- A aluminium, calcium, magnesium
 B carbon, hydrogen, nitrogen
 C chlorine, nitrogen, potassium
 D hydrogen, magnesium, potassium
- 28 For which metal are the use and the property correctly linked?

metal	use	reason
A aluminium	car bodies	light and strong
B aluminium	food containers	light and resists corrosion
C mild steel	aircraft	strong and doesn't corrode
D stainless steel	cutlery	strong and cheap

29 The diagram shows a blast furnace.

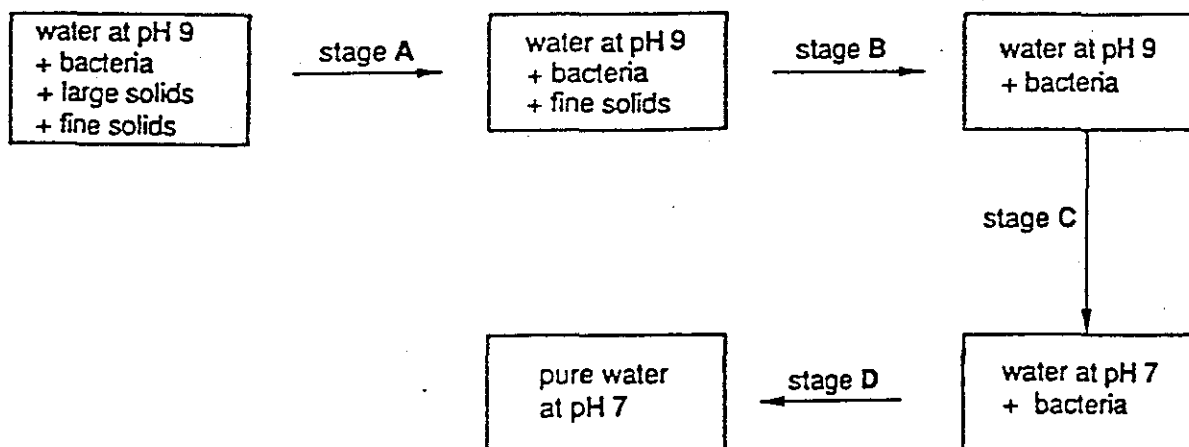


What leaves the furnace at X?

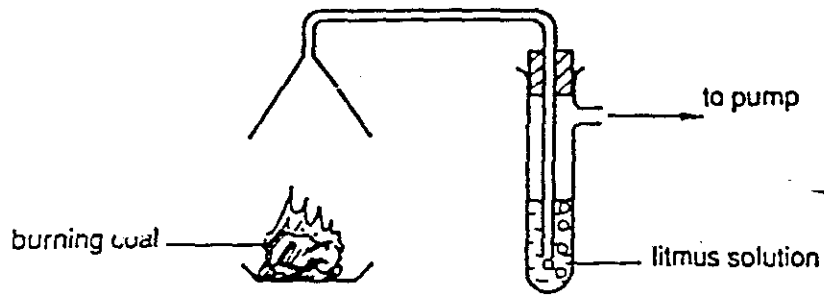
- A carbon dioxide
- B iron
- C slag
- D sulphur dioxide

30 The diagram shows stages in the purification of water.

Which stage uses chlorine?



31 The apparatus shown was used to test the gases formed when coal is burned.



The litmus solution turned red.

Which gas caused this change?

- A ammonia
- B chlorine
- C nitrogen
- D sulphur dioxide

32 A car owner noticed that the paint had been chipped, exposing the steel.



Which treatment would not prevent the steel from rusting?

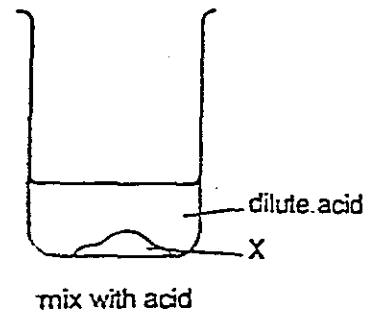
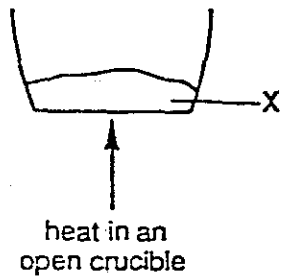
- A painting the surface
- B putting grease on the surface
- C sealing the surface with plastic
- D washing the surface with water

- 33 To grow potatoes, a fertiliser which is high in potassium, and also contains nitrogen and phosphorus is required.

Which fertiliser should be used to grow potatoes?

fertiliser	percentage by mass		
	nitrogen	phosphorus	potassium
A	29	13	0
B	29	5	6
C	13	13	20
D	9	0	20

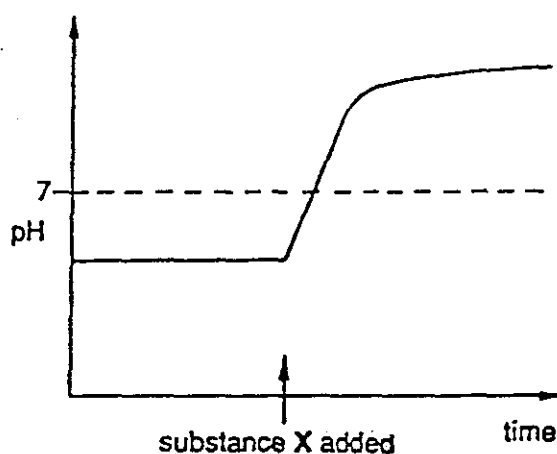
- 34 The diagram shows two experiments in which carbon dioxide is formed.



What is X?

- A calcium carbonate
- B candle wax
- C carbon
- D copper(II) oxide

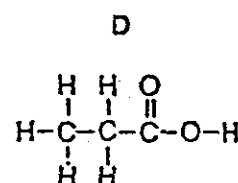
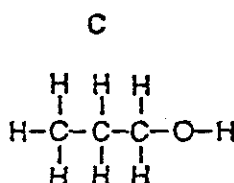
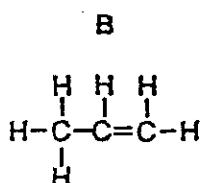
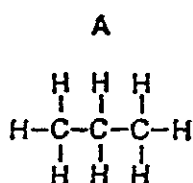
35 The graph shows how the pH of an industrial waste changed when treated with substance X.



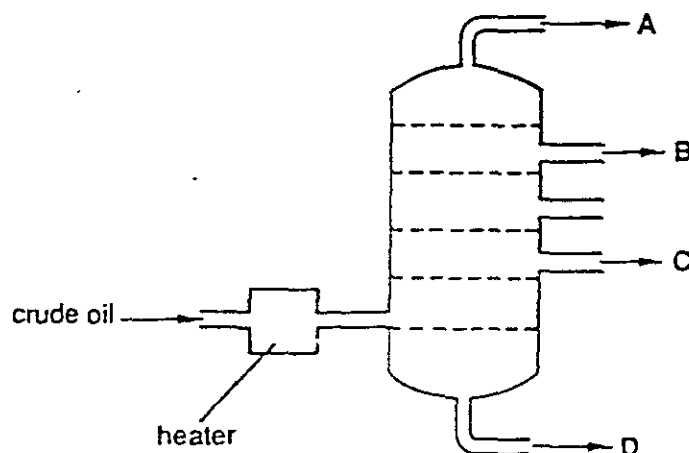
Which of the following must be substance X?

- A coal
- B lime
- C salt
- D water

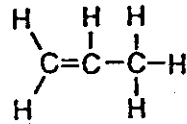
36 Which structural formula is that of an alkene?



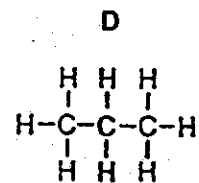
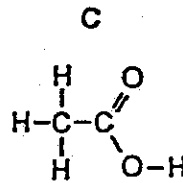
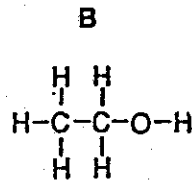
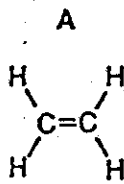
37 From which level, in the fractionating column, is a substance used for making roads obtained?



38 The diagram represents a propene molecule.



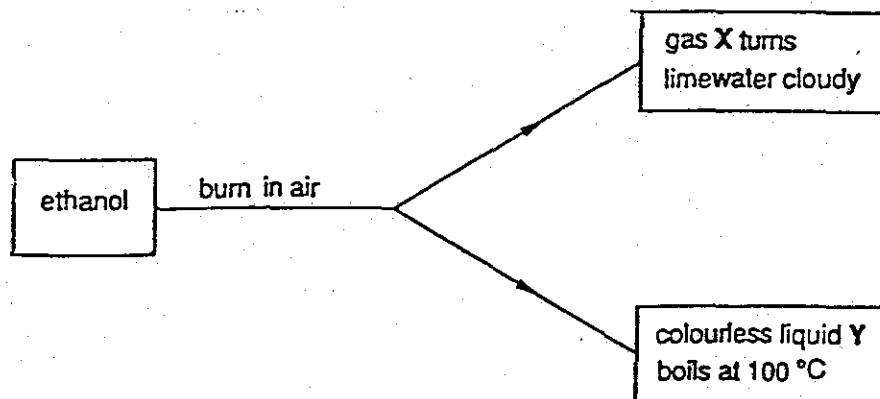
Which structure is that of a compound in the same homologous series?



39 Which of the following compounds can be polymerised?

- A ethanol
- B ethene
- C methane
- D methanol

40 The diagram gives information about the burning of ethanol.



What are X and Y?

- | X | Y |
|-------------------|-----------------|
| A carbon | hydrogen |
| B carbon dioxide | carbon monoxide |
| C carbon dioxide | water |
| D carbon monoxide | water |

<u>19</u> DATE OF EXAM PAPER

IGCSE CHEMISTRY PAPER 1

OBJECTIVE TEST

PRACTICE ANSWER SHEET

CORRECT ANSWERS <u>48</u>

% SCORE

Your name _____

Time : 45 minutes

Date / / 199

- 1 < A > < B > < C > < D >
- 2 < A > < B > < C > < D >
- 3 < A > < B > < C > < D >
- 4 < A > < B > < C > < D >
- 5 < A > < B > < C > < D >

- 21 < A > < B > < C > < D >
- 22 < A > < B > < C > < D >
- 23 < A > < B > < C > < D >
- 24 < A > < B > < C > < D >
- 25 < A > < B > < C > < D >

- 6 < A > < B > < C > < D >
- 7 < A > < B > < C > < D >
- 8 < A > < B > < C > < D >
- 9 < A > < B > < C > < D >
- 10 < A > < B > < C > < D >

- 26 < A > < B > < C > < D >
- 27 < A > < B > < C > < D >
- 28 < A > < B > < C > < D >
- 29 < A > < B > < C > < D >
- 30 < A > < B > < C > < D >

- 11 < A > < B > < C > < D >
- 12 < A > < B > < C > < D >
- 13 < A > < B > < C > < D >
- 14 < A > < B > < C > < D >
- 15 < A > < B > < C > < D >

- 31 < A > < B > < C > < D >
- 32 < A > < B > < C > < D >
- 33 < A > < B > < C > < D >
- 34 < A > < B > < C > < D >
- 35 < A > < B > < C > < D >

- 16 < A > < B > < C > < D >
- 17 < A > < B > < C > < D >
- 18 < A > < B > < C > < D >
- 19 < A > < B > < C > < D >
- 20 < A > < B > < C > < D >

- 36 < A > < B > < C > < D >
- 37 < A > < B > < C > < D >
- 38 < A > < B > < C > < D >
- 39 < A > < B > < C > < D >
- 40 < A > < B > < C > < D >

EXAMPAC

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

CHEMISTRY
PAPER 1 Multiple Choice

0620/1

Thursday **16 MAY 1998** Morning 45 minutes

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Soft pencil (type B or HB is recommended)

TIME 45 minutes

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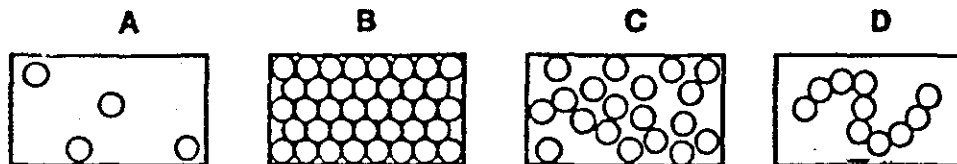
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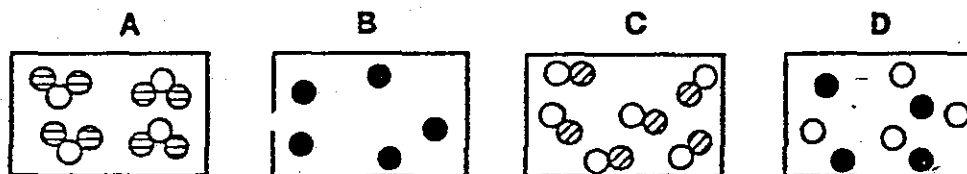
65

1 Which diagram of particles represents a gas?

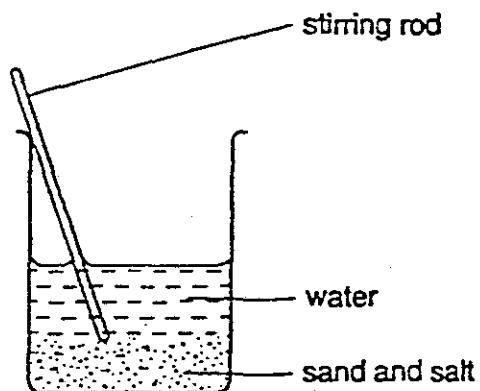


2 In the diagrams, \ominus \circ and \bullet represent different atoms.

Which diagram represents a mixture of atoms?



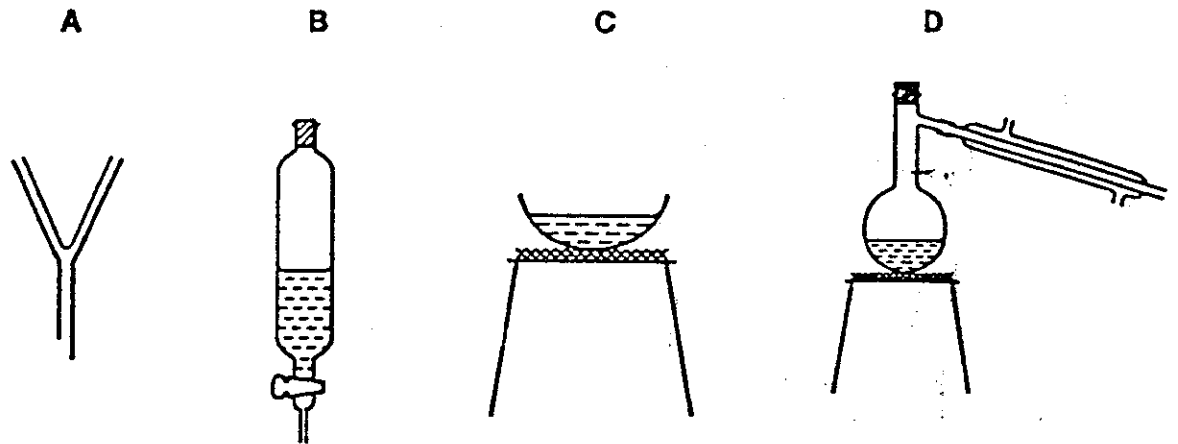
3 The diagram shows the first step in separating sand from salt.



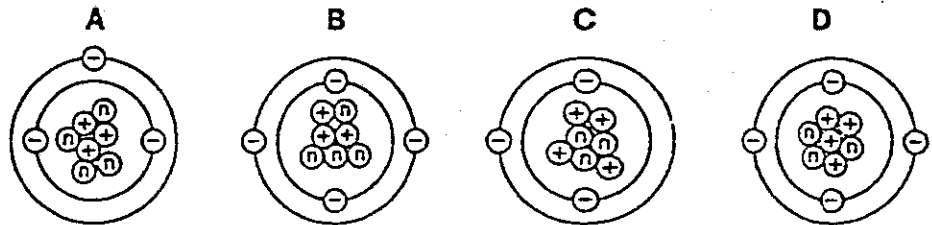
What is the next step?

- A evaporate the water
- B filter the mixture
- C freeze the mixture
- D make a chromatogram

4 Which apparatus can be used to obtain a pure sample of water from sea water?

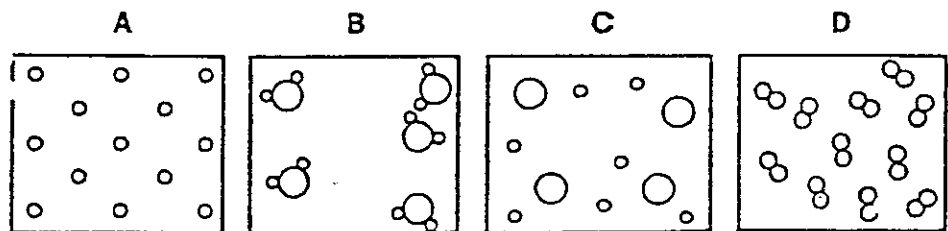


5 Which diagram correctly shows a lithium atom?

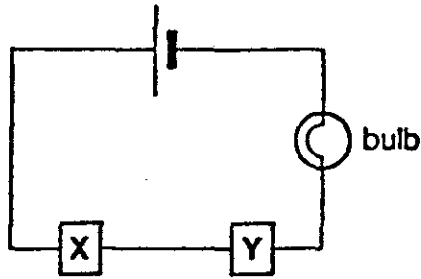


6 In the diagrams, different size circles represent atoms of different elements.

Which diagram represents chlorine gas?



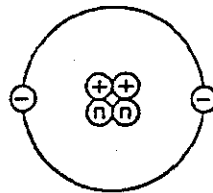
7 The diagram shows an electric circuit.



Which two substances at X and Y would make the bulb light up?

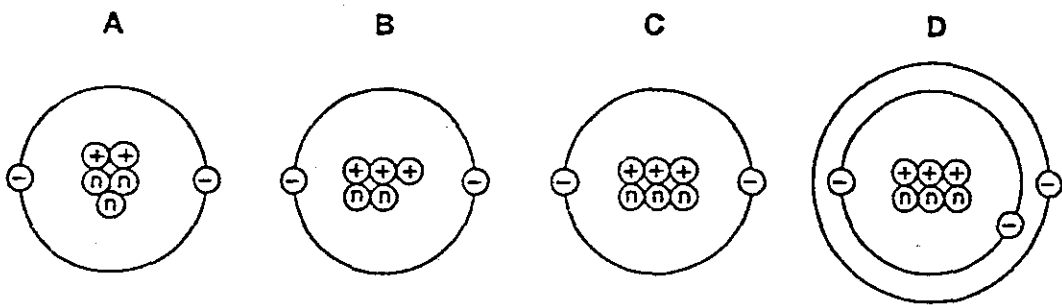
- | | X | Y |
|---|--------|--------------|
| A | copper | graphite |
| B | copper | poly(ethene) |
| C | rubber | graphite |
| D | wood | aluminium |

8 The diagram shows the structure of an atom.



- ⊕ is a proton
- Ⓝ is a neutron
- ⊖ is an electron

Which diagram shows the structure of an isotope of this atom?



- 9 Which row of symbols is correct for copper, chlorine and carbon?

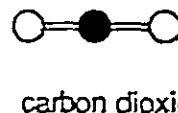
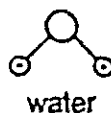
row	copper	chlorine	carbon
A	C	Cl	Ca
B	Cr	C	Co
C	Cu	Cl	C
D	Cu	Cr	C

- 10 A word equation is shown below.

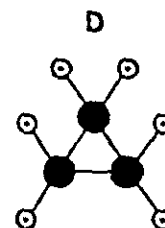
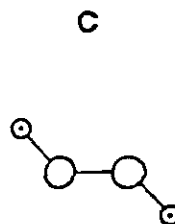
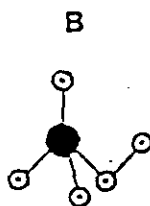
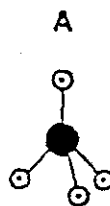


What is the symbol equation for this reaction?

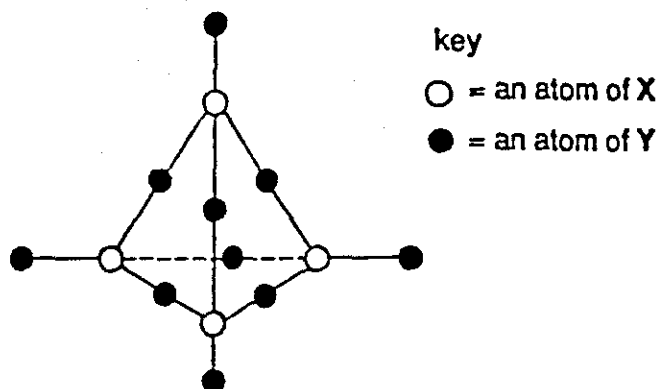
- A $\text{Zn} + \text{HCl} \longrightarrow \text{ZnCl}_2 + \text{H}_2$
 B $\text{Zn} + 2\text{HCl} \longrightarrow \text{ZnCl}_2 + \text{H}_2$
 C $2\text{Zn} + \text{HCl} \longrightarrow \text{ZnCl}_2 + \text{H}_2$
 D $2\text{Zn} + 2\text{HCl} \longrightarrow \text{ZnCl}_2 + \text{H}_2$
- 11 The diagrams show models of a water molecule, H_2O , and of a carbon dioxide molecule, CO_2 .



Which diagram represents a molecule of methane?

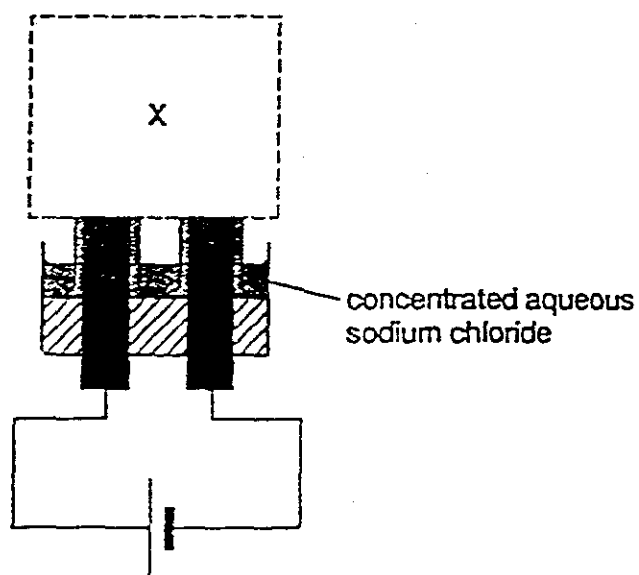


- 12 The diagram shows a model of one molecule of a compound.

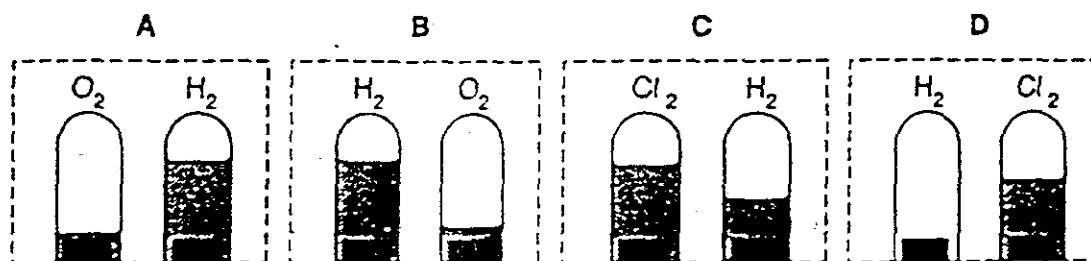


What is the molecular formula of the compound?

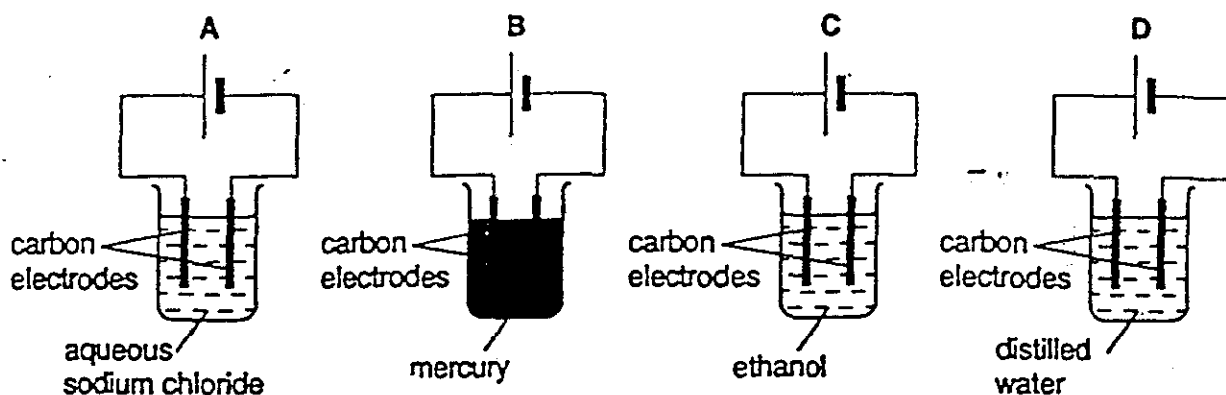
- A X_2Y_5 B X_5Y_2 C X_4Y_{10} D $X_{10}Y_4$
- 13 The diagram shown is not complete.



Which of the following should appear at X when the solution has been electrolysed for some time?

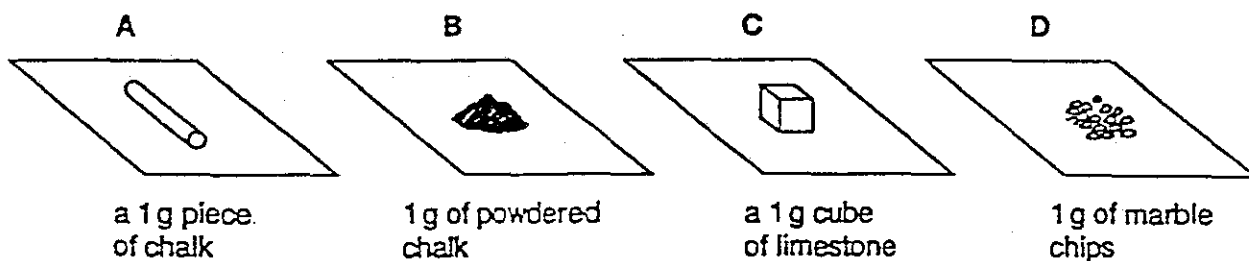


14 Which diagram shows a beaker in which electrolysis takes place?

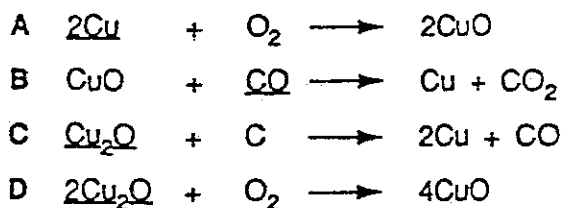


15 Chalk, limestone and marble are all forms of calcium carbonate.

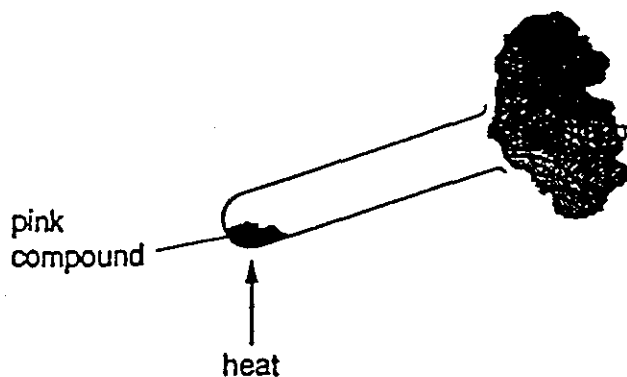
Which diagram shows calcium carbonate in the form that reacts most quickly with dilute hydrochloric acid?



16 In which reaction is the underlined substance being reduced?



- 17 A pink compound was heated as shown.



It changed colour from pink to blue. After cooling water was added to the contents of the test-tube and the pink colour returned.

Which term describes the change that took place?

- A combustion
 - B cracking
 - C neutralisation
 - D reversible
- 18 Iron filings and sulphur are mixed in a test-tube and heated with a Bunsen burner. The reaction mixture continues to glow even when the Bunsen burner is removed.
- Which type of reaction is taking place?
- A endothermic
 - B exothermic
 - C neutralisation
 - D precipitation
- 19 A compound is a salt if it
- A can neutralise an acid.
 - B dissolves in water.
 - C contains more than one element.
 - D is a product of the reaction between an acid and a base.

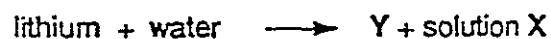
20 Which of the following is a property of all acids?

- A They are solid at room temperature.
- B Their aqueous solutions have a pH greater than 7.
- C They react with copper to give hydrogen.
- D They react with bases.

21 Which three steps are needed to make sodium sulphate crystals from aqueous sodium hydroxide and dilute sulphuric acid?

- | | <i>first step</i> | <i>second step</i> | <i>third step</i> |
|---|-------------------|--------------------|-------------------|
| A | evaporation | crystallisation | neutralisation |
| B | evaporation | neutralisation | crystallisation |
| C | neutralisation | crystallisation | evaporation |
| D | neutralisation | evaporation | crystallisation |

22 In the following reaction, gas Y is released.



What is gas Y?

- A carbon dioxide
- B hydrogen
- C nitrogen
- D oxygen

23 The table shows the density of four noble gases.

Which gas is most suitable for filling weather balloons?

	<i>gas</i>	<i>density</i>
A	argon	0.00166 g/cm ³
B	helium	0.00016 g/cm ³
C	neon	0.00084 g/cm ³
D	krypton	0.00346 g/cm ³

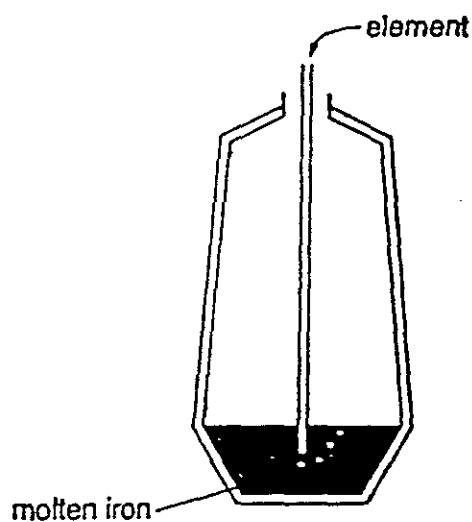
- 24 The chart shows part of the Periodic Table. The elements X, Y and Z all have proton (atomic) numbers of less than 20.

Which statement is correct?

- A The proton number of X is the same as that of Z.
 B The proton number of Z is three more than that of X.
 C The proton number of Y is one more than that of X.
 D The proton number of Y is eight less than that of X.
- 25 Which metal reacts most quickly with water?
- A copper
 B magnesium
 C potassium
 D zinc
- 26 Which metal in the table is most likely to be aluminium?

metal	density	resistance to corrosion	appearance of clean metal
A	low	high	dull
B	low	high	silvery
C	high	low	dull
D	high	low	silvery

27 The diagram shows how impure iron is changed to steel.



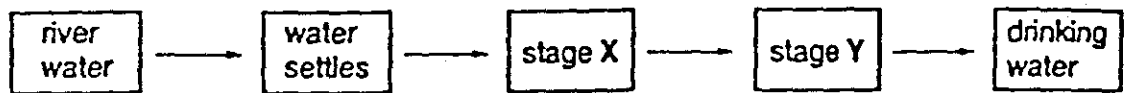
Which element is passed down the tube into the molten iron?

- A chlorine
- B oxygen
- C silicon
- D sulphur

28 Which entry in the table, correctly links the property and use of the metal?

<i>metal</i>	<i>property</i>	<i>use</i>
A aluminium	conducts electricity	making aeroplanes
B aluminium	resists corrosion	making food containers
C mild steel	conducts electricity	making garden tools
D mild steel	high density	making car bodies

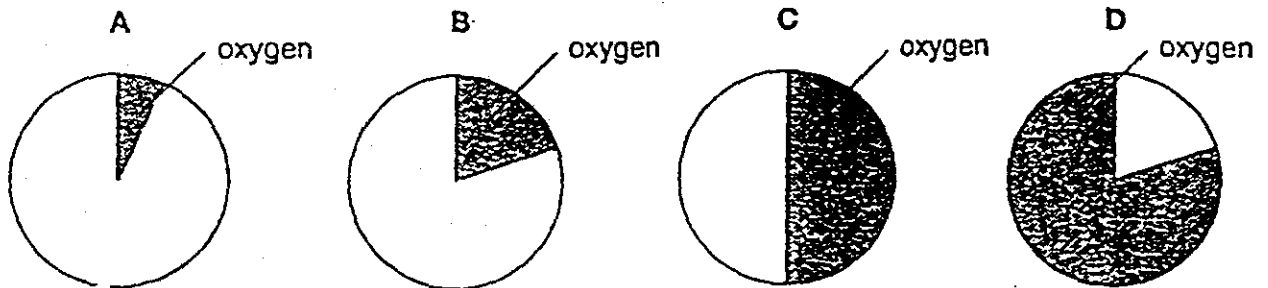
29 The flow chart shows stages in the treatment of river water to produce drinking water.



What occurs at stages X and Y?

- | X | Y |
|-------------------|--------------|
| A crystallisation | distillation |
| B distillation | chlorination |
| C filtration | chlorination |
| D filtration | distillation |

30 Which pie chart shows the proportion of oxygen in air? -



31 Which gas is the main cause of damage to stonework on buildings?

- A carbon dioxide
- B carbon monoxide
- C nitrogen
- D sulphur dioxide

32 A man wants to buy nails to mend the fence outside his house.

He chooses galvanised nails.

Why are galvanised steel nails better than steel?

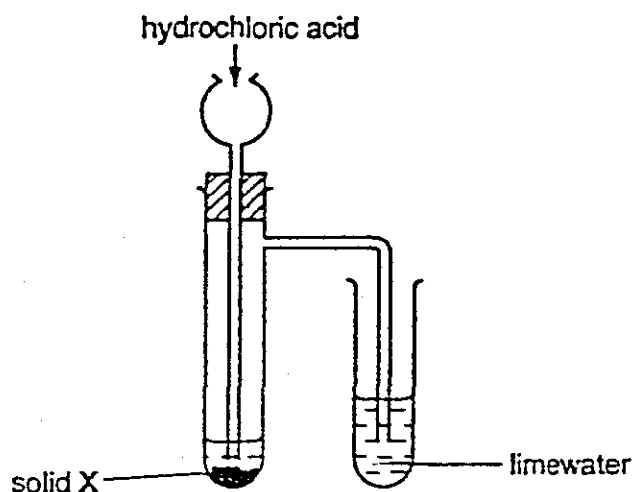
- A They are good conductors of electricity.
- B They are shiny.
- C They bend easily.
- D They do not rust.

33 The three essential elements in fertilisers are nitrogen, phosphorus and potassium.

Which compound provides two of these essential elements?

- A - ammonium nitrate
- B ammonium sulphate
- C calcium phosphate
- D potassium nitrate

34 Hydrochloric acid is added to solid X in the apparatus as shown.

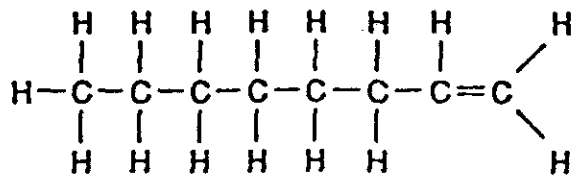


The limewater turns cloudy.

What is X?

- A magnesium
 - B magnesium carbonate
 - C magnesium chloride
 - D magnesium oxide
- 35 Which of the following is an industrial use of calcium carbonate?
- A cracking of hydrocarbons
 - B manufacture of aluminium
 - C manufacture of cement
 - D purification of water

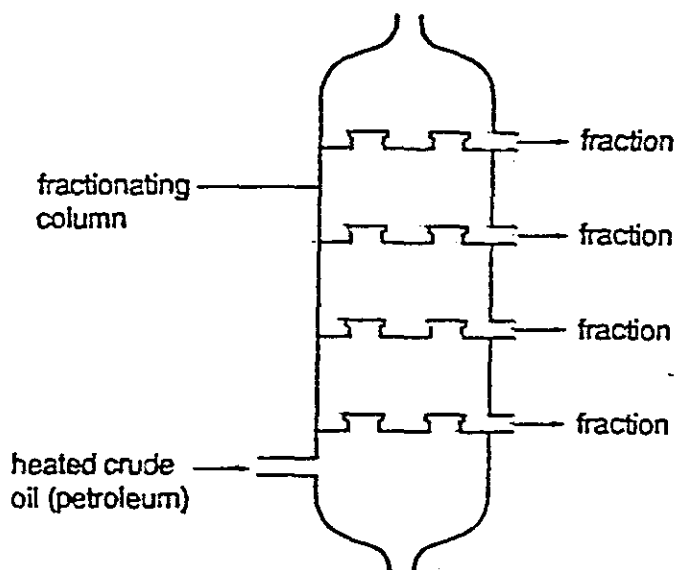
36 The structure of an organic compound is shown.



To which homologous series does this compound belong?

- A acids
- B alcohols
- C alkanes
- D alkenes

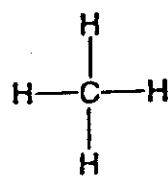
37 The diagram shows how crude oil (petroleum) is separated.



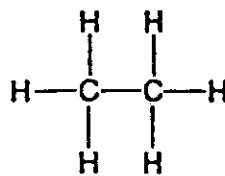
Which of the following is not a fraction produced by this process?

- A diesel fuel
- B paraffin
- C petrol
- D poly(ethene)

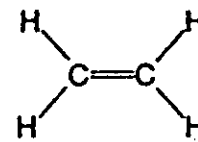
38 The diagrams show the structures of three compounds.



methane



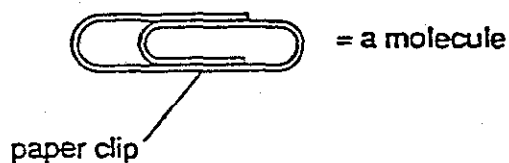
ethane



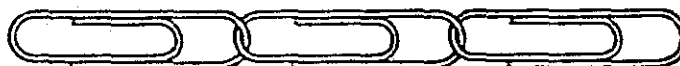
ethene

Which compounds belong to the same homologous series?

- A ethane and ethene only
 B ethane and methane only
 C ethene and methane only
 D ethane, ethene and methane
- 39 A pupil was learning about organic chemistry. The teacher suggested that a paper clip could represent a molecule.



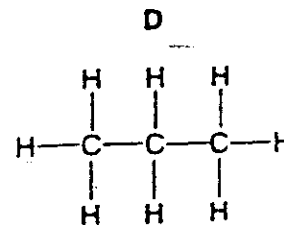
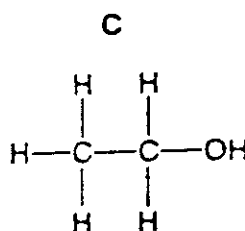
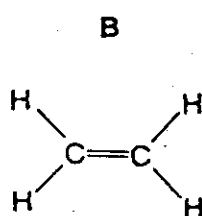
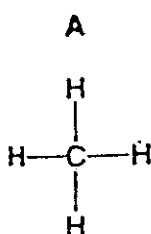
The teacher then joined some paper clips together.



Which process was the teacher explaining?

- A cracking
 B fermentation
 C fractional distillation
 D polymerisation
- 40 The structures of four organic molecules are shown.

Which structure is a liquid at room temperature and is found in wine and beer?



19
DATE OF EXAM PAPER

CHEMISTRY PAPER 1
OBJECTIVE TEST
PRACTICE ANSWER SHEET

CORRECT ANSWERS
48

%
SCORE

Your name _____

Time : 45 minutes

Date / / 199

1	< A > < B > < C > < D >	21	< A > < B > < C > < D >
2	< A > < B > < C > < D >	22	< A > < B > < C > < D >
3	< A > < B > < C > < D >	23	< A > < B > < C > < D >
4	< A > < B > < C > < D >	24	< A > < B > < C > < D >
5	< A > < B > < C > < D >	25	< A > < B > < C > < D >
6	< A > < B > < C > < D >	26	< A > < B > < C > < D >
7	< A > < B > < C > < D >	27	< A > < B > < C > < D >
8	< A > < B > < C > < D >	28	< A > < B > < C > < D >
9	< A > < B > < C > < D >	29	< A > < B > < C > < D >
10	< A > < B > < C > < D >	30	< A > < B > < C > < D >
11	< A > < B > < C > < D >	31	< A > < B > < C > < D >
12	< A > < B > < C > < D >	32	< A > < B > < C > < D >
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15	< A > < B > < C > < D >	35	< A > < B > < C > < D >
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18	< A > < B > < C > < D >	38	< A > < B > < C > < D >
19	< A > < B > < C > < D >	39	< A > < B > < C > < D >
20	< A > < B > < C > < D >	40	< A > < B > < C > < D >

EXAMTRAC

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

CHEMISTRY

0620/1

PAPER 1 Multiple Choice

Tuesday

5 NOVEMBER 1996

Morning

45 minutes

Additional materials:

Mathematical tables

Multiple Choice answer sheet

Soft clean eraser

Soft pencil (type B or HB is recommended)

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are forty questions in this paper. Answer all questions. For each question there are four possible answers, A, B, C and D. Choose the one you consider correct and record your choice in soft pencil on the separate answer sheet.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

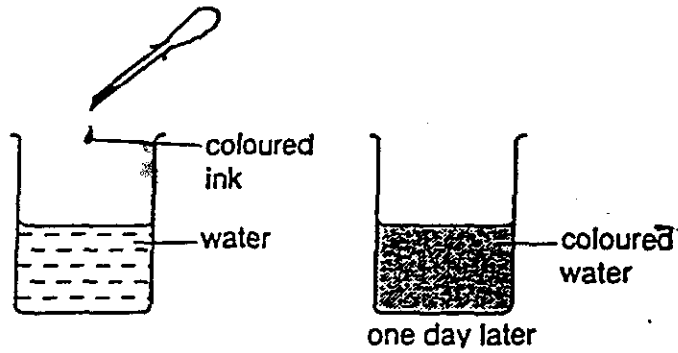
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 16.

This question paper consists of 16 printed pages.

- 1 A drop of coloured ink was added to water.



Which process caused the colour to spread?

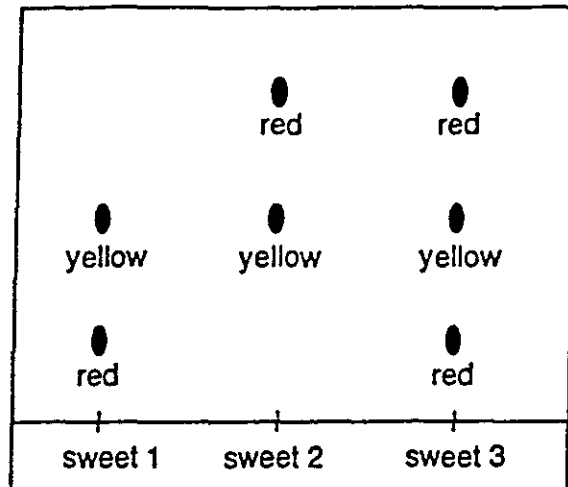
- A diffusion
 - B distillation
 - C melting
 - D oxidation
- 2 The diagram shows a change of state.



Which change of state is shown?

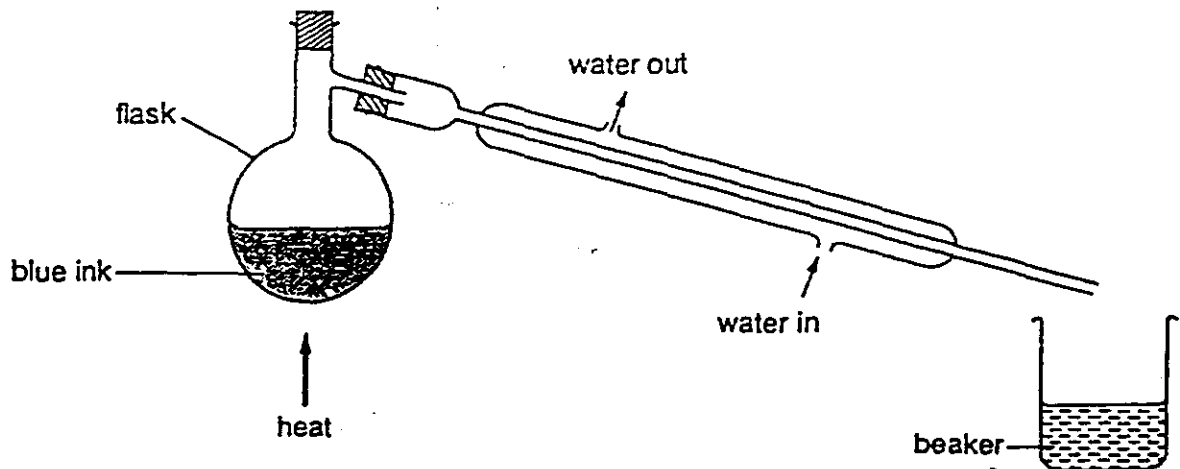
- A boiling
- B condensation
- C freezing
- D melting

- 3 The diagram shows a chromatogram obtained from three different orange sweets.



How many different red dyes were present in the sweets?

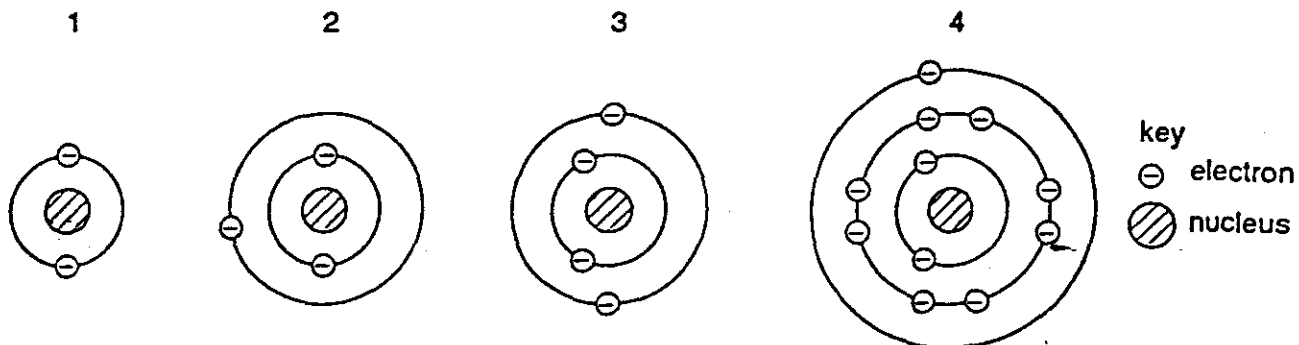
- A 2 B 3 C 4 D 7
- 4 The diagram shows apparatus used to obtain pure water from blue ink.



What will be the colours of the liquids in the flask and the beaker at the end of the experiment?

- | | <i>flask</i> | <i>beaker</i> |
|---|--------------|---------------|
| A | blue | blue |
| B | blue | colourless |
| C | colourless | blue |
| D | colourless | colourless |

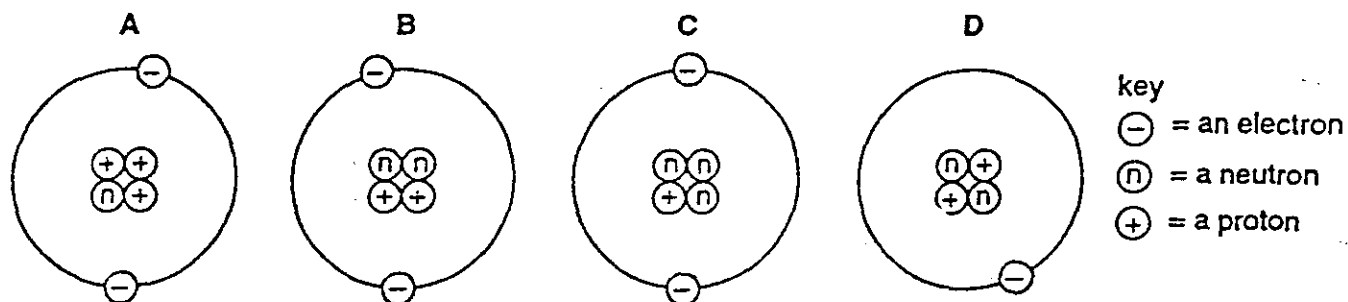
5 The diagrams show the arrangement of electrons in four different atoms.



Which two atoms represent elements in the same group of the Periodic Table?

- A 1 and 2 B 1 and 3 C 2 and 4 D 3 and 4

6 Which diagram represents an atom of helium ${}^4_2\text{He}$?



7 Which element is a metal?

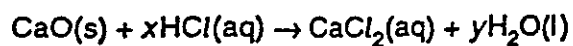
- A carbon
 B chlorine
 C magnesium
 D sulphur

8 The table shows the electronic structures of four atoms.

Which atom would form an ion with a negative charge?

atom	electronic structure
A	2, 8, 1
B	2, 8, 2
C	2, 8, 7
D	2, 8, 8

- 9 The equation shows the reaction between calcium oxide and hydrochloric acid.



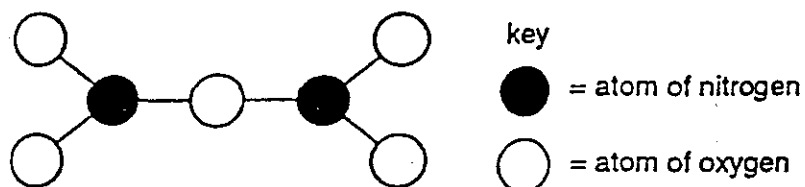
Which values of x and y are needed to balance this equation?

	x	y
A	1	1
B	1	2
C	2	1
D	2	2

- 10 Which formula represents a molecule containing three atoms?

A HNO_3 B H_2O C LiF D ZnSO_4

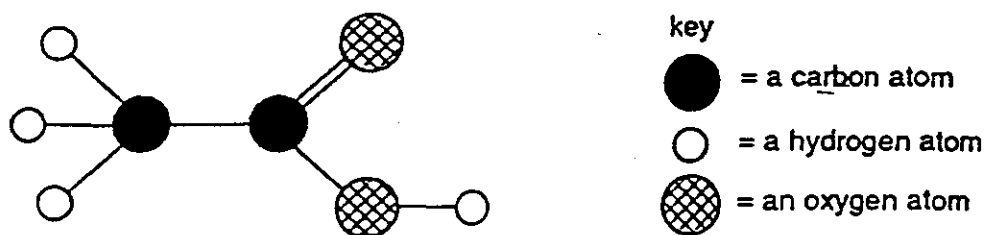
- 11 The diagram shows a model of a molecule.



What is its formula?

A NO_2 B NO_3 C N_2O_5 D N_5O_2

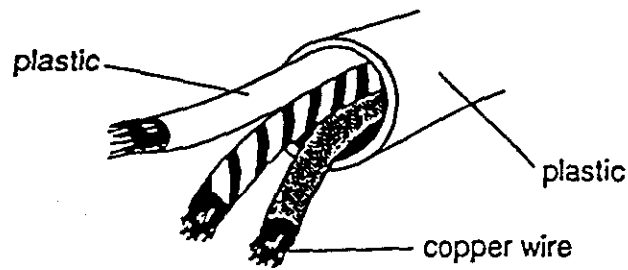
- 12 The model represents ethanoic acid.



What is the relative molecular mass, M_r , of the acid?

A 8 B 30 C 60 D 84

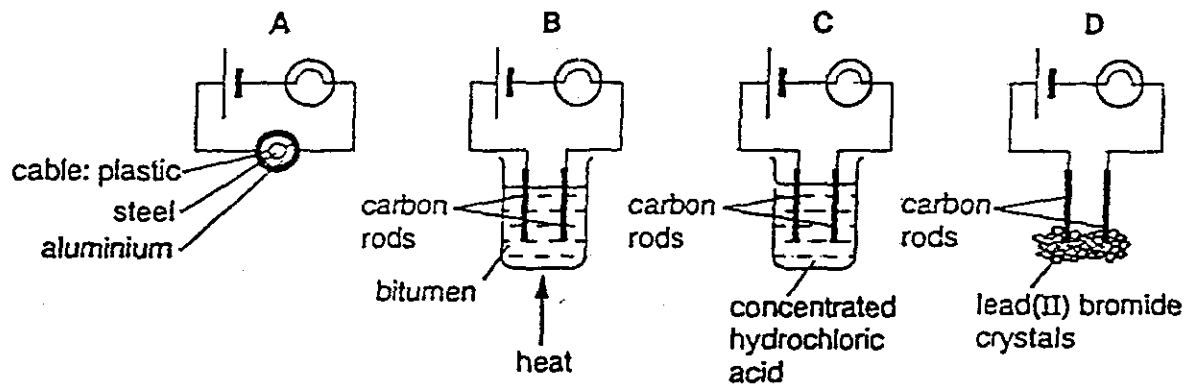
13 Copper wires in an electricity cable are covered in plastic



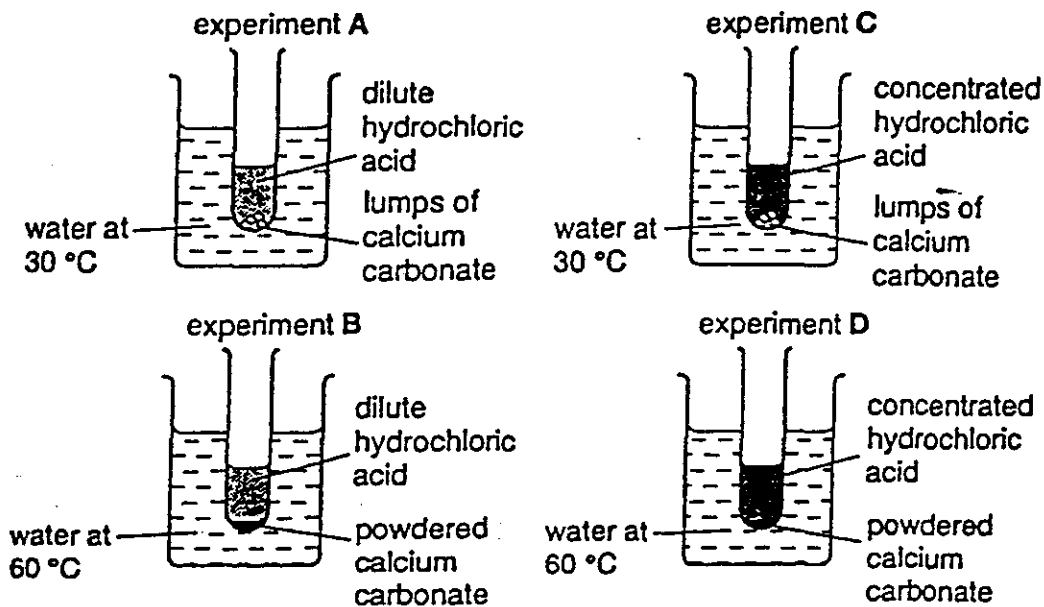
Why is plastic used?

- A It is an insulator.
- B It is a polymer.
- C It is hard.
- D It melts easily.

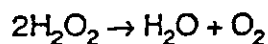
14 Which diagram shows an experiment in which the bulb will light?



- 15 In which experiment would the rate of reaction between hydrochloric acid and calcium carbonate be the slowest?



- 16 Oxygen can be obtained by the catalytic decomposition of hydrogen peroxide.



Why is a catalyst used?

- A To dry the oxygen released from the hydrogen peroxide.
 - B To make the oxygen released from the hydrogen peroxide less soluble.
 - C To react with the hydrogen in hydrogen peroxide.
 - D To speed up the decomposition of hydrogen peroxide.
- 17 Flour in a bag is difficult to burn but flour mixed with air may explode if sparked.

Why is this?

- A Air acts as a catalyst.
- B Air warms the flour.
- C A larger surface area of flour is in contact with the air.
- D Flour molecules are small.

18 In an exothermic reaction

- A a gas is given off.
- B heat is produced.
- C a catalyst is used.
- D there is a colour change.

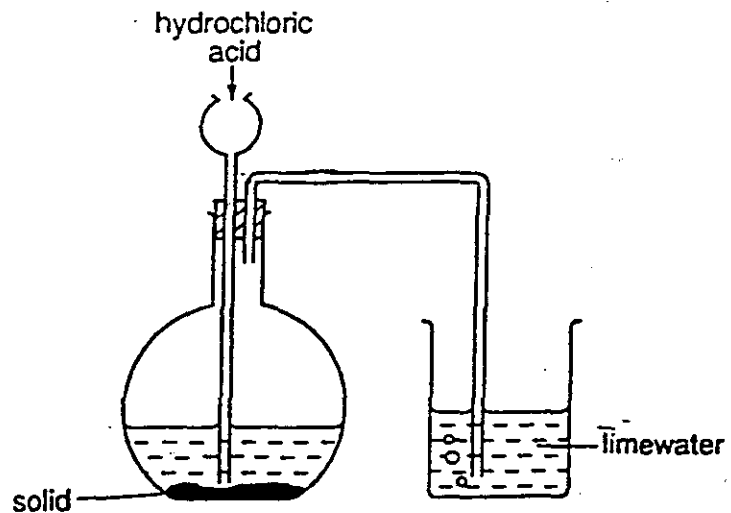
19 Which of the following reacts with dilute sulphuric acid to produce hydrogen?

- A carbon
- B chlorine
- C copper
- D zinc

20 Which of the following is the pH value of an alkaline solution?

- A 1 B 5 C 7 D 9

21 Hydrochloric acid was added to a solid as shown.



The gas produced turned the limewater cloudy.

What was the solid?

- A sodium carbonate
- B sodium chloride
- C sodium hydroxide
- D sodium oxide

22 The table gives some information about four elements in the Periodic Table and their oxides.

Which element is a transition element?

<i>element</i>	<i>appearance of element</i>	<i>appearance of oxide</i>
A	grey solid	white solid
B	shiny solid	green solid
C	green gas	yellow gas
D	colourless gas	colourless liquid

23 Which of the following is a noble gas?

- A carbon monoxide
- B hydrogen
- C nitrogen
- D radon

24 The table shows some properties of two elements in Group VII of the Periodic Table.

<i>element</i>	<i>state</i>	<i>melting point/°C</i>	<i>density/g per cm³</i>
chlorine	gas	-101	0.0032
bromine	liquid	-7	3.1

Which properties is fluorine likely to have?

	<i>state</i>	<i>melting point/°C</i>	<i>density/g per cm³</i>
A	gas	-220	0.0017
B	gas	-188	0.17
C	liquid	-220	0.0017
D	liquid	-188	1.7

25 The table gives some information about the reactivity of three different metals.

<i>metal</i>	<i>reaction with water or steam</i>	<i>reaction with dilute hydrochloric acid</i>
X	reacts with cold water	reacts with cold acid
Y	no reaction when heated in steam	no reaction when boiled with acid
Z	reacts when heated in steam	reacts when warmed with acid

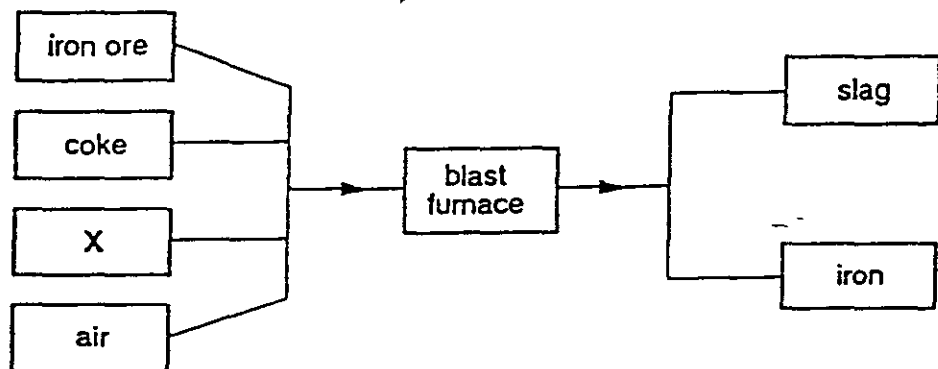
What is the order of reactivity of the three metals?

	<i>most reactive</i>	→	<i>least reactive</i>
A	X	Y	Z
B	X	Z	Y
C	Y	Z	X
D	Z	X	Y

26 What is produced when sodium metal reacts with water?

- A hydrogen gas and a neutral solution
- B hydrogen gas and an alkaline solution
- C oxygen gas and an acid solution
- D oxygen gas and an alkaline solution

27 The diagram represents the manufacture of iron.



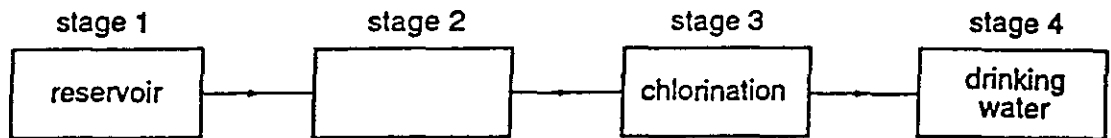
What is X?

- A bauxite
- B limestone
- C mild steel
- D sand

28 Which metal is widely used for the purpose listed below?

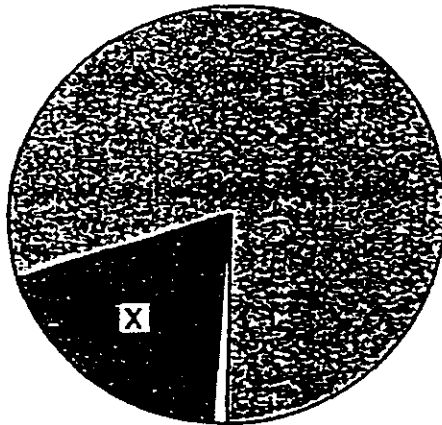
<i>metal</i>	<i>use</i>
A aluminium	food containers
B copper	car bodies
C mild steel	cutlery
D stainless steel	food cans

29 The diagram shows how water is treated to make it suitable for drinking.



What happens in stage 2?

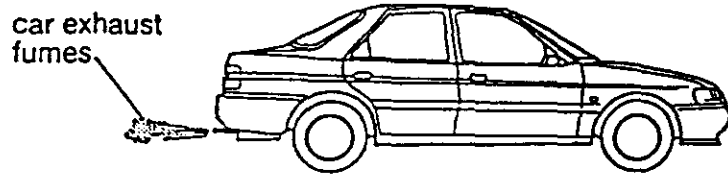
- A condensation
 - B distillation
 - C evaporation
 - D filtration
- 30 The pie chart represents the composition of air.



What is gas X?

- A carbon dioxide
- B hydrogen
- C nitrogen
- D oxygen

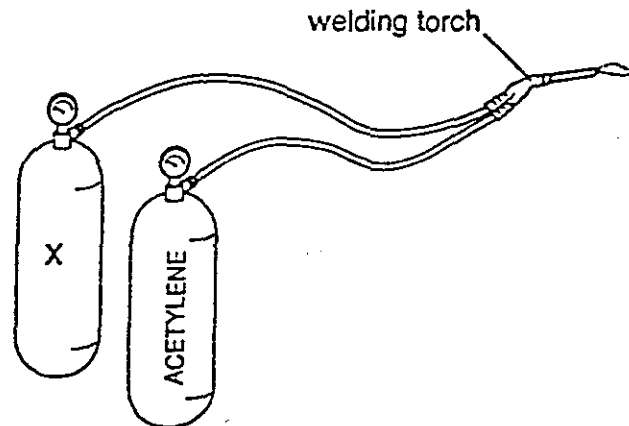
31 Car exhaust fumes are a mixture of substances.



Which of the following emissions from cars is **not** harmful to health?

- A carbon monoxide
- B lead compounds
- C nitrogen oxides
- D water vapour

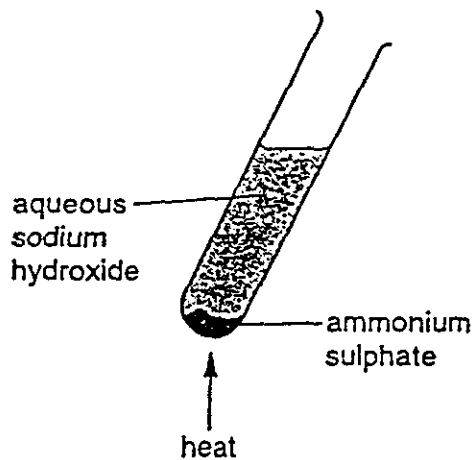
32 In welding, acetylene is mixed with another gas before burning.



What is gas X?

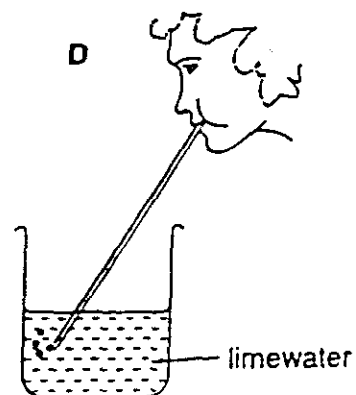
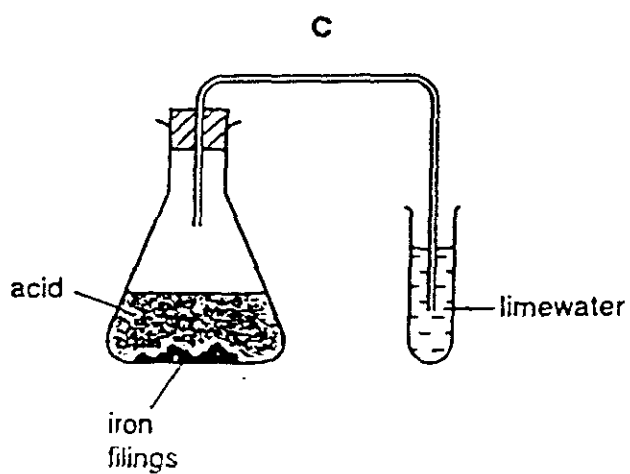
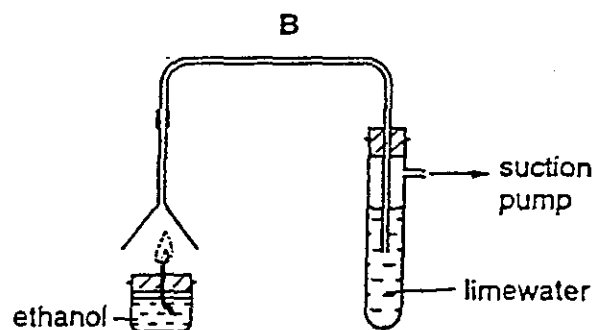
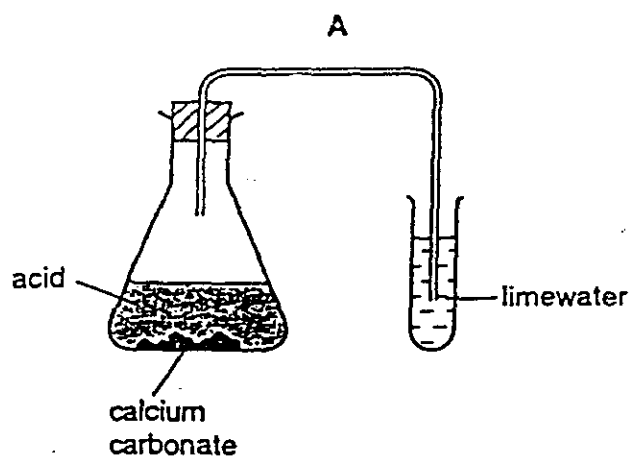
- A air
- B carbon dioxide
- C nitrogen
- D oxygen

33 Which gas is produced in the apparatus shown?

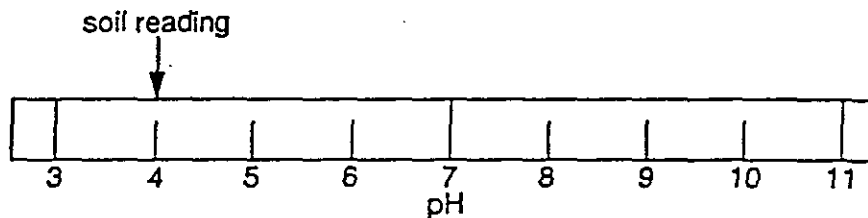


- A ammonia
- B hydrogen
- C oxygen
- D sulphur dioxide

34 In which experiment will the limewater not turn milky?



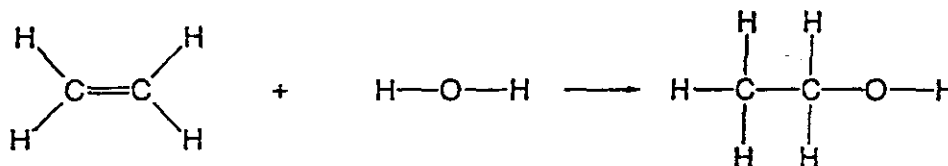
35 The diagram shows the results of a pH test on a sample of garden soil.



What could be added to the soil to change its pH to 7?

- A sulphuric acid
- B lime
- C sand
- D sodium chloride

36 The formulae represent a reaction.

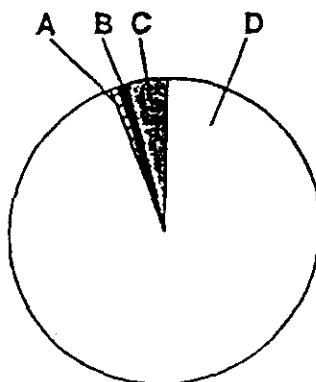


What reaction is taking place?

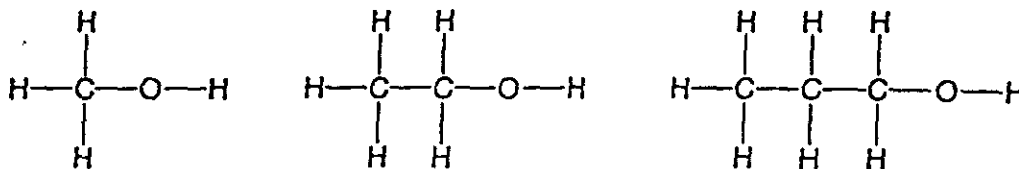
- A ethane to ethanoic acid
- B ethane to ethanol
- C ethene to ethanoic acid
- D ethene to ethanol

37 The pie chart represents the composition of natural gas.

Which sector represents methane?



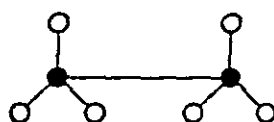
38 The structures of three substances are shown.



Why do these substances all belong to the same homologous series?

- A They are all compounds.
- B They are all saturated.
- C They all contain oxygen.
- D They all contain the same functional group.

39 The diagram shows a model of an organic compound.



key

- is a carbon atom
- is a hydrogen atom

What is the name of this compound?

- A ethane
- B ethanoic acid
- C ethanol
- D ethene

40 The diagram shows uses of ethanol.



What could fill box 3?

- A a can of fuel
- B a packet of washing powder
- C a sack of fertiliser
- D a fire extinguisher



TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are forty questions in this paper. Answer all questions. For each question, there are four possible answers, A, B, C and D. Choose the one you consider correct and record your choice in soft-pencil on the separate answer sheet.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

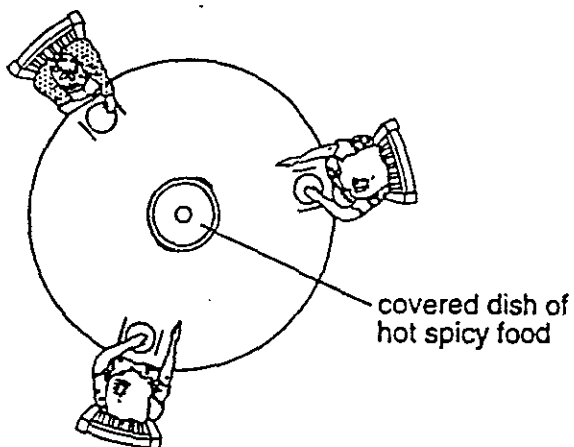
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

A copy of the Periodic Table is printed on page 20.

Any rough working should be done in this booklet.

This question paper consists of 17 printed pages and 3 blank pages.

- 1 The diagram shows some people sitting round a dinner table.



When the lid of the dish was removed, all the people could smell the food.

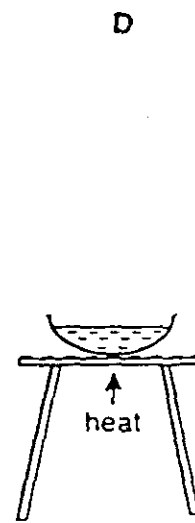
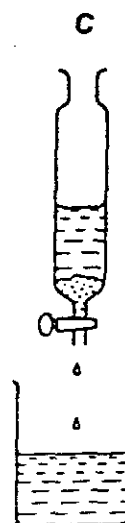
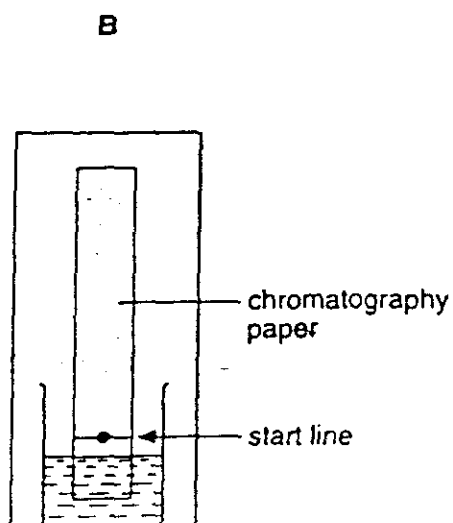
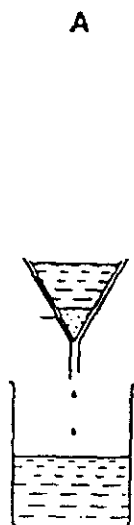
How did the smell reach them?

- A by decolourisation
 - B by decomposition
 - C by diffusion
 - D by distillation
- 2 The table shows the physical state of a substance at different temperatures.

temperature /°C	-40	0	40	80	120
physical state	solid	solid	liquid	liquid	gas

What could the melting point of the substance be?

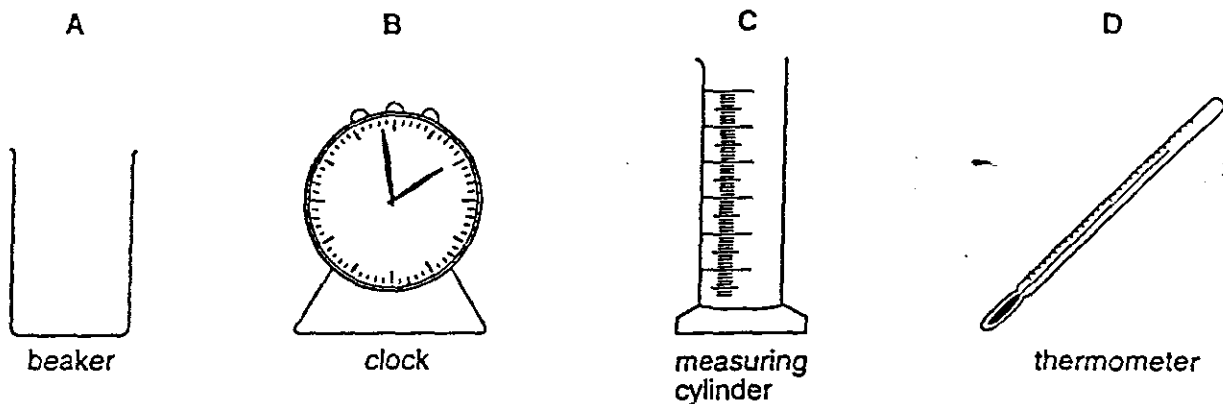
- A -20°C
 - B 20°C
 - C 60°C
 - D 100°C
- 3 Which method is used to obtain salt crystals from a dilute salt solution?



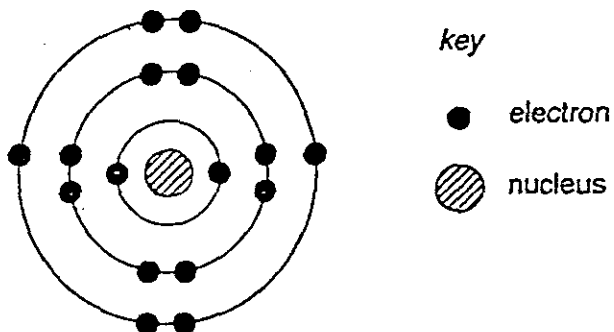
06301537

- 4 A student mixes 25 cm^3 samples of dilute hydrochloric acid with different volumes of aqueous sodium hydroxide. Each time, the student measures the change in temperature.

Which piece of apparatus would not be needed?



- 5 The diagram represents an atom of an element X.



To which group of the Periodic Table does X belong?

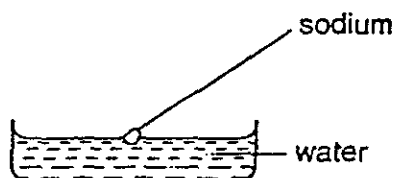
- A 0 B 2 C 3 D 6

- 6 The table shows the electronic structures of four elements.

Which element is a noble gas?

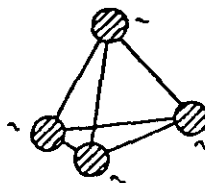
element	number of electrons	
	shell 1	shell 2
A	1	0
B	2	0
C	2	2
D	2	6

- 7 Which element has a giant covalent structure?
- A carbon
B hydrogen
C nitrogen
D oxygen
- 8 Which particles are gained by chlorine when it reacts with potassium?
- A atoms
B electrons
C ions
D protons
- 9 When sodium reacts with water, a solution and a gas are produced.



Which word equation represents this reaction?

- A sodium + water → sodium hydroxide + hydrogen
B sodium + water → sodium hydroxide + oxygen
C sodium + water → sodium oxide + hydrogen
D sodium + water → sodium oxide + oxygen
- 10 The diagram shows a covalent molecule of phosphorus.



How many electrons are shared in the bonds in this molecule?

- A 2 B 4 C 8 D 12

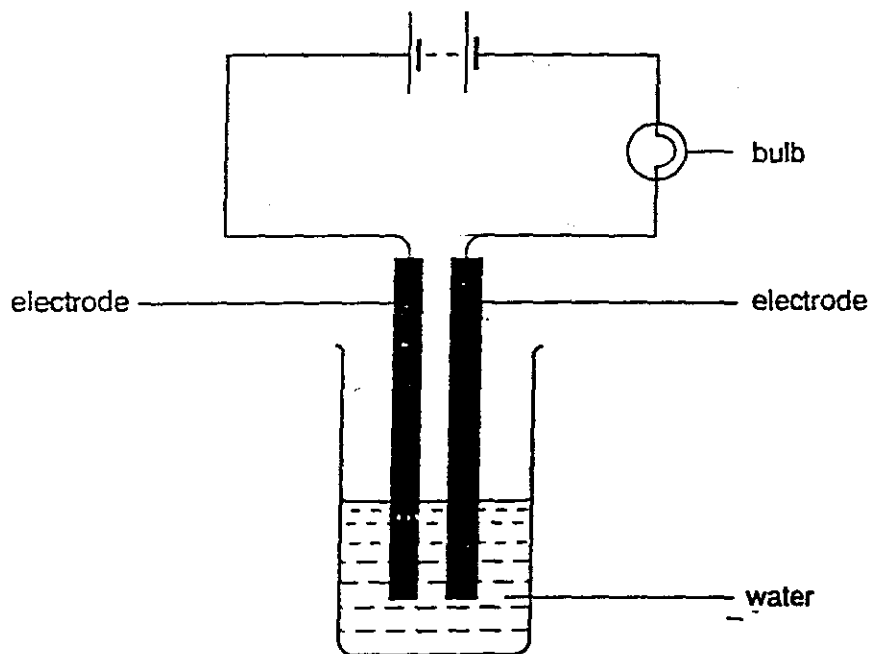
- 11 What are the correct symbols for the elements chlorine, nitrogen and potassium?

	<i>chlorine</i>	<i>nitrogen</i>	<i>potassium</i>
A	C	N	K
B	C	Ni	P
C	Cl	N	K
D	Cl	Ni	P

- 12 The relative formula mass, M_r , of calcium carbonate, CaCO_3 , is 100.

What mass of carbon is present in 100 g of calcium carbonate?

- A 12g B 36g C 40g D 60g
- 13 A student set up the apparatus shown. The bulb did not glow.



After the student added substance X to the water, the bulb glowed.

What could X be?

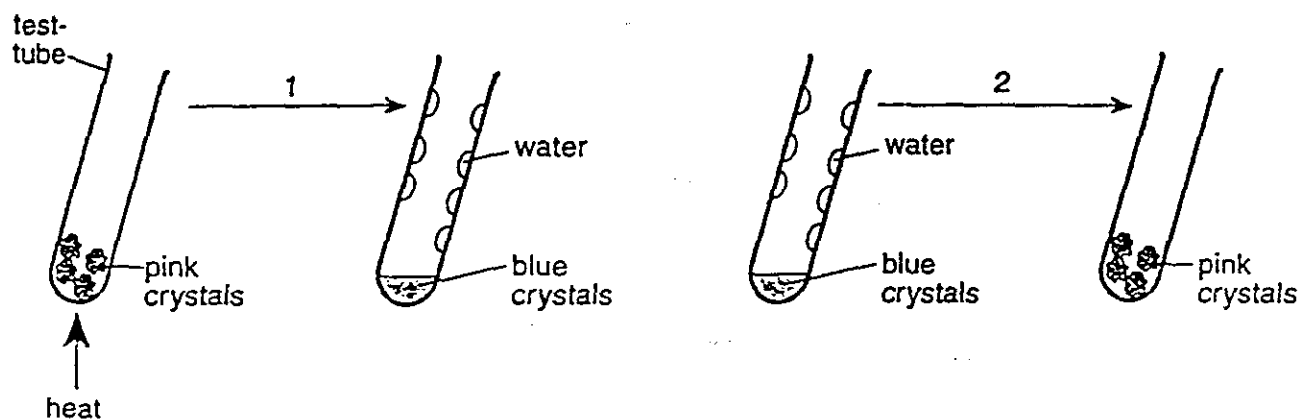
- A carbon
 B ethanol
 C calcium carbonate
 D sodium chloride

14 The table shows some of the properties of four compounds.

Which compound could be aluminium oxide?

compound	solubility in water	products of electrolysis of molten compound	
		positive electrode	negative electrode
A	soluble	metal	oxygen
B	soluble	oxygen	metal
C	insoluble	metal	oxygen
D	insoluble	oxygen	metal

15 The diagrams show the changes that occurred in an experiment on some pink crystals.

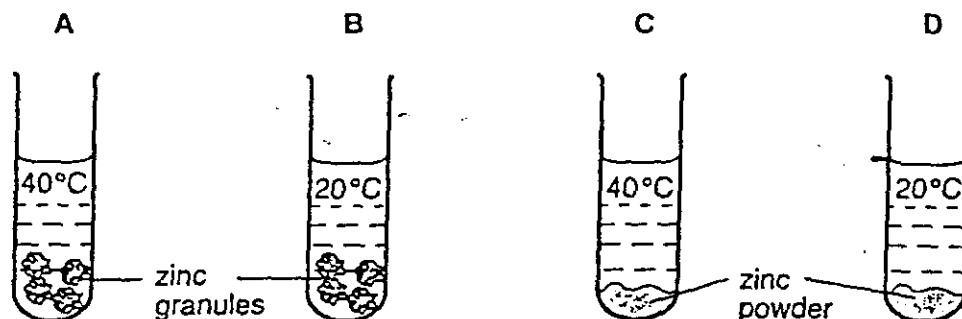


Which changes were exothermic?

- A 1 only
- B 2 only
- C both 1 and 2
- D neither 1 nor 2

Questions 16 and 17 refer to the diagrams shown.

Equal masses of zinc granules and zinc powder were added to dilute sulphuric acid at the temperatures shown.



16 In which test-tube was the reaction fastest?

17 Which gas was released during the reaction?

- A carbon dioxide
- B hydrogen
- C oxygen
- D sulphur dioxide

18 The table shows the results of testing two gases with damp litmus paper.

test	gas X	gas Y
effect of gas on damp litmus paper	turned blue	bleached

What could the gases be?

	X	Y
A	HCl	Cl ₂
B	HCl	O ₂
C	NH ₃	Cl ₂
D	NH ₃	O ₂

19 The diagram shows the hazard warning symbol on a gas cylinder.

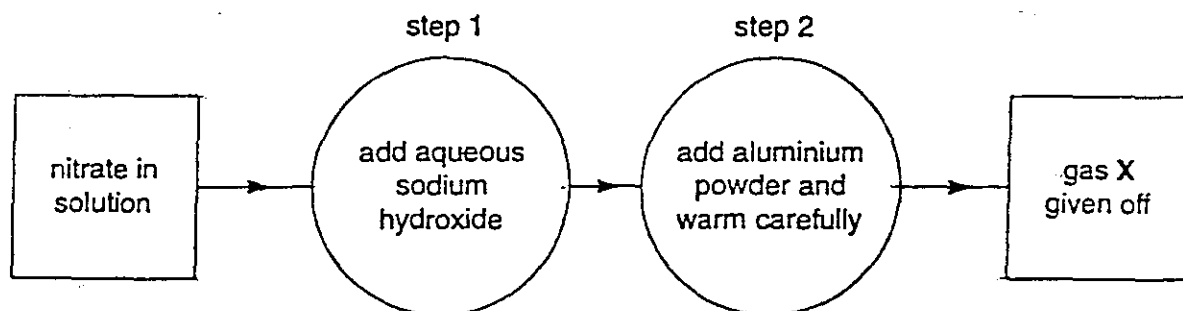
The gas in the cylinder is flammable.



Which gas is in the cylinder?

- A argon
- B hydrogen
- C nitrogen
- D oxygen

20 The diagram shows how the presence of a nitrate in solution can be tested.

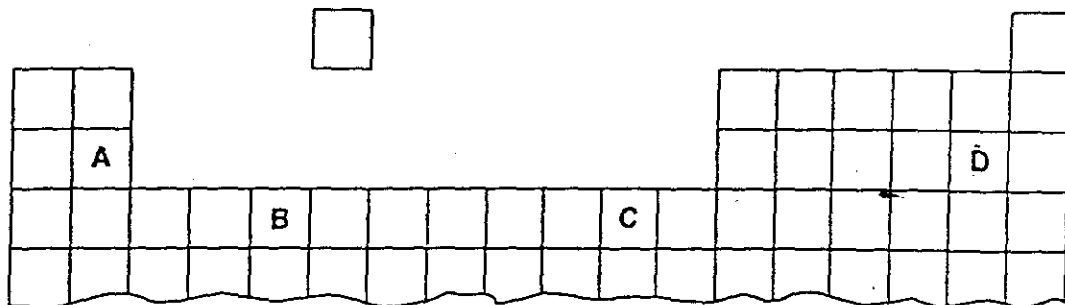


What does gas X contain?

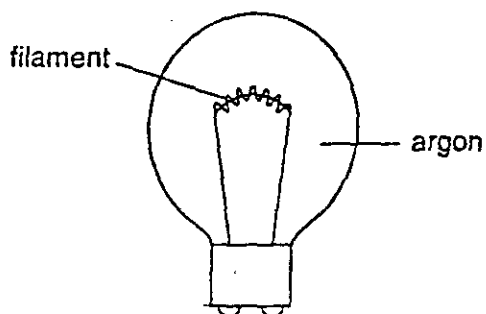
- A ammonia
- B nitrogen
- C nitrogen oxide
- D oxygen

21 The positions of four elements are shown on the outline of the Periodic Table.

Which element exists as a diatomic gas?



22 The diagram shows a light bulb.



Why is the bulb filled with argon?

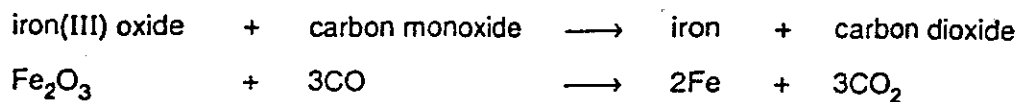
- A Argon glows when hot.
- B Argon is an unreactive gas.
- C Argon is less dense than air.
- D Argon makes the filament glow.

23 The table shows some properties of four elements.

Which one is a transition element?

<i>element</i>	<i>melting point, in °C</i>	<i>density, in g/cm³</i>
A	98	0.97
B	650	1.74
C	1900	5.96
D	444	2.07

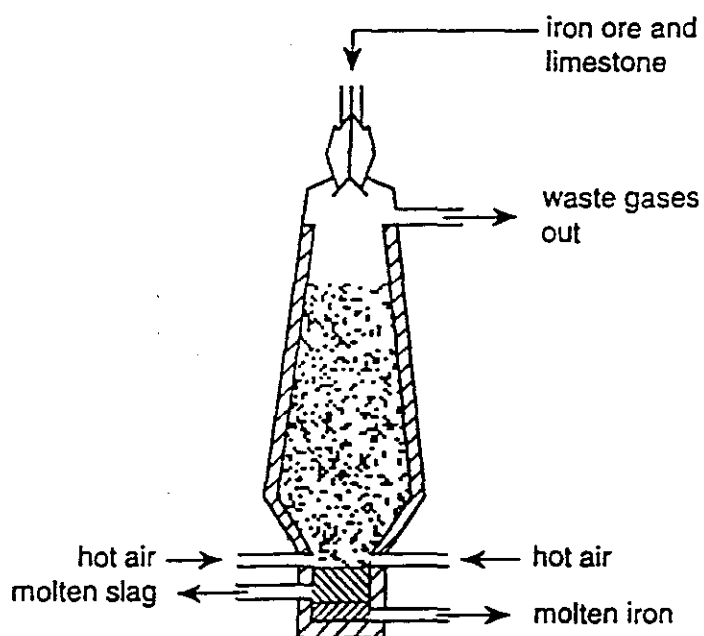
24 The equations describe a reaction which occurs in a blast furnace.



Which substance is reduced?

- A carbon dioxide
- B carbon monoxide
- C iron
- D iron(III) oxide

25 The diagram shows a blast furnace.



Why is limestone used in the extraction of iron?

- A to generate heat
- B to produce carbon monoxide
- C to reduce iron ore
- D to remove impurities

26 Metal X is above metal Y in the reactivity series.

Which reaction is most likely to occur?

- A $X + Y \longrightarrow XY$
- B $X + \text{oxide of } Y \longrightarrow \text{oxide of } X + Y$
- C $Y + \text{oxide of } X \longrightarrow \text{oxide of } Y + X$
- D $Y + \text{aqueous salt of } X \longrightarrow \text{aqueous salt of } Y + X$

27 To make steel, oxygen is blown into molten iron.

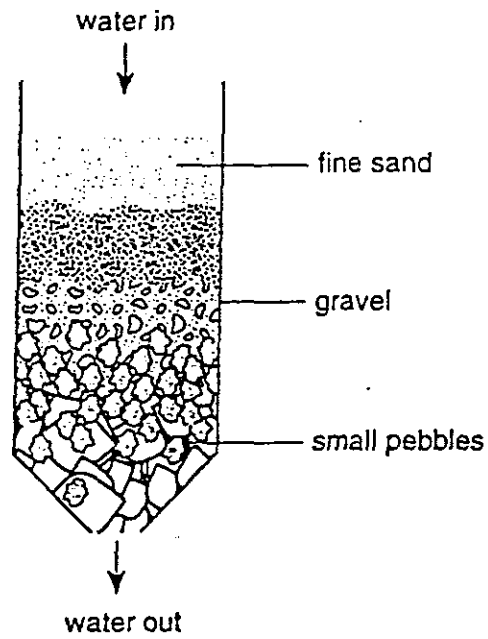
Why is the oxygen used?

- A to convert the iron into iron oxide
- B to help the slag float to the surface
- C to make the iron less dense
- D to remove some of the carbon from the iron

28 Which line in the table correctly links a property with a use of a metal?

<i>metal</i>	<i>property</i>	<i>use</i>
A aluminium	conducts electricity	making saucepans
B aluminium	low density	making aeroplanes
C stainless steel	conducts electricity	making garden tools
D stainless steel	high density	making car bodies

29 Muddy water was purified by passing it down a column.



Which process is taking place?

- A chlorination
 - B crystallisation
 - C filtration
 - D neutralisation
- 30 'Acid rain' may be formed if the air is polluted by sulphur dioxide.

What is the main source of the sulphur dioxide pollution?

- A burning of forests
- B coal-burning power stations
- C manufacture of sulphuric acid
- D nuclear power stations

- 31 The table shows the percentages of the gases in air samples taken from four garages where car engines had been left running.

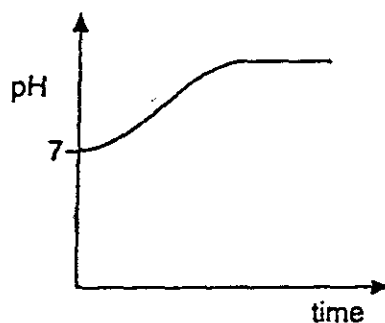
Which sample is most polluted?

sample	% composition			
	nitrogen	oxygen	carbon dioxide	carbon monoxide
A	77	20	1	2
B	78	19	3	trace
C	79	18	2	1
D	80	12	4	4

- 32 Which of the following does not use oxygen?

- A a hospital operating theatre
- B a light bulb
- C an oil-fired power station
- D a welding torch

- 33 The graph shows the change in pH when a gas X was bubbled into water.



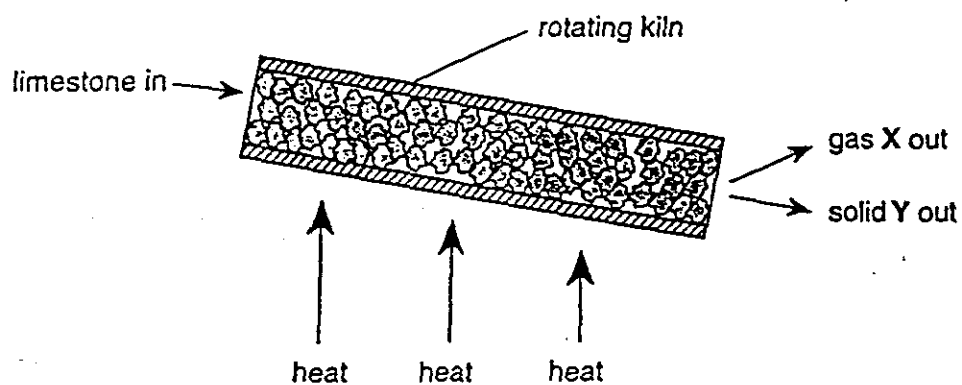
What could gas X be?

- A ammonia
- B carbon dioxide
- C hydrogen
- D sulphur dioxide

34 What is produced when methane is completely burnt in air?

- A carbon and water
- B carbon dioxide and hydrogen
- C carbon dioxide and water
- D carbon monoxide and hydrogen

35 The diagram shows a lime kiln used to heat limestone.

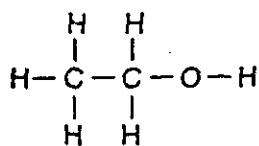


What are gas X and solid Y?

gas X *solid Y*

- A carbon dioxide calcium hydroxide
- B carbon dioxide calcium oxide
- C oxygen calcium hydroxide
- D oxygen calcium oxide

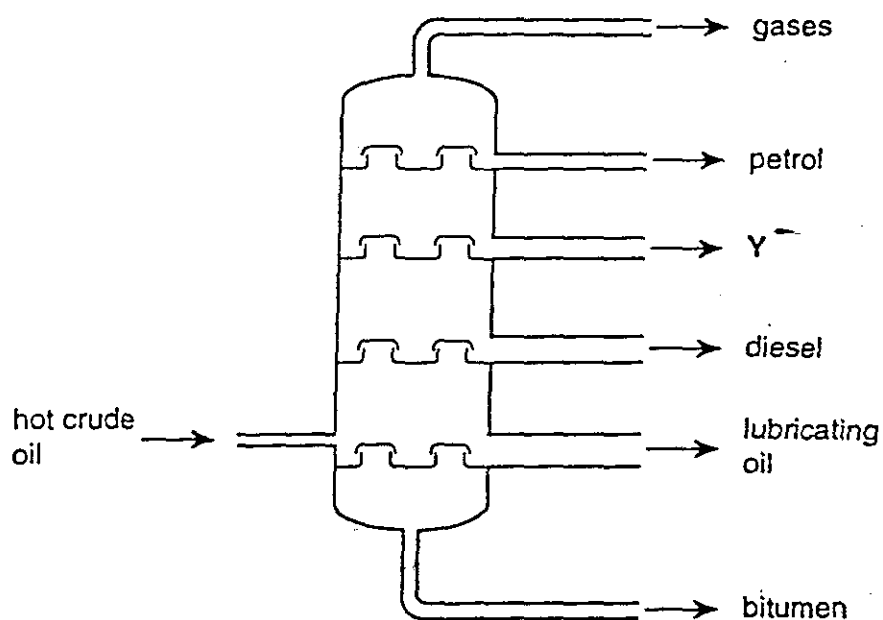
36 The diagram shows the formula of a molecule of X.



What is X?

- A ethane
- B ethanoic acid
- C ethanol
- D ethene

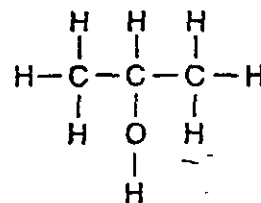
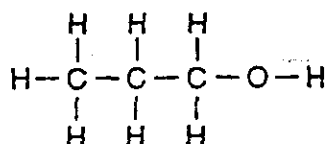
37 The diagram shows the refining of crude oil.



Which of the following is a use for Y?

- A fuel for aircraft
- B fuel for lorries
- C surfacing roads
- D making waxes

38 The diagram shows the structures of two compounds.



The two compounds have similar chemical properties.

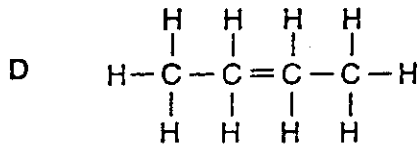
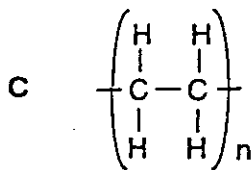
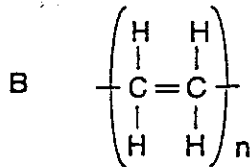
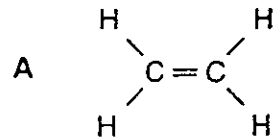
Why is this?

Their molecules have the same

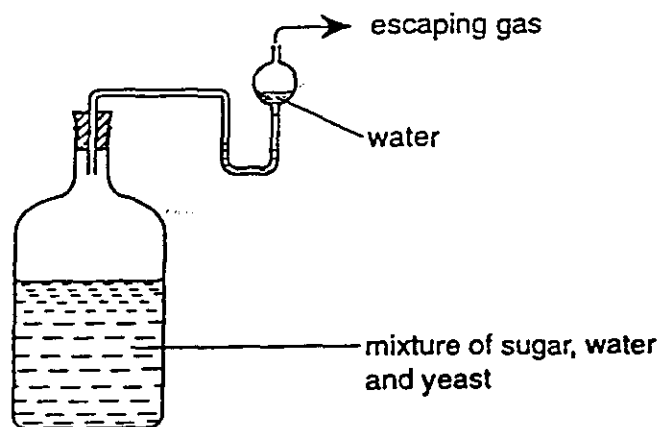
- A functional group.
- B number of carbon atoms.
- C number of oxygen atoms.
- D relative molecular mass.

39 Ethene can be polymerised.

Which diagram represents the structure of the product formed?

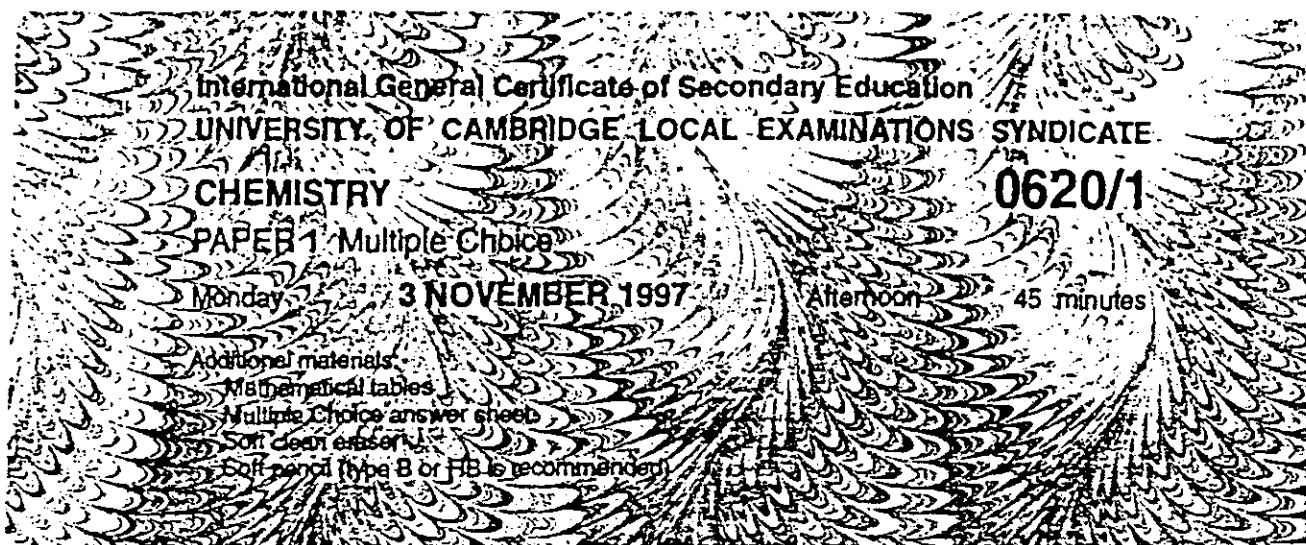


40 The diagram shows apparatus for fermenting sugar.



Which gas escapes from the apparatus?

- A carbon monoxide
- B carbon dioxide
- C hydrogen
- D sulphur dioxide



TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

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INFORMATION FOR CANDIDATES

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A copy of the Periodic Table is printed on page 16.

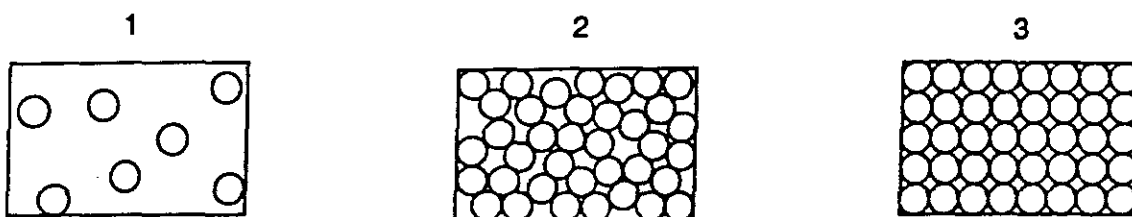
This question paper consists of 16 printed pages.

113

1 In which substance are the particles furthest apart at room temperature?

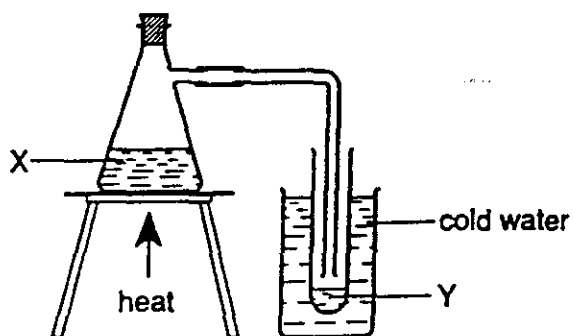
- A petrol
- B salt
- C steam
- D sugar

2 Diagrams 1, 2 and 3 represent the three states of matter.



For which states can diffusion be demonstrated by using simple laboratory apparatus?

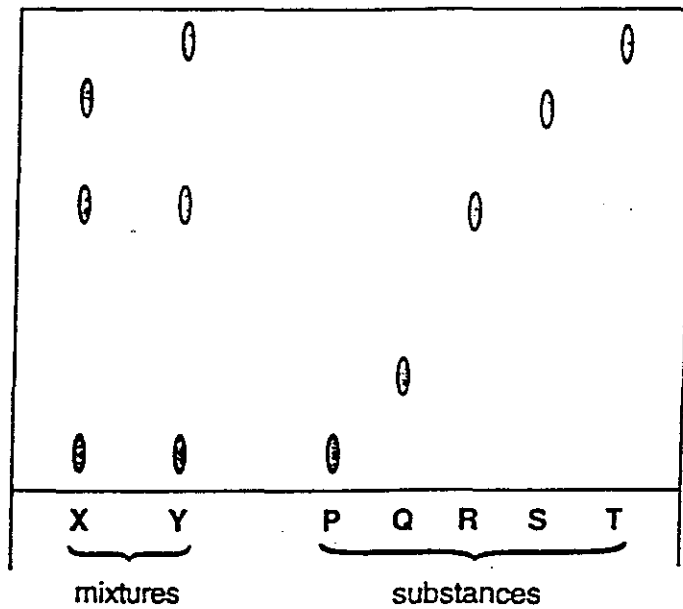
- A 1 only
 - B 1 and 2
 - C 2 and 3
 - D 1, 2 and 3
- 3 The diagram shows apparatus which can be used for the distillation of sea water.



What are the substances at X and at Y?

- | X | Y |
|--------------|------------|
| A pure water | salt |
| B pure water | sea water |
| C sea water | salt |
| D sea water | pure water |

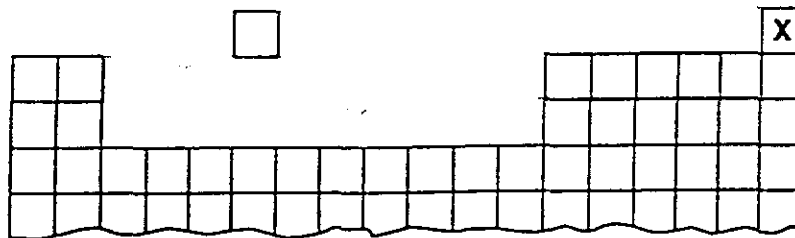
4 The diagram shows the result of a chromatography experiment.



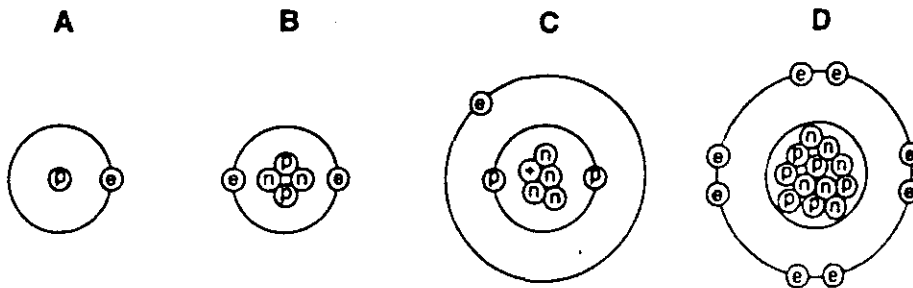
How many substances are present in mixture X but not in mixture Y?

- A 1 B 2 C 3 D 6

5 The diagram shows an outline of part of the Periodic Table.



Which diagram shows an atom of element X?



key
e = an electron
n = a neutron
p = a proton

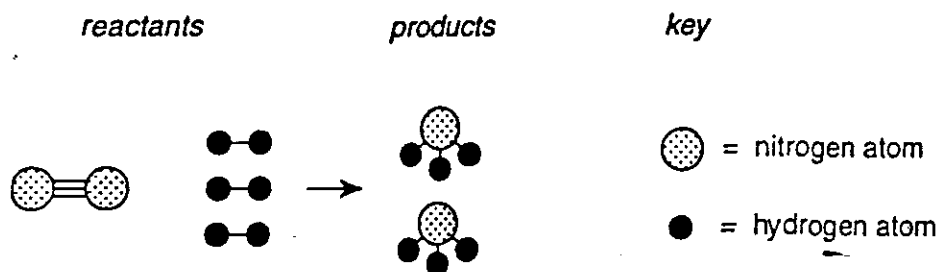
6 The symbol of an element may be shown as $^{27}_{13}\text{Al}$

How many electrons does one atom of this element contain?

- A 13 B 14 C 27 D 40

- 7 The chemical properties of an element depend mainly on the number of
- A electrons in the innermost shell.
 - B electrons in the outermost shell.
 - C fully occupied shells of electrons.
 - D partly occupied shells of electrons.
- 8 Which property do all metals have?
- A They are soluble in water.
 - B They conduct electricity.
 - C They have high melting points.
 - D They react with dilute sulphuric acid.
- 9 For which compound is the formula correct ?
- | <i>compound</i> | <i>formula</i> |
|-------------------|----------------------|
| A ammonia | NH_4 |
| B carbon dioxide | C_2O |
| C potassium oxide | P_2O |
| D zinc chloride | ZnCl_2 |
- 10 When hydrochloric acid reacts with calcium carbonate, a gas is given off.
- calcium carbonate + hydrochloric acid \longrightarrow calcium chloride + water + X
- What is X?
- A carbon dioxide
 - B chlorine
 - C hydrogen
 - D oxygen

11 The diagram represents molecules reacting.

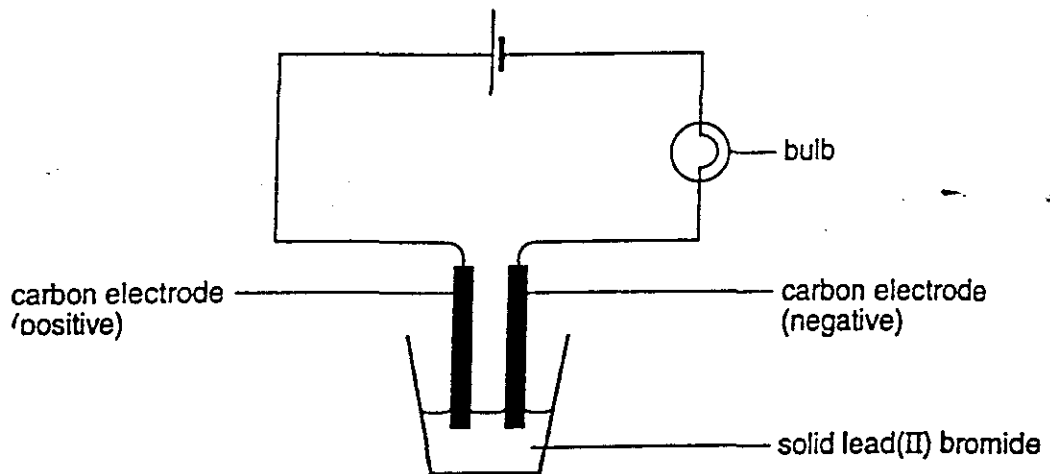


What is the equation for this reaction?

- A $\text{N} + \text{H}_3 \longrightarrow \text{NH}_3$
- B $\text{N} + 3\text{H} \longrightarrow \text{NH}_3$
- C $\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3$
- D $\text{N}_2 + 2\text{NH}_2 \longrightarrow 2\text{NH}_3$
- 12 The formula of ethanoic acid is $\text{CH}_3\text{CO}_2\text{H}$.
- How should the relative molecular mass, M_r , of this acid be calculated?
- A $12 + 1 + 16$
- B $3(12 + 1) + 2(12 + 16) + 1$
- C $(4 \times 12) + (2 \times 1) + 16$
- D $(2 \times 12) + (4 \times 1) + (2 \times 16)$
- 13 An electric current is passed through concentrated aqueous sodium chloride.
- Which gases are obtained at the electrodes?

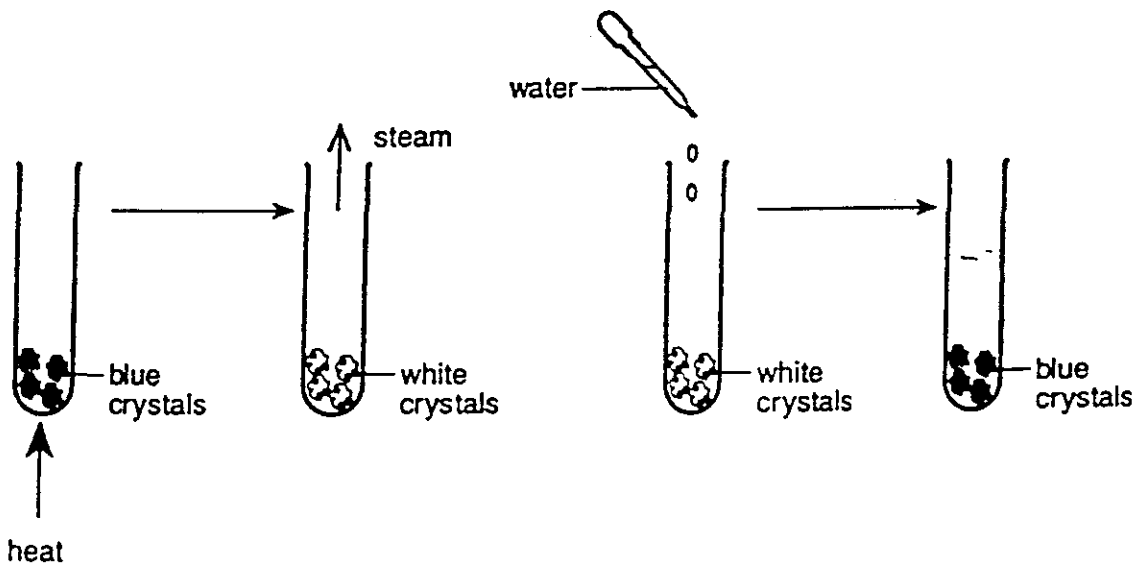
<i>negative electrode</i>	<i>positive electrode</i>
A hydrogen	chlorine
B hydrogen	oxygen
C oxygen	chlorine
D oxygen	hydrogen

- 14 The diagram shows the apparatus set up by a student in an experiment to electrolyse lead(II) bromide. The bulb did not glow.



Which of the following changes would cause the bulb to glow?

- A adding more lead(II) bromide
 - B heating the lead(II) bromide until it melts
 - C reversing the connections to the electrodes
 - D using platinum electrodes instead of carbon electrodes
- 15 The diagrams show an experiment using copper(II) sulphate.

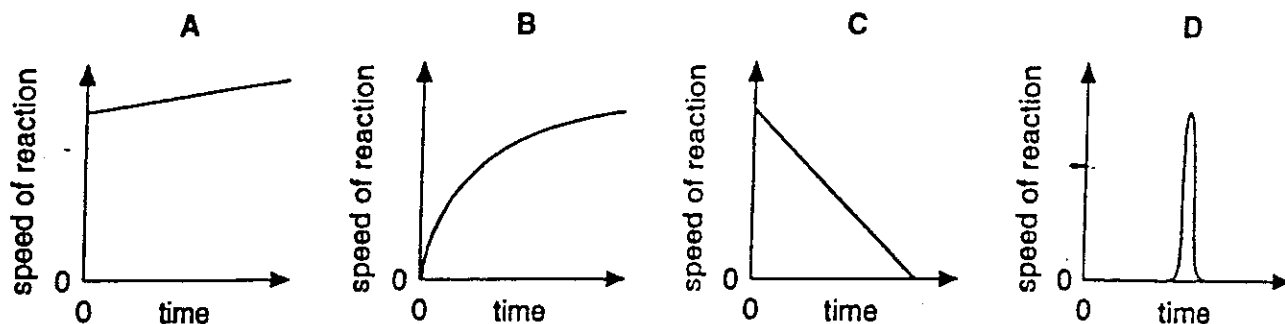


What do these diagrams represent?

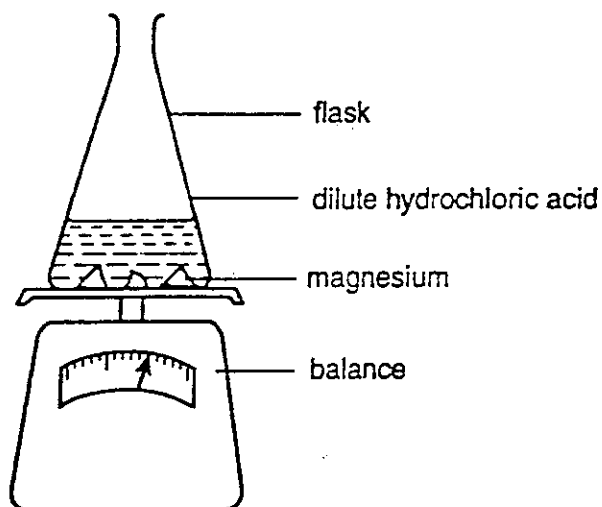
- A a redox reaction
- B a reversible reaction
- C crystallisation
- D distillation

16 The graphs show, for four different reactions, speed of reaction plotted against time.

Which graph could represent the explosive combustion of hydrogen?



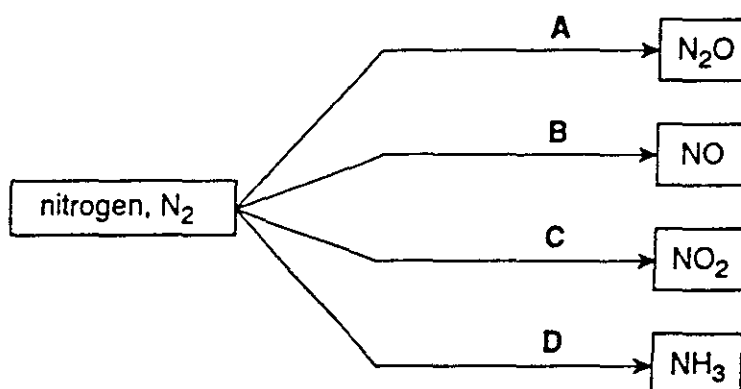
17 A student set up the experiment shown to investigate how quickly a gas was released when a solid reacted with an acid.



What happened to the balance readings?

- A They decreased.
- B They did not change.
- C They increased.
- D They increased at first, then decreased.

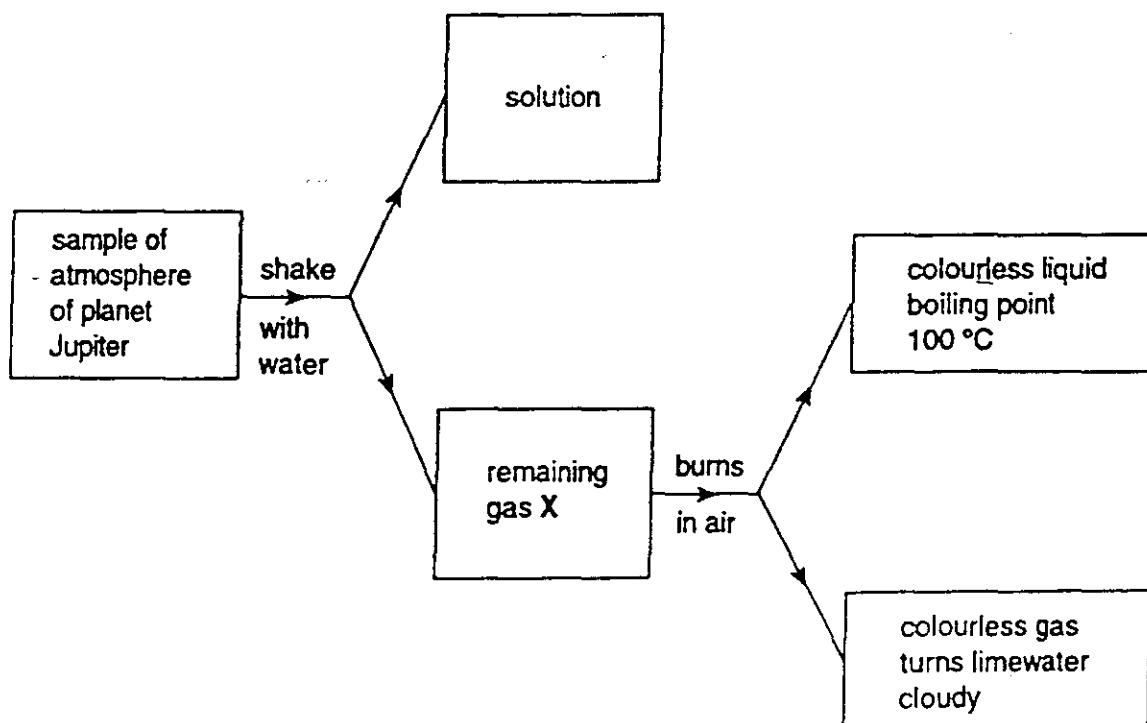
18 In which change shown has nitrogen been reduced?



19 Which potassium salt produces a yellow precipitate when it is dissolved in water and acidified aqueous lead(II) nitrate is added?

- A potassium chloride
- B potassium iodide
- C potassium nitrate
- D potassium sulphate

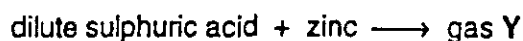
20 The diagram shows the possible results of testing gases from the atmosphere of the planet Jupiter.



What is gas X?

- A CH_4
- B CO_2
- C H_2
- D N_2

- 21 When zinc reacts with dilute sulphuric acid, a gas Y is formed.



What is gas Y?

- A carbon dioxide
- B chlorine
- C hydrogen
- D oxygen

- 22 The table gives information about four elements.

Which element could be in Group I in the Periodic Table?

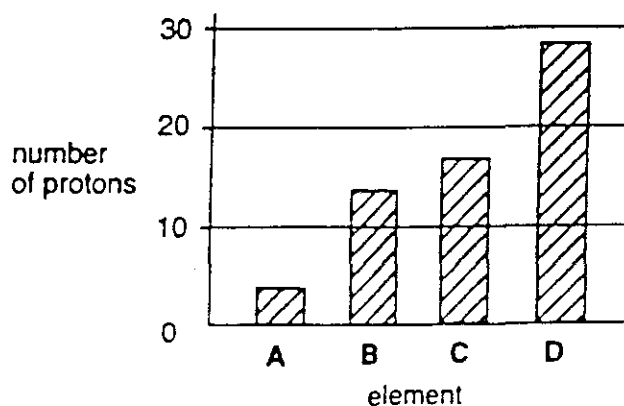
<i>element</i>	<i>metallic or non-metallic</i>	<i>reaction with water</i>
A	metal	reacts
B	metal	no reaction
C	non-metal	reacts
D	non-metal	no reaction

- 23 Which of the following is a transition element?

- A aluminium
- B iron
- C magnesium
- D sodium

- 24 The bar chart shows the numbers of protons in the atoms of four elements.

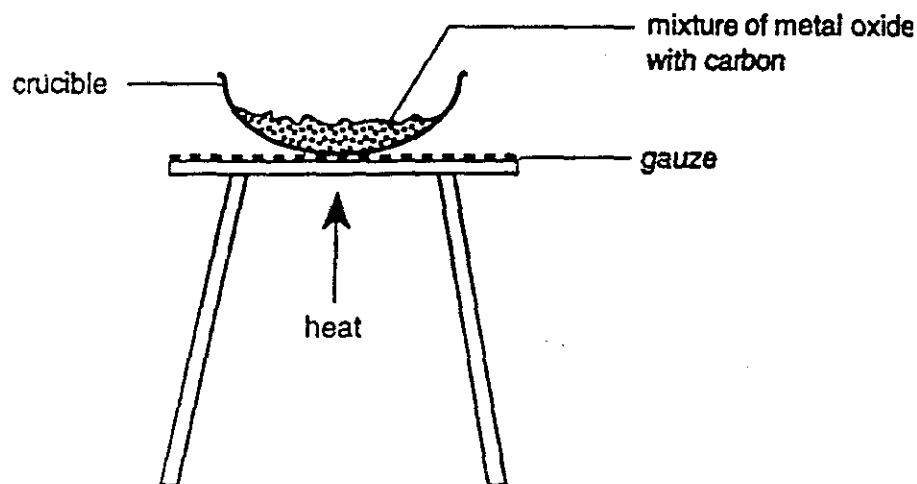
Which element is a transition metal?



25 Which products are formed when magnesium reacts with steam?

- A magnesium hydroxide and hydrogen
- B magnesium hydroxide and oxygen
- C magnesium oxide and hydrogen
- D magnesium oxide and oxygen

26 An experiment was carried out as shown.



The table shows the results.

<i>oxide</i>	<i>reaction</i>
aluminium oxide	none
calcium oxide	none
iron(III) oxide	iron formed
lead(II) oxide	lead formed

Which conclusion can be made from this information?

- A Aluminium and calcium are more reactive than lead and iron.
- B Aluminium is the most reactive of these four materials.
- C Lead and iron are more reactive than aluminium and calcium.
- D Lead is the most reactive of these four metals.

27 Which metal is obtained from haematite?

- A aluminium
- B copper
- C iron
- D zinc

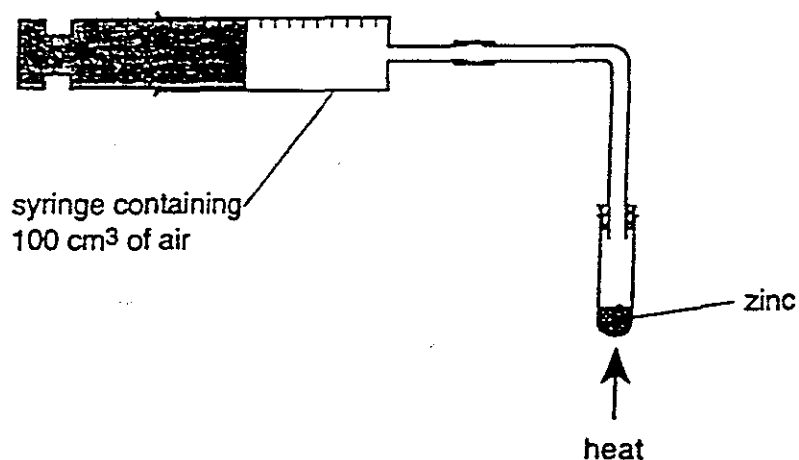
28 What type of substance is steel?

- A an alloy
- B a catalyst
- C a plastic
- D a salt

29 Which of the following substances is used in the purification of water?

- A calcium sulphate
- B carbon dioxide
- C chlorine
- D sodium chloride

30 The diagram shows apparatus used to measure the proportion, by volume, of oxygen in the air.



What was the approximate volume of gas left after the zinc had cooled down?

- A 3 cm³
- B 20 cm³
- C 80 cm³
- D 100 cm³

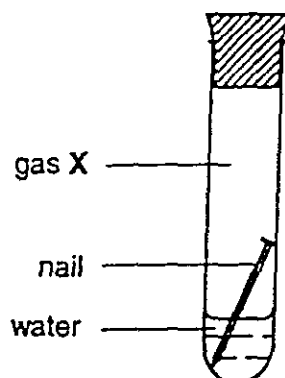
31 A steel works and a chemical works were built near to a city. The limestone buildings in the city have now begun to crumble.

Which gas is most likely to have caused this damage?

- A carbon dioxide
- B carbon monoxide
- C oxygen
- D sulphur dioxide

32 An iron nail was placed in a closed test-tube, as shown.

The nail slowly rusted.



What was gas X?

- A carbon dioxide
- B hydrogen
- C nitrogen
- D oxygen

33 A fertiliser contains an ammonium compound.

Which element must be present in the fertiliser?

- A iron
- B nitrogen
- C sodium
- D sulphur

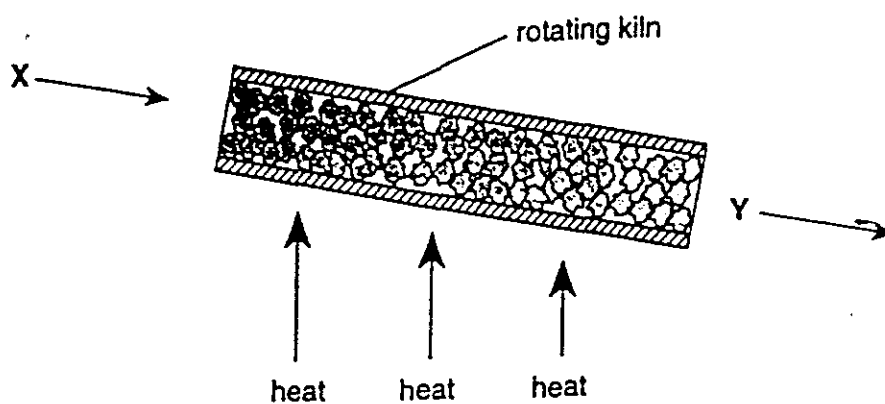
34 Three processes are listed.

- 1 burning petrol in a car engine
- 2 cracking of alkanes to form alkenes
- 3 heating limestone to make lime

Which processes produce carbon dioxide?

- A 1 only
- B 2 only
- C 1 and 3 only
- D 2 and 3 only

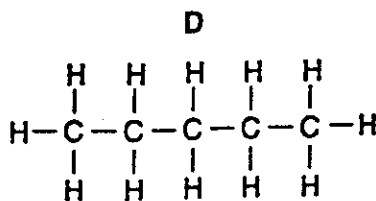
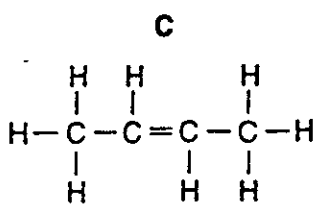
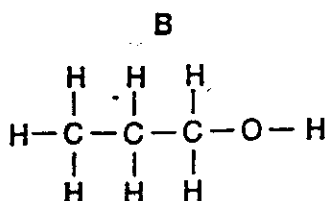
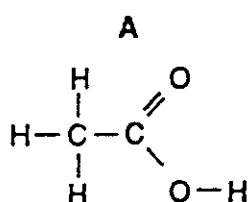
35 The diagram shows a lime kiln.



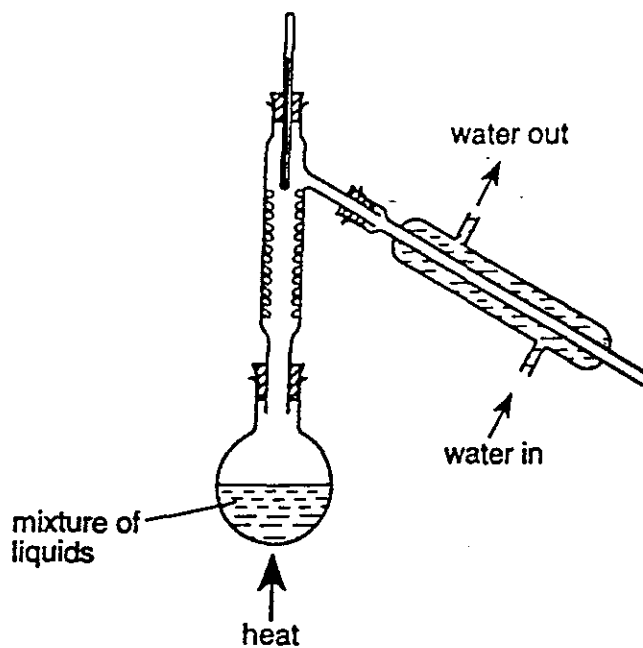
What are X and Y?

- | | X | Y |
|---|-------------|-------------|
| A | lime | limestone |
| B | lime | slaked lime |
| C | limestone | lime |
| D | slaked lime | lime |

36 Which structure shown is that of an alkane?



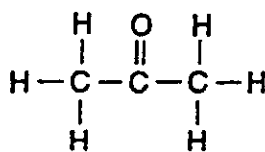
37 The laboratory apparatus shown is used to separate mixtures.



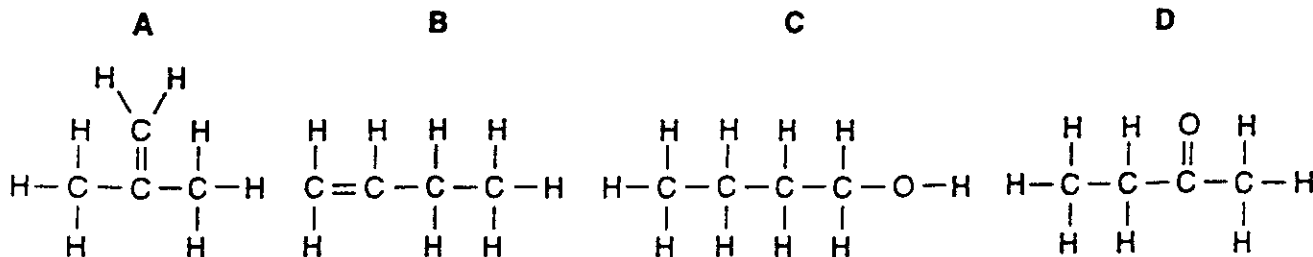
For which mixture is the apparatus most suitable?

- A air
- B coal
- C natural gas
- D petroleum

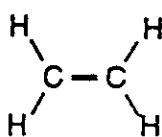
38 Propanone has the structure shown.



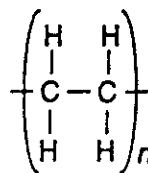
Which compound is in the same homologous series as propanone?



39 The diagram shows the structures of ethene and poly(ethene).



ethene



poly(ethene)

Which of the following is the same for both structures?

- A chemical properties
- B empirical formula
- C molecular formula
- D number of bonds

40 Which equation shows the formation of ethanol from ethene?

- A $\text{CH}_4 + \text{H}_2\text{O} \longrightarrow \text{CH}_3\text{OH} + \text{H}_2$
- B $\text{C}_2\text{H}_4 + \text{H}_2\text{O} \longrightarrow \text{C}_2\text{H}_5\text{OH}$
- C $\text{C}_2\text{H}_4 + 2\text{H}_2\text{O} \longrightarrow \text{HOCH}_2\text{CH}_2\text{OH} + \text{H}_2$
- D $\text{C}_2\text{H}_6 + \text{H}_2\text{O} \longrightarrow \text{C}_2\text{H}_5\text{OH} + \text{H}_2$

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
CHEMISTRY **0620/1**

PAPER 1 Multiple Choice

Tuesday

12 MAY 1998

Morning

45 minutes

Additional materials:

Mathematical tables

Multiple Choice answer sheet

Soft clean eraser

Soft pencil (type B or HB is recommended)

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are forty questions in this paper. Answer all questions. For each question, there are four possible answers, A, B, C and D. Choose the one you consider correct and record your choice in soft pencil on the separate answer sheet.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

A copy of the Periodic Table is printed on page 16.

Any rough working should be done in this booklet.

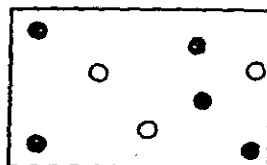
This question paper consists of 14 printed pages and 2 blank pages.

128

1 When water is warmed, what happens to its molecules?

- | | <i>movement of molecules</i> | <i>size of molecules</i> |
|---|------------------------------|--------------------------|
| A | faster | decreases |
| B | faster | stays the same |
| C | slower | decreases |
| D | slower | stays the same |

2 In the diagram, O and ● are different atoms.



What is represented by the diagram?

- A a compound
 B a metal
 C a mixture
 D a solid
- 3 Which mixture can be separated by adding water, stirring and filtering?
- A calcium carbonate and sodium chloride
 B copper(II) sulphate and sodium chloride
 C iron and magnesium
 D dilute hydrochloric acid and dilute sulphuric acid
- 4 The reaction between solution P and solution Q is exothermic.

A student is told to test this statement by mixing equal volumes of the two solutions and measuring the temperature change.

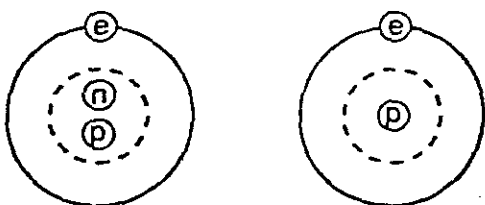
Which two of the following pieces of apparatus does the student need?

- A balance and burette
 B balance and clock
 C burette and thermometer
 D clock and thermometer

- 5 Which property of the atoms of an element fixes where the element is placed in the Periodic Table?
- A the number of neutrons
 - B the number of protons
 - C the total number of protons plus neutrons
 - D the total number of protons plus neutrons plus electrons

- 6 Which two diagrams show two different types of atom of the same element?

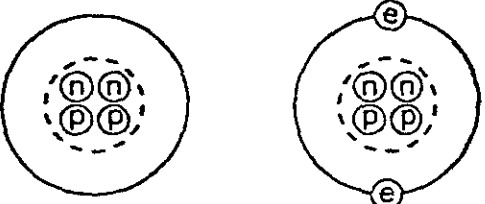
A



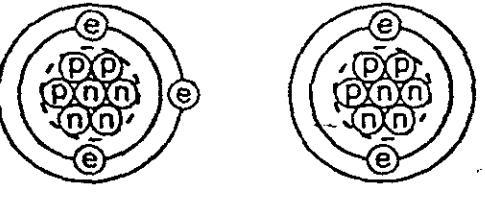
key

- Ⓟ = a proton
- Ⓝ = a neutron
- ⓔ = an electron
- ⊖ = a nucleus

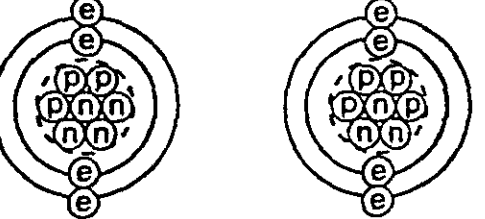
B



C

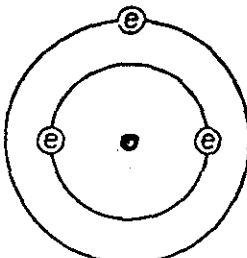


D

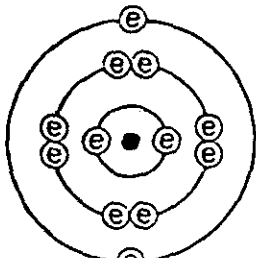


- 7 Which diagram shows an atom in the same group of the Periodic Table as sodium?

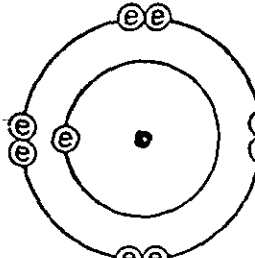
A



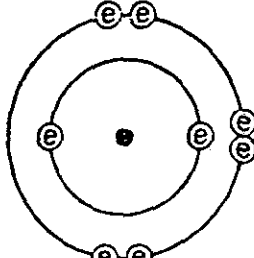
B



C



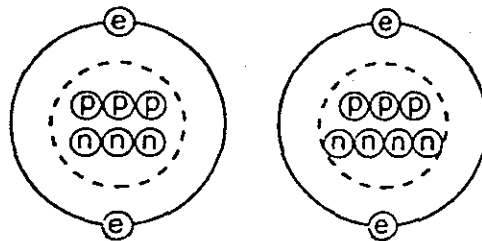
D



key

- ⓔ = an electron
- = nucleus

- 8 The diagrams show two ions with the same charge.



key

⊖ = an electron

⊖ = a neutron

Ⓟ = a proton

⊖ = a nucleus

What is the charge on each of these ions?

- A +1 B +2 C -1 D -2
- 9 What is the formula of copper(II) oxide and of sulphur dioxide?

	<i>copper(II) oxide</i>	<i>sulphur dioxide</i>
A	CuO	S ₂ O
B	CuO	SO ₂
C	Cu ₂ O	S ₂ O
D	Cu ₂ O	SO ₂

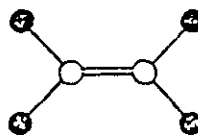
- 10 The equation shows the reaction between aluminium oxide and hydrochloric acid.



Which values of x and y are needed to balance this equation?

	x	y
A	3	1
B	3	2
C	6	1
D	6	2

- 11 A student made a correct model of a molecule, using different sizes of sphere for different atoms, as shown.

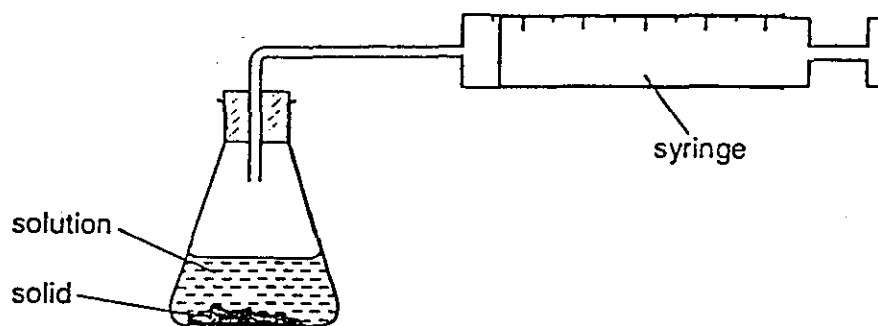


Which of the following could be the molecular formula of this molecule?

- A H₂O₄ B H₄O₂ C C₂H₄ D C₄H₂

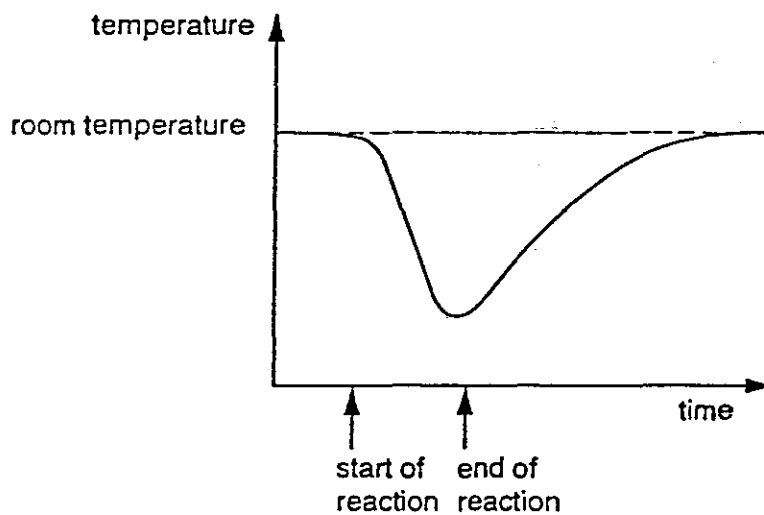
- 12 The electrolysis of concentrated aqueous sodium chloride produces sodium hydroxide.
Which two other substances are also produced?
- A chlorine and hydrogen
 - B chlorine and sodium
 - C hydrogen and sodium
 - D hydrogen and oxygen
- 13 In the electrolytic manufacture of aluminium, which substance is used to dissolve aluminium oxide?
- A cryolite
 - B graphite
 - C hydrochloric acid
 - D sodium hydroxide
- 14 Some fuels react with oxygen to release energy.
To which fuel does this statement not apply?
- A coal
 - B hydrogen
 - C methane
 - D uranium
- 15 Which process can convert molecules to a new substance by removing hydrogen atoms?
- A displacement
 - B fermentation
 - C neutralisation
 - D oxidation
- 16 In which reaction is the underlined substance being reduced?
- A copper(II) oxide + carbon \rightarrow copper + carbon dioxide
 - B iron + sulphur \rightarrow iron(II) sulphide
 - C sodium chloride + silver nitrate \rightarrow sodium nitrate + silver chloride
 - D zinc + sulphuric acid \rightarrow zinc sulphate + hydrogen

- 17 The speed with which a solid reacts with a solution to produce a gas can be measured by using the apparatus shown.



Which essential item is missing from the diagram?

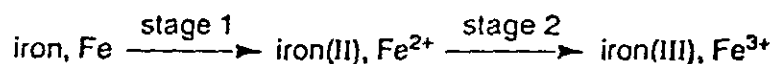
- A a Bunsen burner
 - B a catalyst
 - C a clock
 - D a thermometer
- 18 The graph shows the temperature change during the investigation of a chemical reaction.



Which type of reaction took place?

- A endothermic
- B exothermic
- C redox
- D reversible

19 The rusting of iron involves two stages:



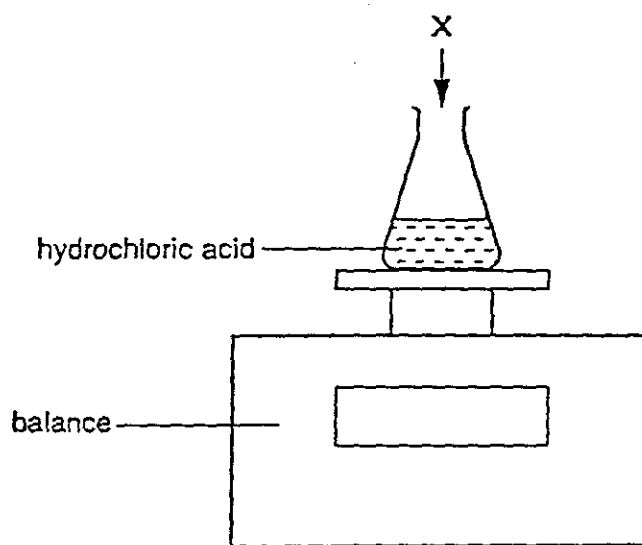
How are these stages described?

- | | <i>stage 1</i> | <i>stage 2</i> |
|---|----------------|----------------|
| A | oxidation | oxidation |
| B | oxidation | reduction |
| C | reduction | oxidation |
| D | reduction | reduction |

20 Which salt, in aqueous solution, gives a white precipitate with aqueous silver nitrate?

- A ammonium nitrate
- B calcium nitrate
- C potassium chloride
- D potassium iodide

21 Solid X is added to the flask shown. After five minutes, the reading on the balance has decreased.



Which of the following could be X?

- A copper
- B copper(II) carbonate
- C copper(II) oxide
- D copper(II) sulphate

22 An excess of dilute hydrochloric acid is added to aqueous sodium hydroxide.

What is the pH of the aqueous sodium hydroxide before the acid is added and of the final mixture?

	pH of aqueous sodium hydroxide	pH of final mixture
A	3	7
B	7	3
C	12	3
D	12	7

23 Which of the following does not react with oxygen?

- A aluminium
- B argon
- C lithium
- D zinc

24 Which Group I metal and which Group VII non-metal would react together most vigorously?

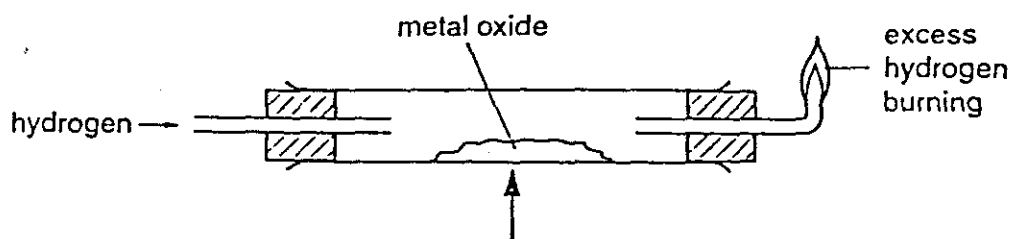
- | | Group I | Group VII |
|---|-----------|-----------|
| A | lithium | bromine |
| B | lithium | chlorine |
| C | potassium | bromine |
| D | potassium | chlorine |

25 The table gives information about the properties of some metals and their iodides.

Which metal is most likely to be a transition metal?

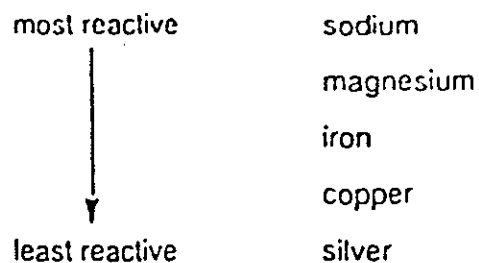
metal	density of metal in g/cm^3	melting point of metal / $^{\circ}\text{C}$	colour of iodide
A	0.97	98	white
B	3.6	710	white
C	10.5	961	yellow
D	11.3	327	yellow

- 26 The diagram shows one method for changing a metal oxide into a metal.



- Which oxide can be changed into a metal using this method?
- A calcium oxide
 - B copper(II) oxide
 - C magnesium oxide
 - D potassium oxide
- 27 A storage tank is to be used to store either water or dilute sulphuric acid.
- Which material cannot be used for making the tank?
- A glass
 - B copper
 - C poly(ethene)
 - D zinc
- 28 Which of the following is made from stainless steel?
- A aircraft frames
 - B car bodies
 - C electrical cables
 - D knives and forks

29 The position of some metals in the reactivity series is shown.



Which two metals cannot be extracted from their oxide by reduction with carbon?

- A sodium and magnesium
- B magnesium and iron
- C iron and copper
- D copper and silver

30 Four samples of sea-water are treated.

Which treatment gives water with the least amount of dissolved salts?

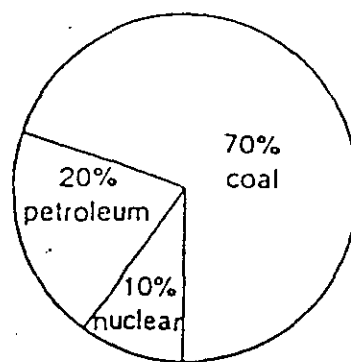
- A chlorination
- B distillation
- C filtration
- D neutralisation

31 In some countries, ethanol, rather than petrol, is used as fuel for cars.

Which gas is not present in the exhaust from cars that burn ethanol?

- A carbon dioxide
- B nitrogen
- C oxides of nitrogen
- D sulphur dioxide

32 The diagram shows the sources of energy a country uses to generate electricity.



What is the total percentage of fuels used which, when burned, could produce acid rain?

- A 20% B 80% C 90% D 100%

33 When acetylene and oxygen react, the hot flame can be used to weld steel.

What does this statement show?

- A Acetylene and oxygen react exothermically.
 B Acetylene is saturated.
 C Oxygen and steel react endothermically.
 D Oxygen is a gaseous fuel.

34 How can the presence of an ammonium salt in solution be shown?

- A displace ammonia from the solution and test the gas with damp blue litmus paper
 B displace ammonia from the solution and test the gas with damp red litmus paper
 C put blue litmus paper into the solution
 D put red litmus paper into the solution

35 Which word equation represents the reaction by which lime is manufactured from limestone?

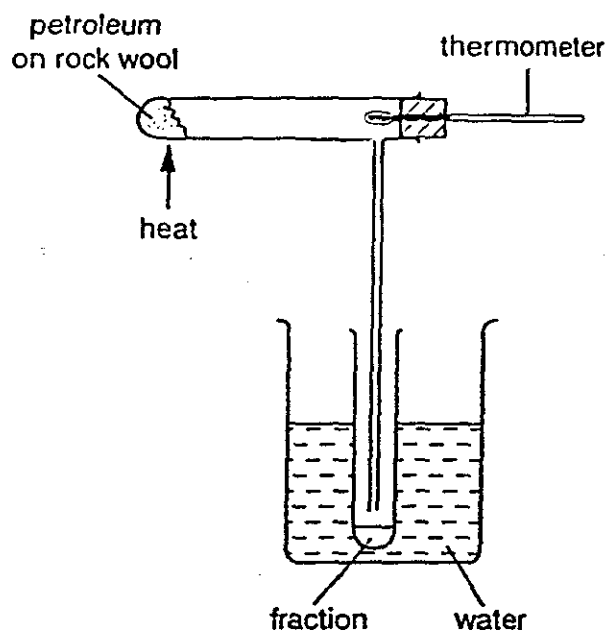
- A calcium carbonate \rightarrow calcium hydroxide + carbon dioxide
 B calcium carbonate \rightarrow calcium oxide + carbon dioxide
 C calcium carbonate \rightarrow calcium hydroxide + carbon monoxide
 D calcium carbonate \rightarrow calcium oxide + carbon monoxide

36 Four types of organic compound have names ending in *-ane*, *-ene*, *-ol* or *-oic acid*.

How many of these types of compound contain oxygen?

- A 1 B 2 C 3 D 4

37 Apparatus used to separate petroleum into four fractions is shown.



Which fraction contains the smallest hydrocarbon molecules?

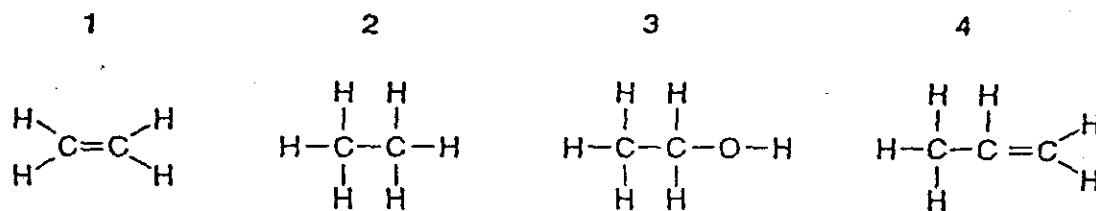
<i>fraction</i>	<i>boiling point range / °C</i>
A	up to 70
B	70 to 120
C	120 to 170
D	over 170

38 Which statement about a family of organic compounds describes an homologous series?

All compounds in the family have the same

- A functional group.
- B physical properties.
- C relative molecular mass.
- D structural formula.

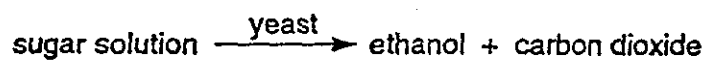
39 The structures of four organic compounds are shown.



Which two compounds are saturated?

- A 1 and 2 B 1 and 4 C 2 and 3 D 2 and 4

40 A chemical reaction to produce ethanol is shown below.



At which temperature is this reaction fastest?

- A 5 °C B 20 °C C 35 °C D 100 °C

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

CHEMISTRY

0620/1

PAPER 1 Multiple Choice

Monday 2 NOVEMBER 1998 Afternoon 45 minutes

Additional materials:

- Mathematical tables
- Multiple Choice answer sheet
- Soft clean eraser
- Soft pencil (type B or HB is recommended)

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are forty questions in this paper. Answer all questions. For each question, there are four possible answers, A, B, C and D. Choose the one you consider correct and record your choice in soft pencil on the separate answer sheet.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

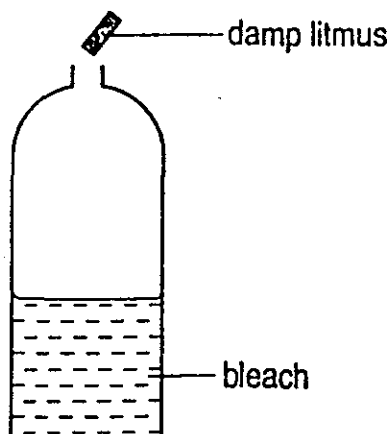
Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 20.

This question paper consists of 17 printed pages and 3 blank pages.

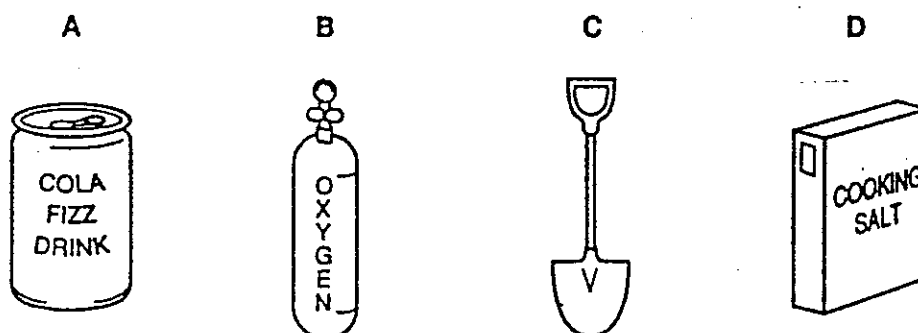
141

- 1 Damp litmus paper held near the top of a bottle can be used to test for the gas present in bleach.



By which process does the gas reach the litmus paper?

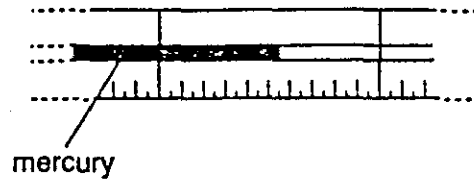
- A diffusion
 - B distillation
 - C fermentation
 - D filtration
- 2 Which of the following contains substances in all three states of matter?



- 3 How can crystals be obtained from a hot, concentrated solution of a salt?

- A by adding cold water
- B by cooling and then filtering
- C by filtering only
- D by filtering and drying the residue

- 4 The diagram represents part of the stem of a thermometer for use up to 50 °C.

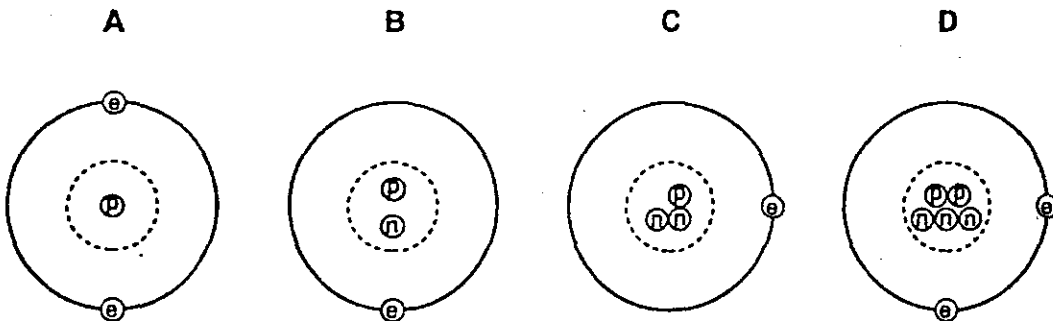


Which of the following could be the temperature shown on the thermometer?

- A 35.0 °C B 35.5 °C C 44.0 °C D 44.5 °C
- 5 An atom of any element must contain equal numbers of

- A electrons and neutrons.
 B electrons and protons.
 C neutrons and protons.
 D electrons, neutrons and protons.

- 6 Which of the following has a nucleon (mass) number of 3?



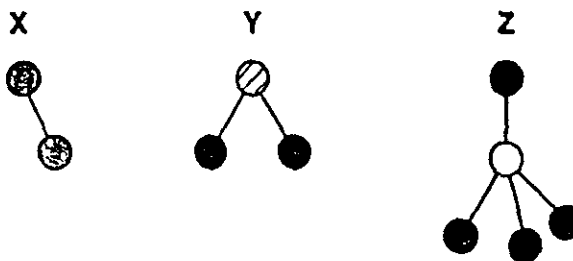
key

- Ⓟ = a proton
 Ⓝ = a neutron
 ⓔ = an electron
 Ⓞ = nucleus

- 7 How do metals form their ions?

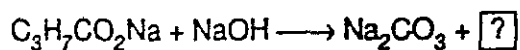
- A by gaining electrons
 B by gaining protons
 C by losing electrons
 D by losing protons

- 8 The diagrams show models of covalent molecules.



Which molecules could the models represent?

- | | X | Y | Z |
|---|----------|----------|----------|
| A | chlorine | methane | water |
| B | chlorine | water | methane |
| C | methane | water | chlorine |
| D | water | chlorine | methane |
- 9 Which of the following is a balanced equation for the reaction between carbon dioxide and aqueous calcium hydroxide?
- A $\text{CO} + \text{Ca}(\text{OH})_2 \longrightarrow \text{CaCO}_2 + \text{H}_2\text{O}$
- B $\text{CO}_2 + \text{CaOH}_2 \longrightarrow \text{CaCO}_3 + \text{H}_2$
- C $\text{CO}_2 + \text{CaOH}_2 \longrightarrow \text{CaCO}_2 + \text{H}_2\text{O}$
- D $\text{CO}_2 + \text{Ca}(\text{OH})_2 \longrightarrow \text{CaCO}_3 + \text{H}_2\text{O}$
- 10 When sodium butanoate, $\text{C}_3\text{H}_7\text{CO}_2\text{Na}$, is heated with solid sodium hydroxide, a hydrocarbon is formed as one of the products. The incomplete equation is given below.

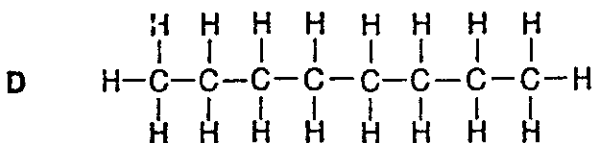
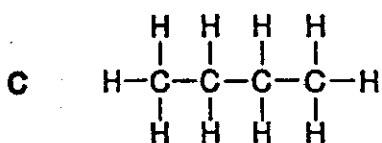
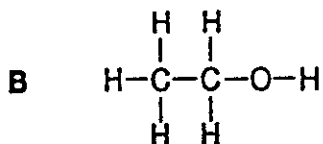
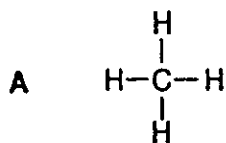


What is needed to complete the equation?

- A C_3H_7 B C_3H_8 C $3\text{CH}_2 + \text{H}_2\text{O}$ D $\text{C}_3\text{H}_8 + \text{H}_2\text{O}$

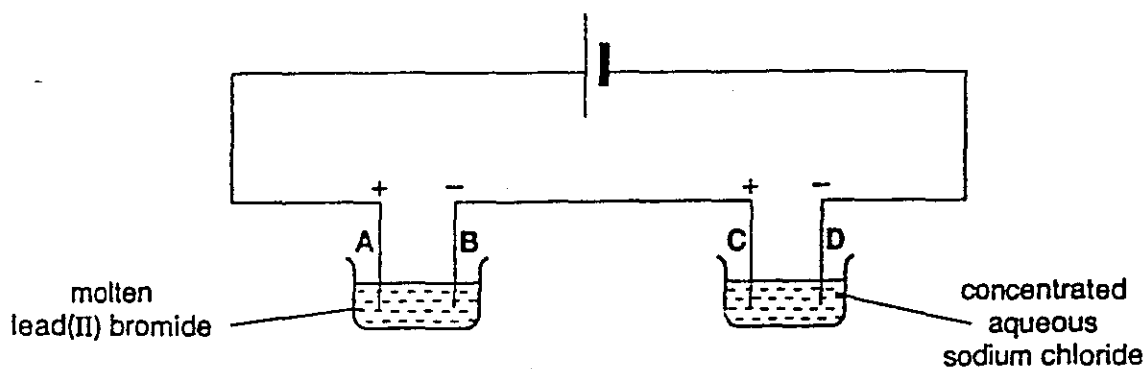
11 The molecular formulae of four fuels are shown.

When completely burned, which fuel gives the most water per carbon atom?

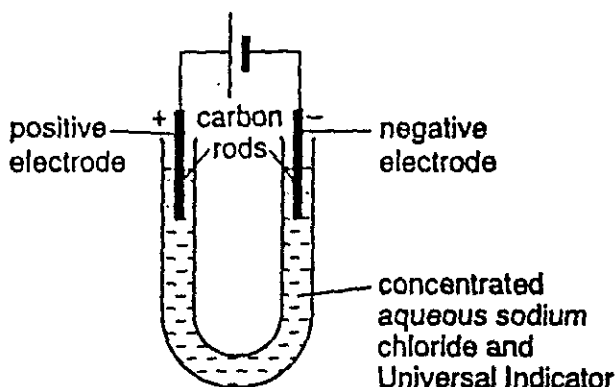


12 The following electrolysis circuit is set up, using inert electrodes.

At which electrode is a metal deposited?



- 13 An electric current is passed through the apparatus shown. The Universal Indicator turns blue around one electrode and colourless around the other electrode.



What is produced at the electrodes?

- | | <i>positive electrode</i> | <i>negative electrode</i> |
|---|---------------------------|---------------------------|
| A | acid | chlorine |
| B | alkali | chlorine |
| C | chlorine | acid |
| D | chlorine | alkali |
- 14 Which process is endothermic?
- A burning carbon to form carbon dioxide
- B condensing steam to water
- C melting ice to form water
- D reacting sodium with water
- 15 A chemical reaction between pieces of a solid and an acid is very fast.

Which changes would make the reaction slower?

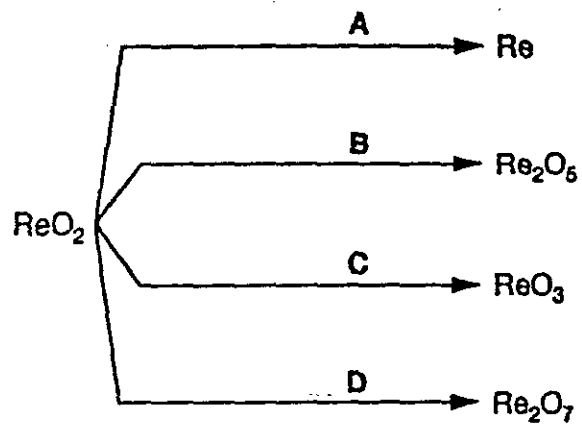
- | | <i>pieces of solid</i> | <i>acid</i> |
|---|------------------------|-------------------|
| A | smaller | less concentrated |
| B | smaller | more concentrated |
| C | larger | less concentrated |
| D | larger | more concentrated |

- 16 In separate experiments, a catalyst is added to a reaction mixture and the temperature of the mixture is decreased.

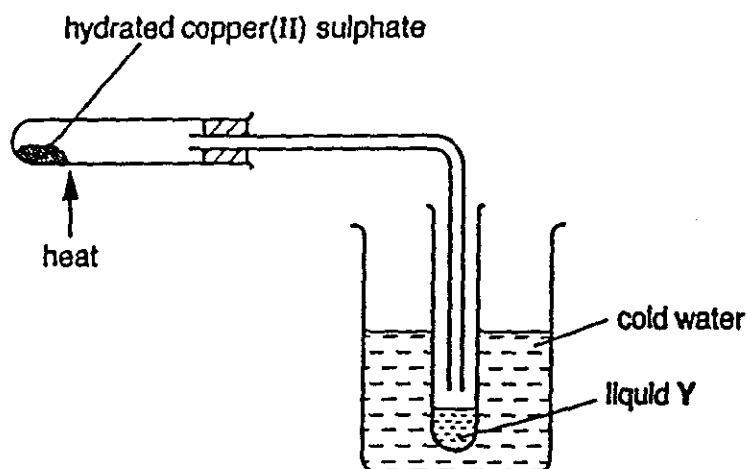
What is the effect of these changes on the speed of the reaction?

	<i>catalyst added</i>	<i>temperature decreased</i>
A	faster	faster
B	faster	slower
C	slower	faster
D	slower	slower

- 17 In which change is rhenium(IV) oxide, ReO_2 , reduced?

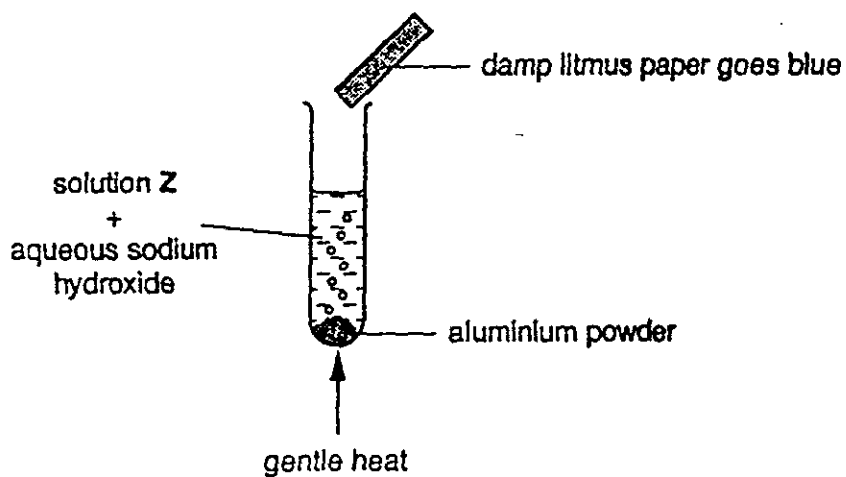


- 18 When hydrated copper(II) sulphate is heated in the apparatus shown, solid X and liquid Y are produced.



What changes are noticed when liquid Y is added to cold solid X?

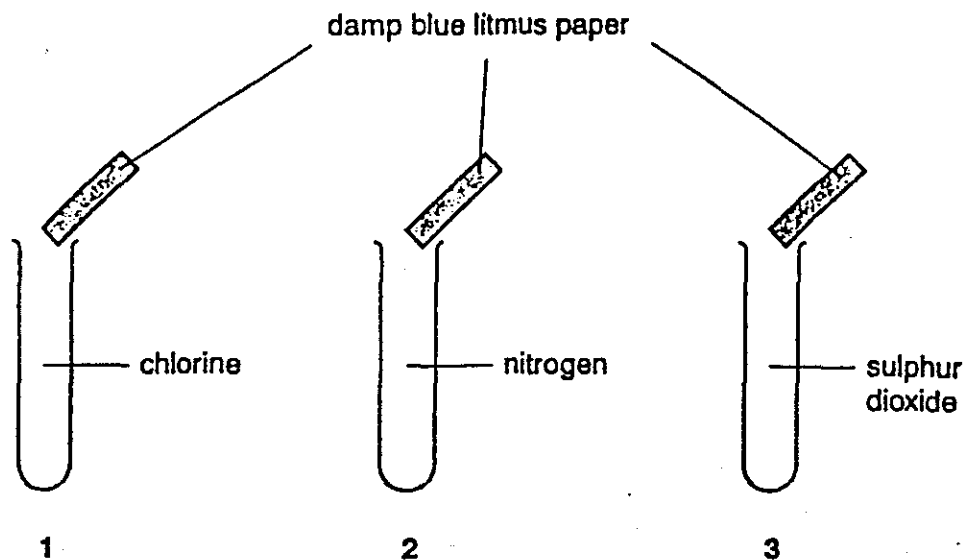
- | | <i>colour change</i> | <i>heat change</i> |
|---|----------------------|--------------------|
| A | blue to white | heat given out |
| B | blue to white | heat taken in |
| C | white to blue | heat given out |
| D | white to blue | heat taken in |
- 19 The diagram shows the result of testing an aqueous solution Z.



Which ion is present in solution Z?

- A carbonate
- B chloride
- C nitrate
- D sulphate

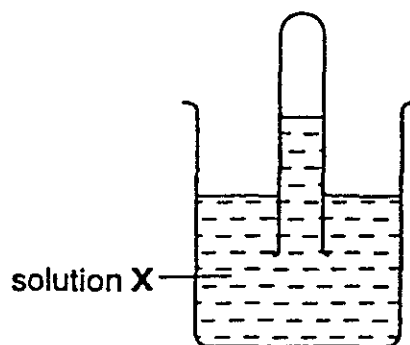
20 Pieces of damp blue litmus paper are placed near three test-tubes.



For which test-tubes does the litmus paper change colour?

- A 1 and 2 only
 - B 1 and 3 only
 - C 2 and 3 only
 - D 1, 2 and 3
- 21 A test-tube full of a gas is placed upside down in solution X.

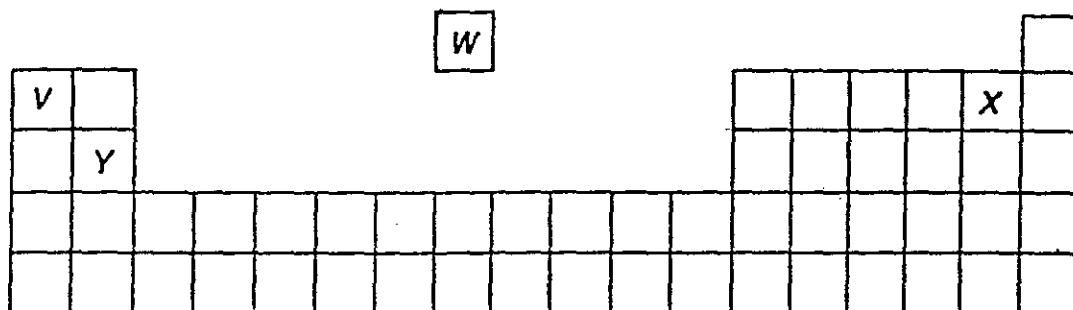
The result is shown.



What is solution X and what is the gas?

	solution X	gas
A	sodium hydroxide	carbon dioxide
B	sodium hydroxide	sulphur dioxide
C	water	ammonia
D	water	a mixture of ammonia and nitrogen

- 22 Which of the following compounds is coloured?
- A Iron(III) chloride
 - B lead(II) bromide
 - C potassium bromide
 - D sodium chloride
- 23 Why are some airships filled with helium rather than hydrogen?
- A Helium is found in air.
 - B Helium is less dense than hydrogen.
 - C Helium is more dense than hydrogen.
 - D Helium is unreactive.
- 24 The diagram shows an outline of the Periodic Table.



Which element is a metal and which is a non-metal?

	<i>metal</i>	<i>non-metal</i>
A	V	W
B	V	Y
C	W	X
D	X	Y

- 25 Some metals react readily with dilute hydrochloric acid.

Some metal oxides can be reduced by heating with carbon.

For which metal are both statements correct?

- A calcium
- B copper
- C iron
- D magnesium

- 26 X, Y and Z are three metals.

X can be extracted only by an electrolytic method.

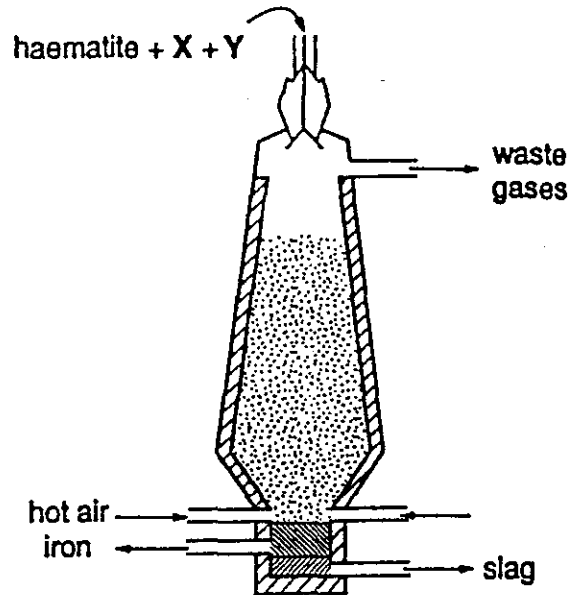
Y is found uncombined.

Z is made from its oxide by a blast furnace method.

What is the most probable order of reactivity of these metals?

	<i>most reactive</i>	→	<i>least reactive</i>
A	X	Y	Z
B	X	Z	Y
C	Z	X	Y
D	Z	Y	X

27 The diagram shows a blast furnace for extracting iron from haematite.



What are X and Y?

- | | X | Y |
|---|-----------|------|
| A | lime | coal |
| B | lime | coke |
| C | limestone | coal |
| D | limestone | coke |

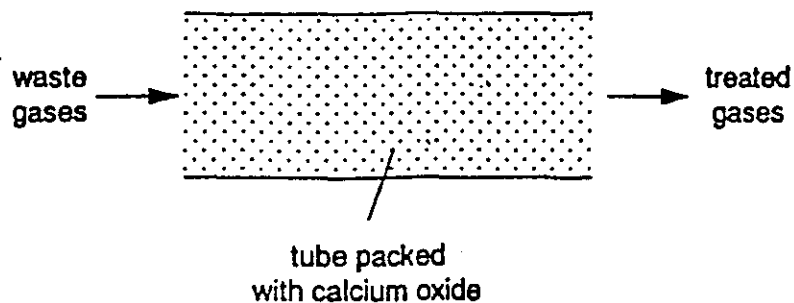
28 Which of the following can be used to make a steel?

- A aluminium, carbon, chromium
- B aluminium, copper, magnesium
- C carbon, chromium, iron
- D copper, iron, magnesium

29 Which element burns in oxygen to form an oxide which is liquid at room temperature?

- A helium
- B hydrogen
- C sodium
- D sulphur

30. The arrangement shown is used to treat the waste gases from a chemical process.

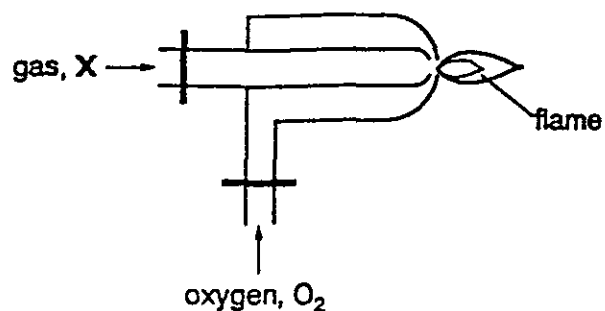


Which gas is removed from the waste gases?

- A hydrogen
 - B nitrogen
 - C oxygen
 - D sulphur dioxide
31. Which of the following gases are released into the air from burning coal?

	<i>carbon monoxide</i>	<i>carbon dioxide</i>	<i>sulphur dioxide</i>
A	yes	yes	yes
B	yes	yes	no
C	yes	no	yes.
D	no	yes	no

32. The diagram shows how oxygen is used in welding.



What is gas X?

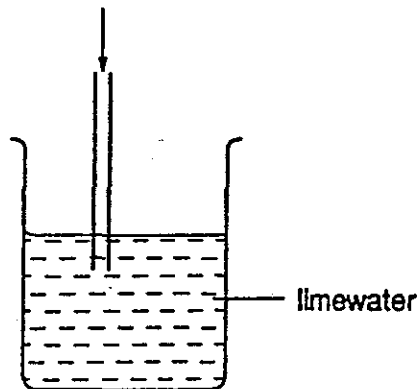
- A acetylene
- B argon
- C neon
- D nitrogen

33 When a mixture of ammonium chloride and substance X is heated, ammonia is produced.

What is substance X?

- A ammonium sulphate
- B barium chloride
- C calcium hydroxide
- D silver nitrate

34 A student blows down a tube into limewater, as shown.



A white precipitate is formed.

Which gas causes this change?

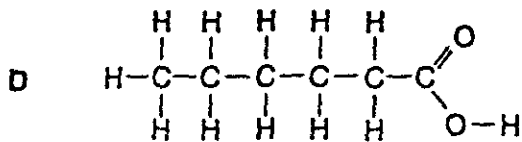
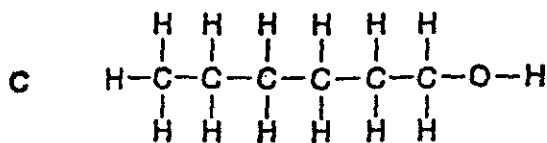
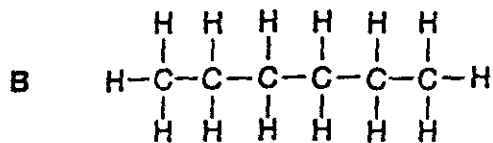
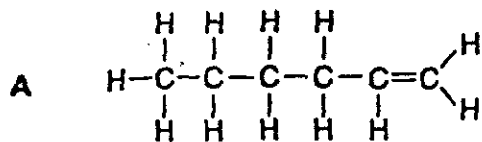
- A carbon dioxide
- B oxygen
- C nitrogen
- D water vapour

35 Slaked lime is used to neutralise an acidic soil.

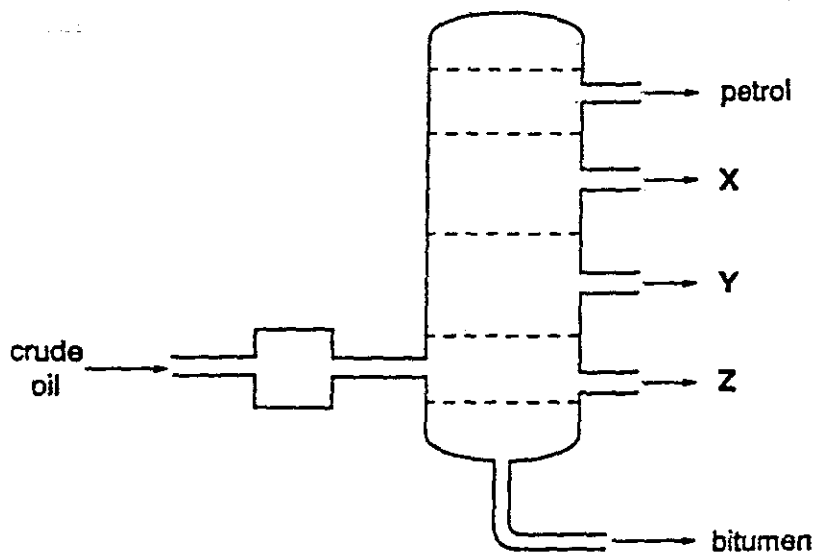
How does the pH of the soil change?

	<i>from</i>	<i>to</i>
A	6	7
B	6	8
C	8	7
D	8	6

36. Which structure could be hexene?



37. The diagram shows the separation of crude oil into fractions.



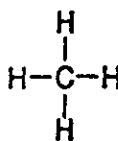
What could X, Y and Z represent?

	X	Y	Z
A	diesel	lubricating oil	paraffin
B	lubricating oil	diesel	paraffin
C	lubricating oil	paraffin	diesel
D	paraffin	diesel	lubricating oil

38 Which two substances belong to the same homologous series?

- A carbon monoxide and carbon dioxide
- B diamond and graphite
- C ethane and hexane
- D ethanol and ethanoic acid

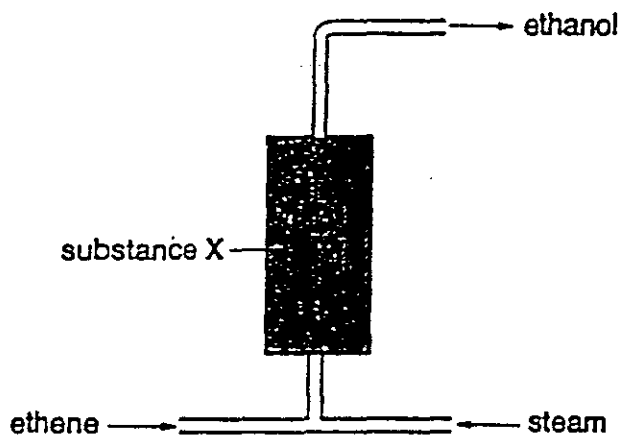
39 The diagram shows the structure of methane.



What is the total number of the electrons used for bonding in this molecule?

- A 2 B 4 C 8 D 10

40 The diagram shows the industrial preparation of ethanol.



What is the purpose of substance X?

- A to condense the steam
- B to polymerise the ethene
- C to react with the ethene
- D to speed up the reaction

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
CHEMISTRY **0620/1**

PAPER 1 Multiple Choice

Tuesday

18 MAY 1999

Morning

45 minutes

Additional materials:

Mathematical tables

Multiple Choice answer sheet

Soft clean eraser

Soft pencil (type B or HB is recommended)

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are **forty** questions in this paper. Answer **all** questions. For each question, there are four possible answers, **A, B, C** and **D**. Choose the **one** you consider correct and record your choice in **soft pencil** on the separate answer sheet.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

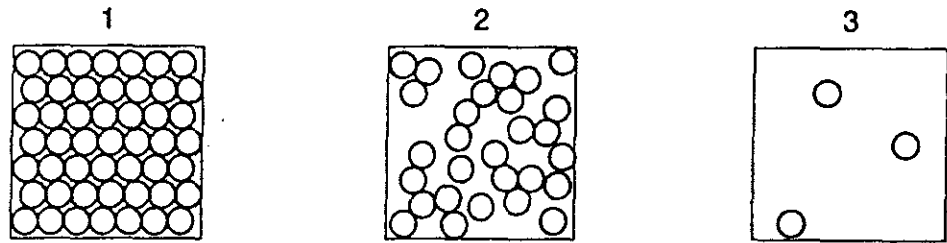
A copy of the Periodic Table is printed on page 16.

Any rough working should be done in this booklet.

This question paper consists of 15 printed pages and 1 blank page.

157

- 1 The diagrams show the arrangement of particles in the three states of matter.



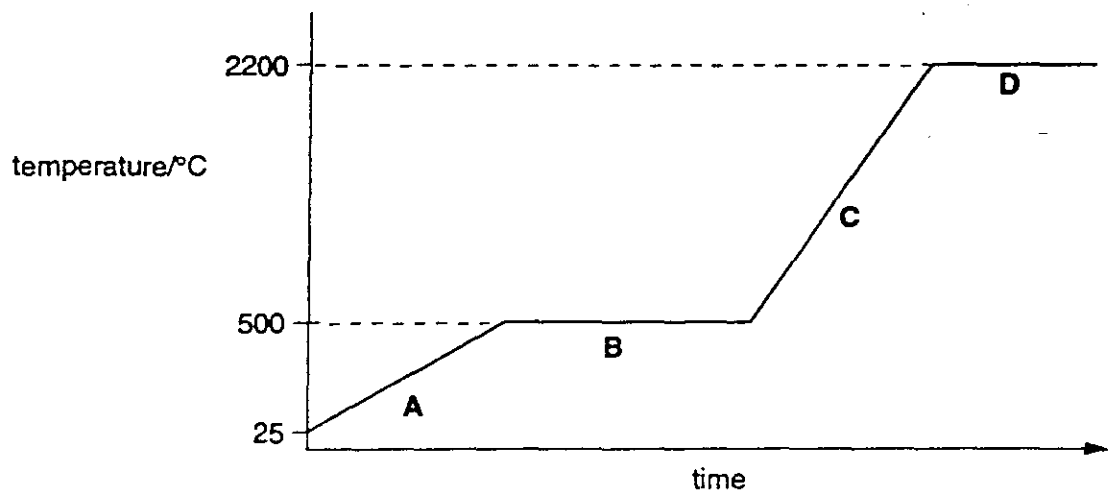
What are the three states?

	1	2	3
A	gas	liquid	solid
B	liquid	gas	solid
C	liquid	solid	gas
D	solid	liquid	gas

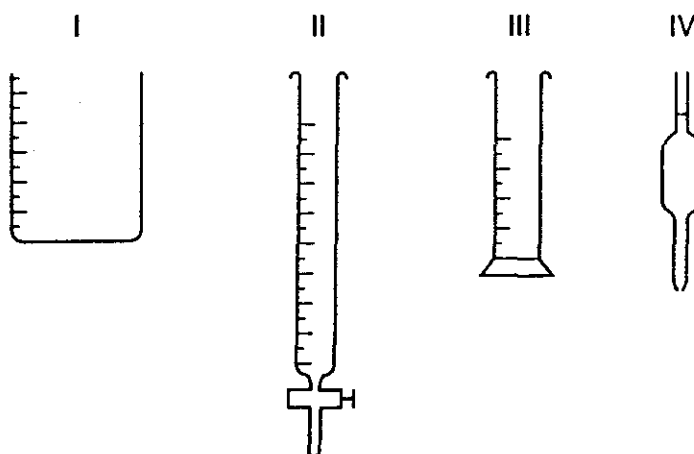
- 2 A solid metal is heated until it turns to vapour.

The graph shows the temperature of the metal during this process.

Which part of the graph represents the metal melting?



- 3 Which two pieces of apparatus can be used for accurately measuring 25.0 cm³ of a liquid?



	I	II	III	IV
A	✓	✓	✗	✗
B	✓	✗	✓	✗
C	✗	✓	✗	✓
D	✗	✗	✓	✓

key

✓ = yes

✗ = no

- 4 The melting points of four substances are given in the table.

Which substance could be pure sodium chloride?

	melting point / °C
A	78 to 82
B	80
C	780 to 820
D	800

- 5 How many protons, neutrons and electrons are present in an atom of the element with proton (atomic) number 6 and nucleon (mass) number 14?

	protons	neutrons	electrons
A	6	8	6
B	6	8	8
C	8	6	6
D	8	6	8

- 6 What is the correct arrangement of electrons in a sodium atom?

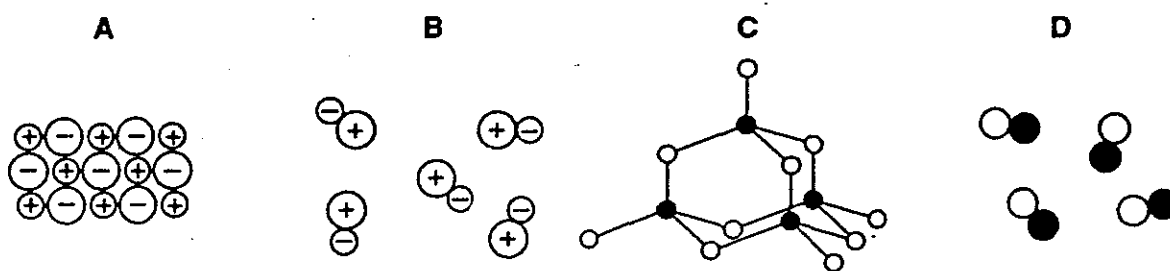
A 1.8.2 B 2.8.1 C 5.5.8.2 D 2.8.6.5

7 Which substance is a poor conductor of electricity both when solid and when liquid?

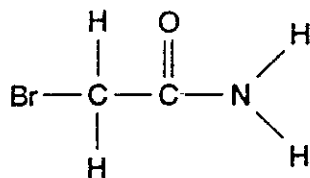
- A lithium chloride
- B magnesium
- C potassium oxide
- D sulphur

8 Sodium chloride is a crystalline ionic solid with the formula NaCl

Which diagram shows the arrangement of particles in solid sodium chloride?



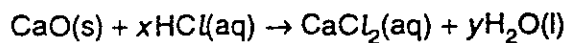
9 The structure of a molecule is shown.



How many different elements does the molecule contain?

- A 4
- B 5
- C 9
- D 10

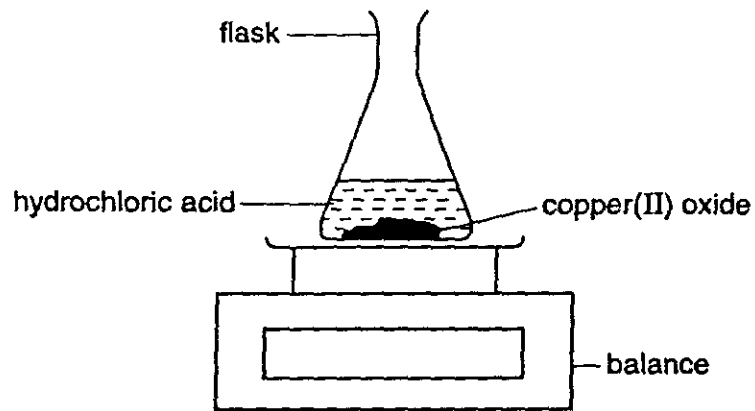
10 The equation shows the reaction between calcium oxide and hydrochloric acid.



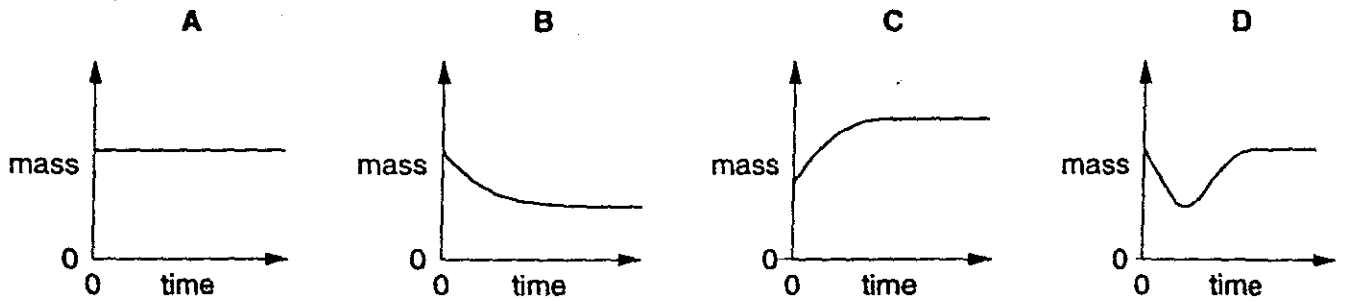
Which values of x and y are needed to balance this equation?

	x	y
A	1	1
B	1	2
C	2	1
D	2	2

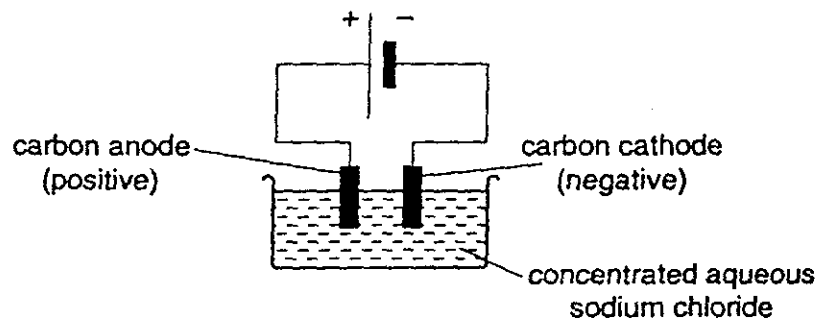
11 Dilute hydrochloric acid is added to copper(II) oxide in the apparatus shown.



Which graph shows how the balance reading changes during the reaction?



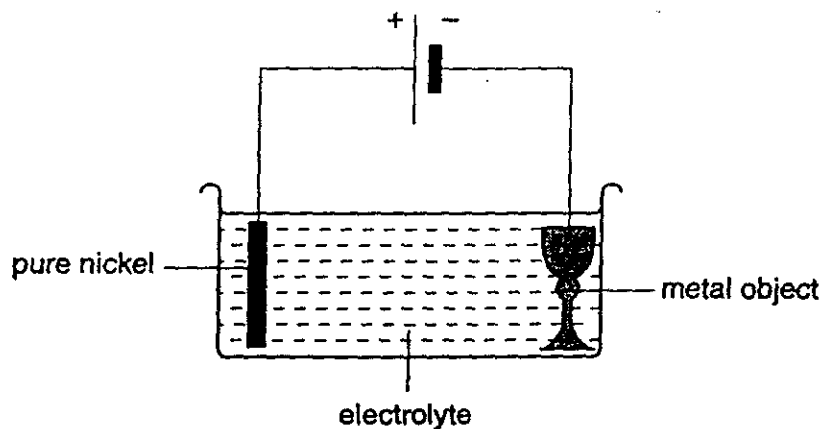
12 The diagram shows the electrolysis of concentrated aqueous sodium chloride.



What is the product at the cathode?

- A chlorine
- B hydrogen
- C oxygen
- D sodium

13 A metal object can be plated with nickel by using the apparatus shown.



Which substance is the most suitable electrolyte?

- A aqueous nickel(II) chloride
- B dilute sulphuric acid
- C melted nickel(II) oxide
- D water

14 Which gas **cannot** be used as fuel?

- A carbon monoxide
- B hydrogen
- C methane
- D nitrogen

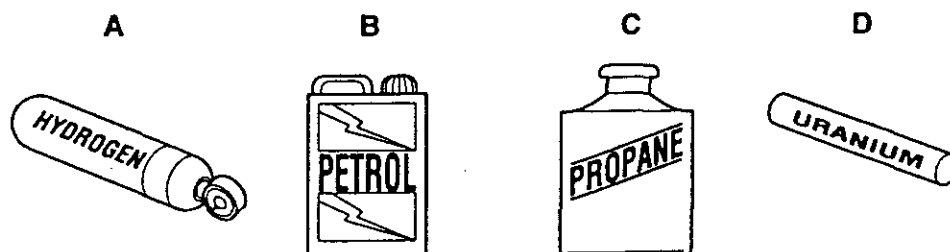
15 The equations for four reactions are given.

In which reaction does oxidation of the underlined substance occur?

- A $2\underline{\text{HgO}} \longrightarrow 2\text{Hg} + \text{O}_2$
- B $\underline{\text{N}_2} + 3\text{H}_2 \longrightarrow 2\text{NH}_3$
- C $\underline{\text{SrCO}_3} \longrightarrow \text{SrO} + \text{CO}_2$
- D $2\underline{\text{Zn}} + \text{O}_2 \longrightarrow 2\text{ZnO}$

- 16 The diagrams show fuels that can be used to produce energy.

Which fuel does **not** need oxygen to produce energy?



- 17 Magnesium burns in air with a bright flame.

Which terms apply to this reaction?

	endothermic	redox
A	✓	✓
B	✓	x
C	x	✓
D	x	x

Key

✓ = yes

x = no

- 18 In four experiments, portions of powdered zinc are added to dilute hydrochloric acid.

In which experiment is the speed of reaction greatest at the beginning?

experiment	temperature of acid /°C	concentration of acid
A	20	high
B	20	low
C	30	high
D	30	low

- 19 Which pH change occurs when water dissolves an alkali?

- A 1 → 7
 B 1 → 12
 C 7 → 1
 D 7 → 12

20 Which gases are produced when a metal and a metal carbonate react with a dilute acid?

	metal	metal carbonate
A	hydrogen	carbon dioxide
B	hydrogen	carbon monoxide
C	oxygen	carbon dioxide
D	oxygen	carbon monoxide

21 A solution gives a coloured precipitate with aqueous sodium hydroxide and a white precipitate with acidified silver nitrate.

Which compound is present in the solution?

- A magnesium chloride
- B magnesium sulphate
- C manganese(II) chloride
- D manganese(II) sulphate

22 Element X is a colourless, unreactive gas.

Where is X in the Periodic Table?

- A Group I
- B Transition elements
- C Group VII
- D Group 0

23 Which element has properties most like those of arsenic, ${}_{33}\text{As}$?

- A antimony, Sb
- B germanium, Ge
- C selenium, Se
- D tin, Sn

24 What is the order of increasing reactivity of the elements in Group I and in Group VII?

	Group I	Group VII
A	Li \rightarrow Cs	F \rightarrow I
B	Li \rightarrow Cs	I \rightarrow F
C	Cs \rightarrow Li	F \rightarrow I
D	Cs \rightarrow Li	I \rightarrow F

- 25 A metal X reacts readily with dilute acids and its oxide is reduced by heating with carbon.
Compared with copper and sodium, where in the reactivity series of metals should X be placed?

- A above copper and above sodium
B above copper but below sodium
C below copper but above sodium
D below copper and below sodium

- 26 From the information given, which element could be titanium?

element	electrical conductivity	melting point
A	good	high
B	good	low
C	poor	high
D	poor	low

- 27 An aeroplane body, a car body and a spoon are made of metal.

Which object is made of which metal?

	aeroplane body	car body	spoon
A	aluminium	mild steel	stainless steel
B	aluminium	stainless steel	mild steel
C	mild steel	mild steel	stainless steel
D	mild steel	stainless steel	mild steel

28 The table lists three ways of extracting metals.

metal	description of extraction
1	heat metal ore with carbon
2	electrolyse melted metal chloride
3	simple purification because metal occurs naturally

What are the metals 1, 2 and 3?

	1	2	3
A	gold	magnesium	iron
B	iron	gold	magnesium
C	iron	magnesium	gold
D	magnesium	iron	gold

29 What is the formula of haematite and which calcium compound is added to the haematite in a blast furnace?

	formula	calcium compound
A	Fe_2O_3	calcium carbonate
B	Fe_2O_3	calcium silicate
C	Fe_3O_4	calcium carbonate
D	Fe_3O_4	calcium silicate

30 Which of the following is not present in clean air?

- A carbon dioxide
- B nitrogen
- C nitrogen dioxide
- D water vapour

- 31 Which row in the table about uses of oxygen is correct?

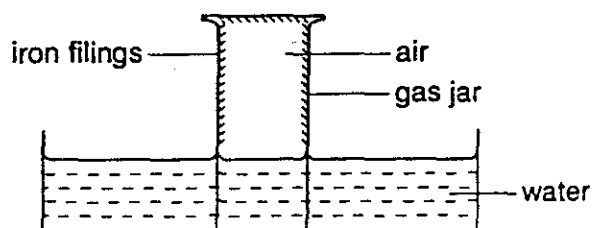
	forming ethanol from ethene	welding using acetylene
A	x	x
B	x	✓
C	✓	x
D	✓	✓

Key

✓ = yes

x = no

- 32 The diagram shows some iron filings inside a gas jar placed over water.



After several days, the water rises in the gas jar.

Why does the water rise?

- A The air in the gas jar dissolves.
 B The iron reacts with oxygen in the water.
 C The iron reacts with oxygen in the air.
 D The water vapour in the gas jar condenses.
- 33 Which compound contains all of the elements needed for a balanced fertiliser?

- A K_2SO_4
 B $K(NH_4)_2PO_4$
 C $(NH_2)_2CO$
 D $(NH_4)_2SO_4$

34 Four chemical changes are listed below.

- 1 burning coal
- 2 heating limestone
- 3 respiration
- 4 rusting of iron

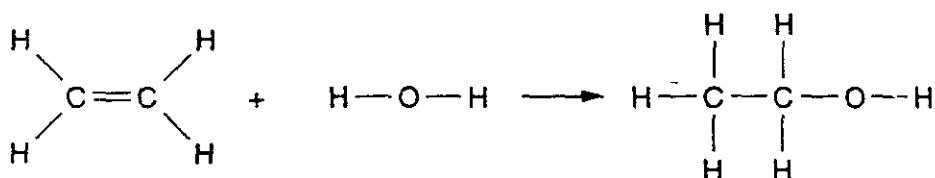
Which changes produce carbon dioxide?

- A 1 only
- B 1 and 2 only
- C 1, 2 and 3 only
- D 2, 3 and 4 only

35 Which substance is manufactured using calcium carbonate?

- A aluminium
- B cement
- C chlorine
- D poly(ethene)

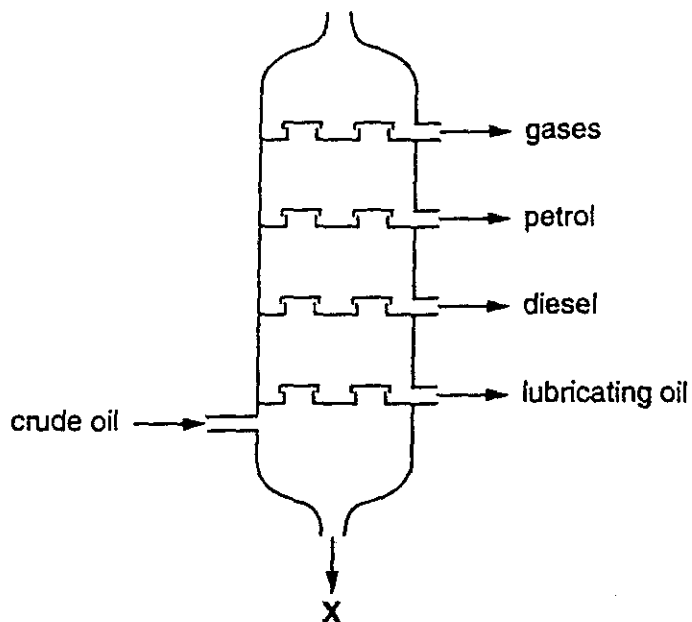
36 The equation for a reaction may be written as shown.



Which change is taking place?

- A ethane to ethanoic acid
- B ethane to ethanol
- C ethene to ethanoic acid
- D ethene to ethanol

37 The diagram shows the fractional distillation of crude oil (petroleum).



Which of the following is a use of fraction X?

- A aircraft fuel
- B fuel for cooking stoves
- C road making
- D waxes

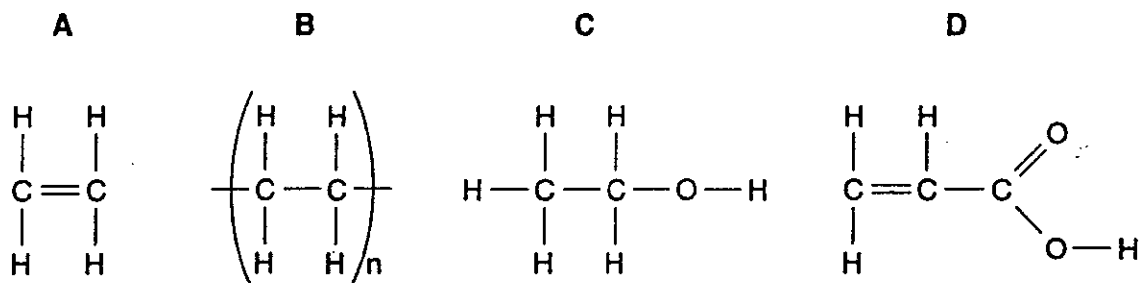
38 The structures of four compounds are shown.

1	2	3	4
$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}-\text{O}-\text{H} \\ \\ \text{H} \end{array}$	$\begin{array}{cc} \text{H} & \text{H} \\ & \\ \text{C} & = & \text{C} \\ & \\ \text{H} & \text{H} \end{array}$	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}-\text{H} \\ \\ \text{H} \end{array}$	$\begin{array}{ccc} \text{H} & & \text{H} \\ & & \\ \text{H}-\text{C} & - & \text{C}-\text{O}-\text{H} \\ & & \\ \text{H} & & \text{H} \end{array}$

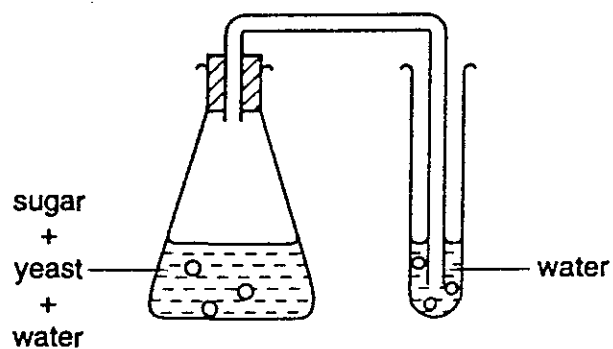
Which two compounds belong to the same homologous series?

- A 1 and 2
- B 1 and 4
- C 2 and 3
- D 2 and 4

39 Which structure shows an unsaturated hydrocarbon?



40 A student sets up the experiment shown to produce a solution of ethanol. The flask is left in a warm place. Bubbles are seen in the flask and in the test-tube.



Which type of reaction occurs?

- A cracking
- B fermentation
- C neutralisation
- D polymerisation

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

CHEMISTRY

0620/1

PAPER 1 Multiple Choice

Monday

1 NOVEMBER 1999

Afternoon

45 minutes

Additional materials:

Mathematical tables

Multiple Choice answer sheet

Soft clean eraser

Soft pencil (type B or HB is recommended)

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are **forty** questions in this paper. Answer **all** questions. For each question, there are four possible answers, **A, B, C** and **D**. Choose the **one** you consider correct and record your choice in **soft pencil** on the separate answer sheet.

Read **very carefully** the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

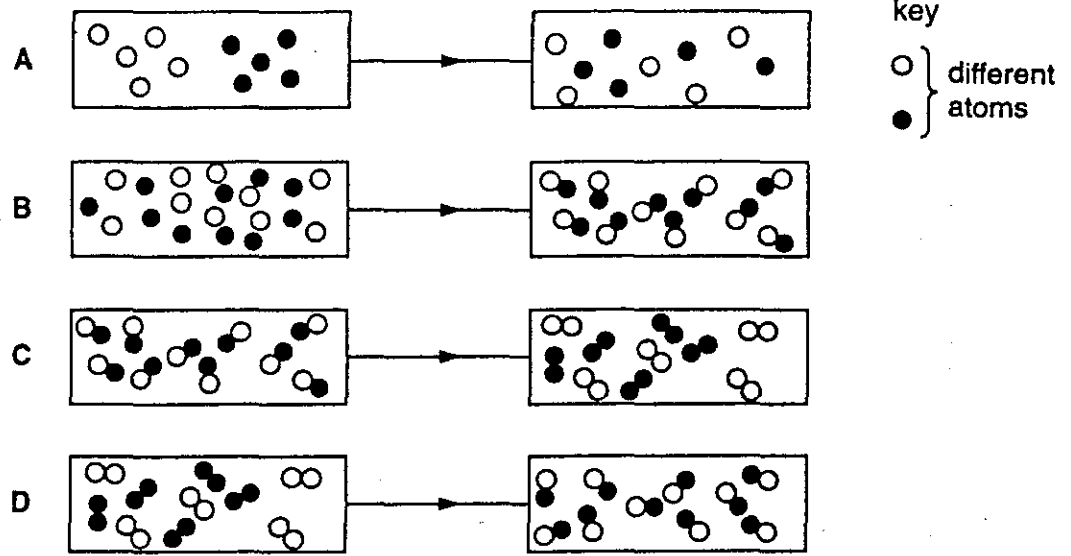
Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 16.

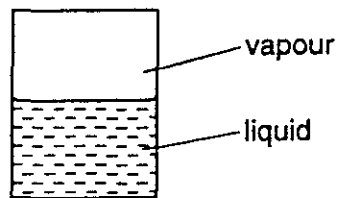
This question paper consists of 15 printed pages and 1 blank page.

171

1 Which diagram shows the process of diffusion?



2 A sealed vessel contains a liquid and its vapour, as shown.

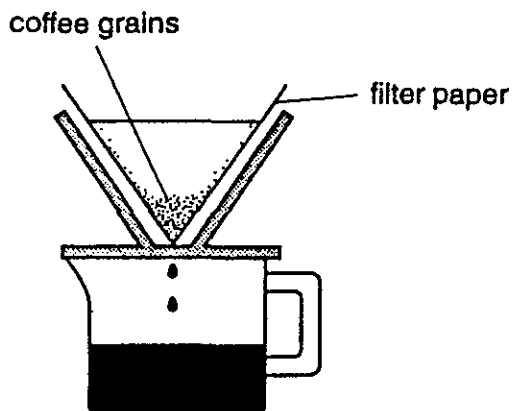


What happens when a molecule in the vapour enters into the liquid?

	the molecule stops moving	the molecule becomes smaller
A	✓	✓
B	✓	x
C	x	✓
D	x	x

key
 ✓ = yes
 x = no

- 3 The diagram shows how fresh coffee can be made.



A dark brown solution of coffee is obtained and coffee grains are left behind.

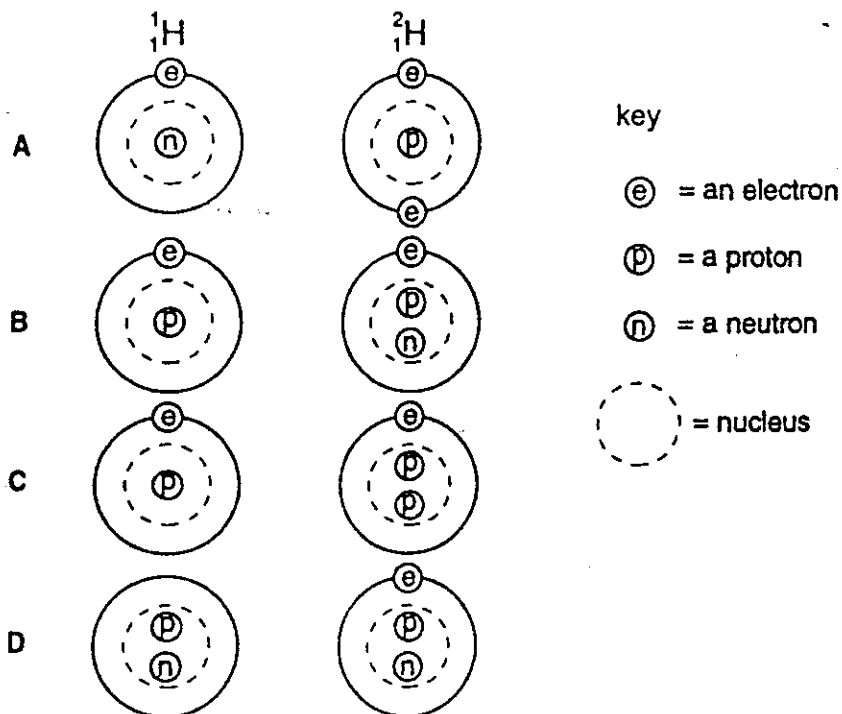
What is the separation method used?

- A boiling
 - B distilling
 - C evaporation
 - D filtration
- 4 What could be the melting point and boiling point of water containing a dissolved impurity?

	melting point / °C	boiling point / °C
A	0	100
B	0	104
C	-3	100
D	-3	104

- 5 Two isotopes of hydrogen are ${}^1_1\text{H}$ and ${}^2_1\text{H}$.

Which diagram shows the arrangement of particles in the two isotopes?



- 6 What is the electronic structure of an atom with a proton (atomic) number 5 and a nucleon (mass) number 11?
- A 2, 3 B 3, 2 C 2, 8, 1 D 1, 8, 2
- 7 What is the formula of a calcium ion?
- A Ca^{2+} B Ca^+ C Ca^- D Ca^{2-}
- 8 The table shows the formula and type of bonding in two compounds.

formula	type of bonding
CsCl	ionic
C_6H_6	covalent

Which compound is likely to have the higher melting point (m.p.) and be more soluble in water?

	higher m.p.	more soluble in water
A	C_6H_6	C_6H_6
B	C_6H_6	CsCl
C	CsCl	C_6H_6
D	CsCl	CsCl

- 9 Hydrogen and chlorine react as shown.



What is the equation for this reaction?

- A $\text{H} + \text{Cl} \rightarrow \text{HCl}$
 B $2\text{H} + 2\text{Cl} \rightarrow 2\text{HCl}$
 C $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$
 D $\text{H}_2 + \text{Cl}_2 \rightarrow \text{H}_2\text{Cl}_2$
- 10 A molecule of compound X contains the following.

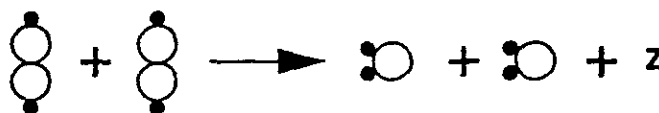
2 atoms of carbon, C

2 atoms of oxygen, O

4 atoms of hydrogen, H

What is the formula of X?

- A $(\text{CH}_2)_2\text{O}$ B $(\text{CH}_2)_2\text{O}_2$ C $\text{C}_2(\text{OH})_4$ D $\text{C}_4\text{H}_2\text{O}$
- 11 The diagram shows a balanced chemical equation. In the diagram, O and • are different atoms.



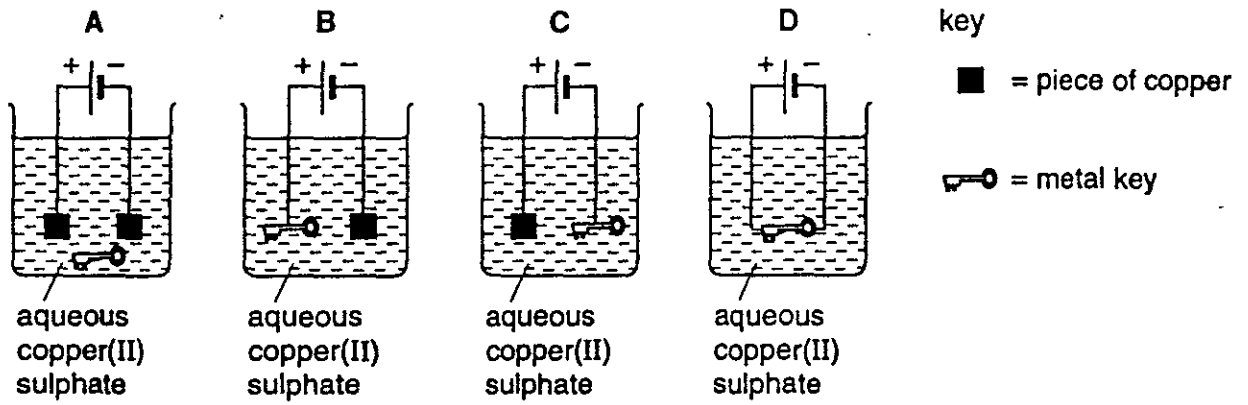
What is Z?



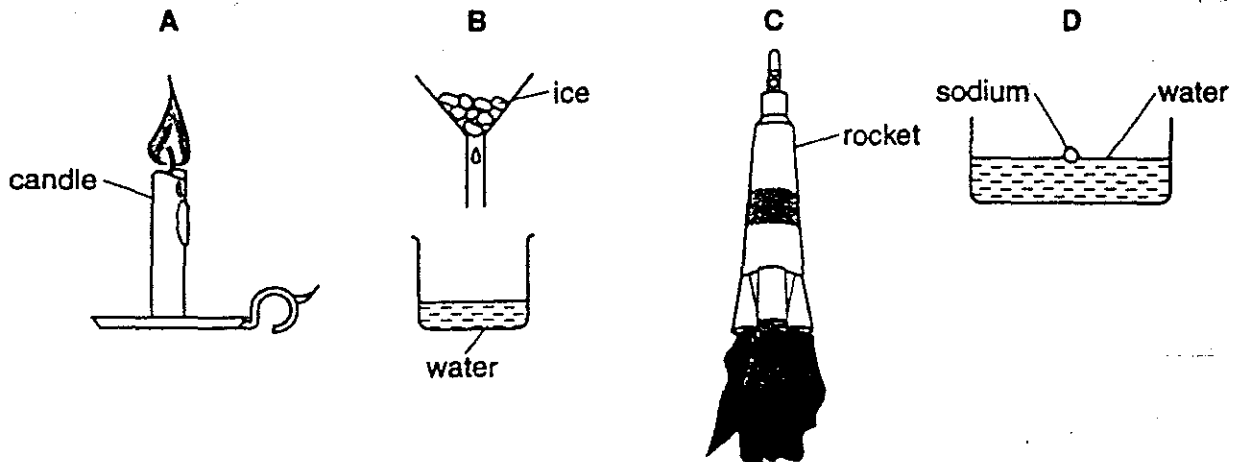
- 12 Which substance is manufactured by electrolysis?

- A aluminium
 B copper(II) sulphate
 C sodium chloride
 D steel

13 In which set of apparatus is the metal key electroplated with copper?



14 Which diagram shows a process in which an endothermic change is taking place?

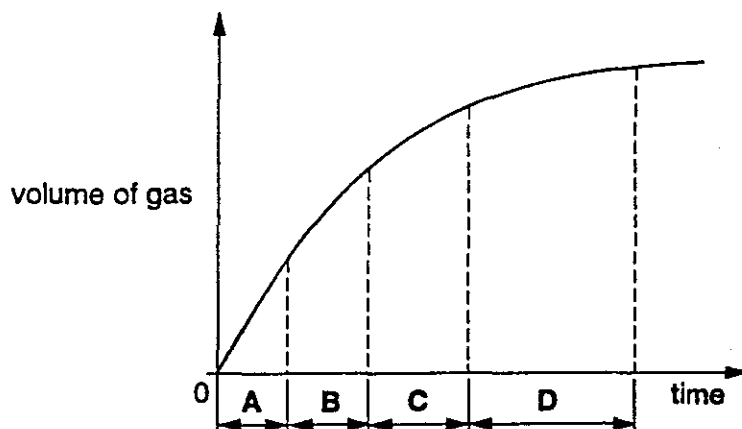


15 A piece of zinc is placed in dilute sulphuric acid.

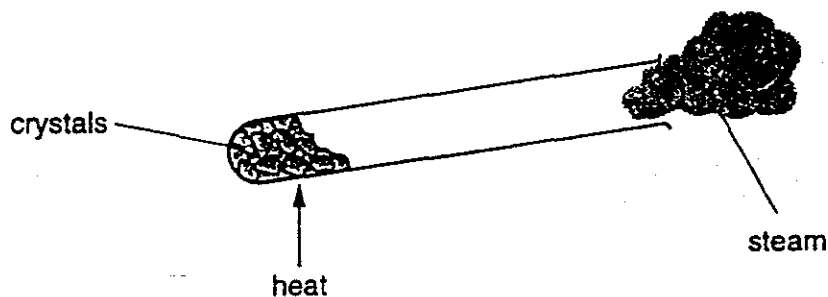
Which change slows down the rate of reaction?

- A adding a catalyst
- B adding water
- C heating the acid
- D powdering the zinc

- 16 The graph shows how the total volume of a gas given off from a reaction changes with time.
In which time interval is least gas given off?



- 17 The diagram shows crystals of copper(II) sulphate, $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, being heated.



The crystals change colour.

Which two terms describe this change?

- A endothermic and dehydration
 - B endothermic and hydration
 - C exothermic and dehydration
 - D exothermic and hydration
- 18 A television news programme shows an explosion at a flour mill.

What could have increased the risk of such an explosion?

- A adding salt to the flour
- B employing more staff in the mill
- C grinding the flour more finely
- D opening the windows

- 19 Ammonium chloride is heated with substance X. The gas given off turns damp red litmus paper blue.

Which type of substance is X?

- A acid
- B base
- C metal
- D salt

- 20 Which of the following is aqueous copper(II) sulphate?

	colour	add acidified barium chloride
A	blue	no precipitate
B	blue	white precipitate
C	colourless	no precipitate
D	colourless	white precipitate

- 21 Potassium salts are soluble.

Which methods in the table are suitable for making aqueous potassium chloride?

	add dilute hydrochloric acid to		
	potassium metal	aqueous potassium hydroxide	aqueous potassium carbonate
A	✓	✓	x
B	✓	✓	✓
C	x	✓	✓
D	x	x	✓

key

✓ = yes

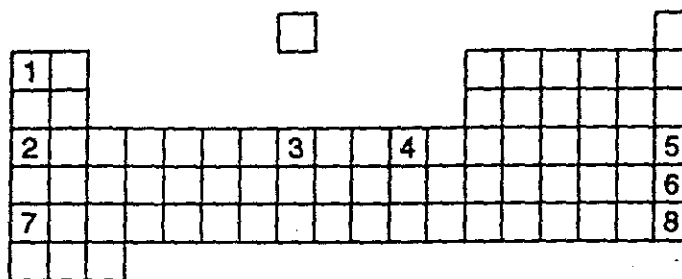
x = no

- 22 The table gives information about four elements.

Which element is a transition metal?

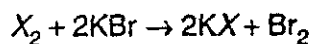
	colour of element	electrical conductivity of element	colour of oxide
A	black	high	colourless
B	colourless	low	white
C	grey	high	red
D	yellow	low	colourless

- 23 Eight elements are numbered in the diagram of a Periodic Table.



Which numbers represent two relatively soft metals in the same group?

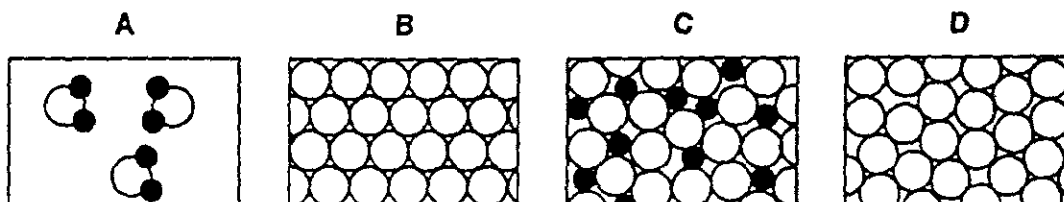
- A 1 and 2
 B 3 and 4
 C 5 and 6
 D 7 and 8
- 24 Element X is in Group VII of the Periodic Table. It reacts with aqueous potassium bromide as shown.



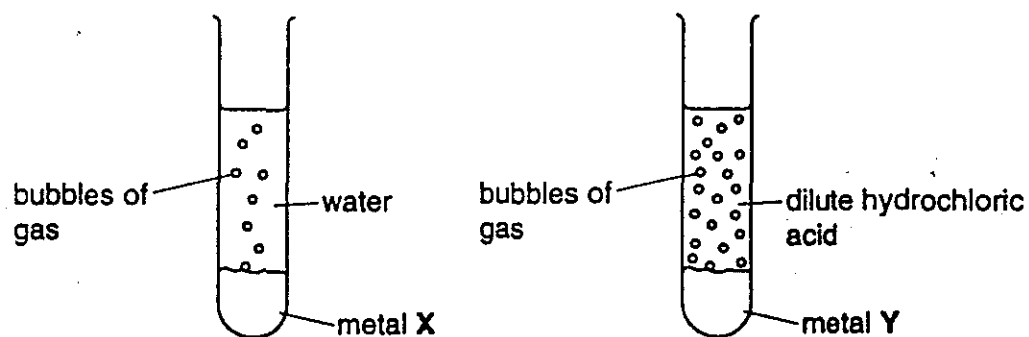
Which facts about X are correct?

	relative atomic mass	reactivity
A	greater than that of bromine	less reactive than bromine
B	greater than that of bromine	more reactive than bromine
C	less than that of bromine	less reactive than bromine
D	less than that of bromine	more reactive than bromine

- 25 Which diagram represents the arrangement of atoms in an alloy?



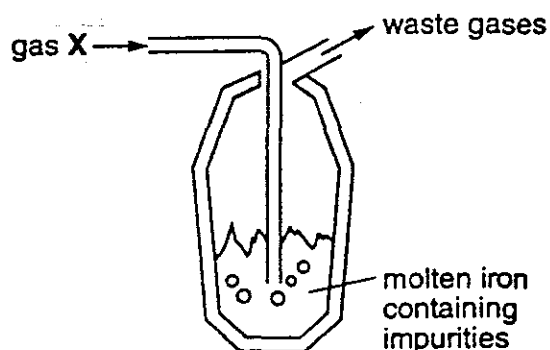
- 26 The results of adding samples of different metals to the liquids in the test-tubes are shown.



What could metals X and Y be?

	X	Y
A	calcium	copper
B	calcium	magnesium
C	iron	copper
D	iron	magnesium

- 27 The diagram shows a furnace used to make steel.

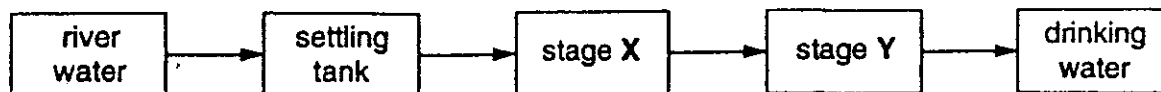


What is gas X?

- A chlorine
 - B hydrogen
 - C methane
 - D oxygen
- 28 Which of the following is **least** likely to contain aluminium?

- A aeroplane
- B bicycle
- C hammer
- D saucepan

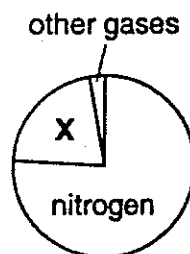
29 The flow chart shows stages in the treatment of river water to produce drinking water.



What occurs at stage X and at Y?

	X	Y
A	crystallisation	distillation
B	distillation	chlorination
C	filtration	chlorination
D	filtration	distillation

30 The pie chart shows the composition of air.



What gas is X?

- A argon
 - B carbon dioxide
 - C oxygen
 - D water vapour
- 31 A limestone building is heated by an inefficient and badly sealed coal-burning heater. The walls near the heater are gradually worn away.
- Which gas, escaping from the heater, is the most likely cause of this?
- A CO
 - B H₂O
 - C N₂
 - D SO₂
- 32 Which treatment is used to prevent the rusting of an iron girder of a bridge?
- A coat it with grease
 - B electroplate it
 - C galvanise it
 - D paint it

- 33 A gas is escaping from a pipe in a chemical plant. A chemist tests this gas and finds that it is alkaline.

What is this gas?

- A ammonia
- B chlorine
- C hydrogen
- D sulphur dioxide

- 34 Two processes are listed.

- 1 Lime is made by heating limestone.
- 2 Slaked lime is used to treat acidic soils.

In which of these processes is carbon dioxide produced?

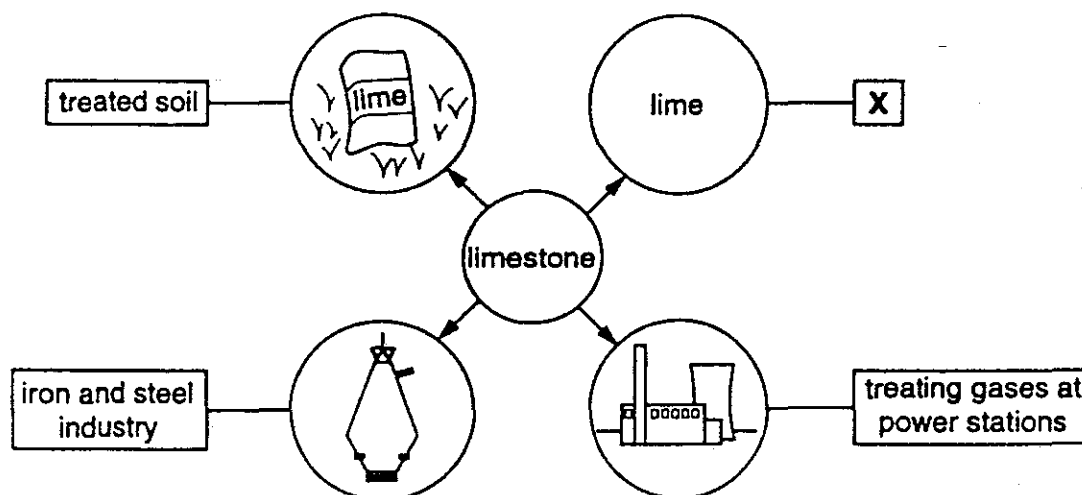
	1	2
A	✓	✓
B	✓	x
C	x	✓
D	x	x

key

✓ = yes

x = no

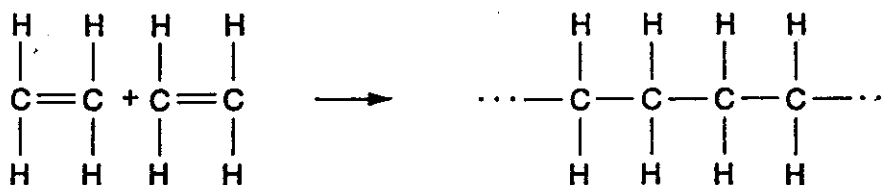
- 35 The diagram shows some uses of limestone.



What is use X?

- A extracting aluminium
- B making cement
- C making ethanol
- D sterilising water

- 36 Ethene behaves as a monomer in addition polymerisation, as shown.



Which terms describe the product of this polymerisation?

- A a saturated compound called poly(ethane)
 B a saturated compound called poly(ethene)
 C an unsaturated compound called poly(ethane)
 D an unsaturated compound called poly(ethene)
- 37 Increasing the number of atoms in one molecule of a hydrocarbon increases the amount of energy released when it burns.

What is the correct order for ethane, ethene and methane?

	less energy released \longrightarrow more energy released		
A	ethane	ethene	methane
B	ethane	methane	ethene
C	methane	ethane	ethene
D	methane	ethene	ethane

- 38 Methanol and ethanol are both liquids.

They both burn with a blue flame to produce carbon dioxide and water.

Both contain the functional group -O-H.

Which of the underlined words shows that methanol and ethanol are members of the same homologous series?

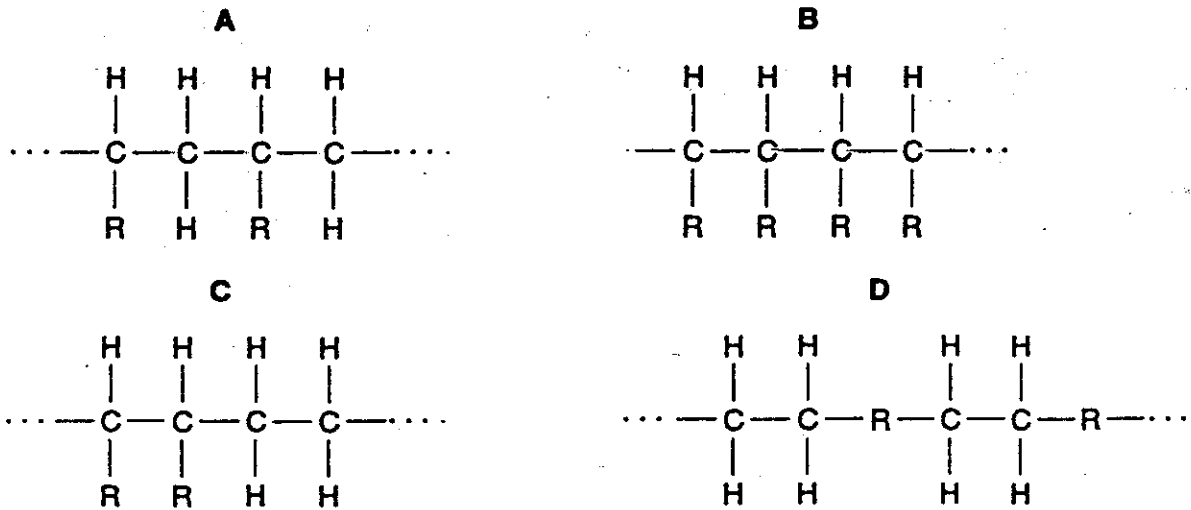
- A both liquids
 B both burn
 C both contain the functional group -O-H
 D produce carbon dioxide and water

39 The table shows how the structure of ethene, of its polymer and of styrene may be written.

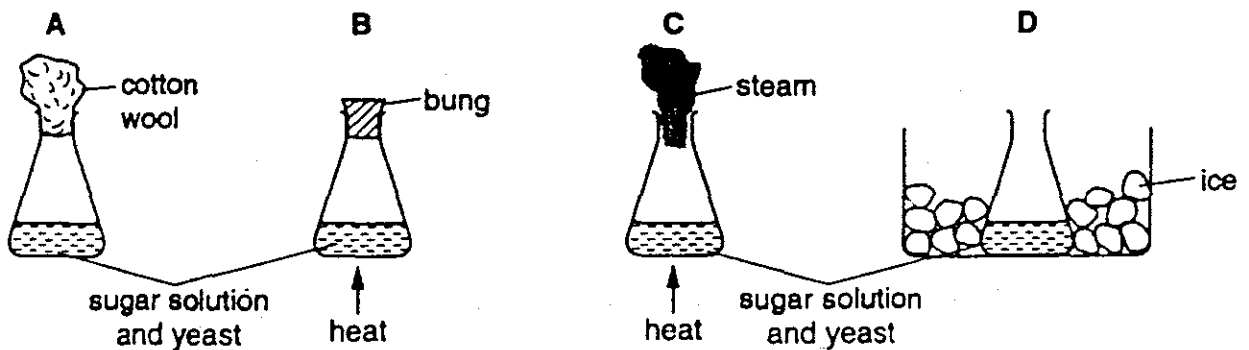
alkene	polymer
$ \begin{array}{c} \text{H} \quad \text{H} \\ \diagdown \quad / \\ \text{C} = \text{C} \\ / \quad \diagdown \\ \text{H} \quad \text{H} \end{array} $ <p>ethene</p>	$ \begin{array}{cccc} \text{H} & \text{H} & \text{H} & \text{H} \\ & & & \\ \cdots - \text{C} & - \text{C} & - \text{C} & - \text{C} - \cdots \\ & & & \\ \text{H} & \text{H} & \text{H} & \text{H} \end{array} $
$ \begin{array}{c} \text{H} \quad \text{H} \\ \diagdown \quad / \\ \text{C} = \text{C} \\ / \quad \diagdown \\ \text{R} \quad \text{H} \end{array} $ <p>styrene</p>	?

Styrene polymerises in the same way as ethene.

Which structure for the polymer of styrene would complete the table?



40 Which apparatus is most suitable for producing ethanol by fermentation?



International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
CHEMISTRY **0620/1**
PAPER 1 Multiple Choice
MAY/JUNE SESSION 2000 45 minutes

Additional materials:
Mathematical tables
Multiple Choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are **forty** questions in this paper. Answer **all** questions. For each question, there are four possible answers, **A, B, C** and **D**. Choose the **one** you consider correct and record your choice in **soft pencil** on the separate answer sheet.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

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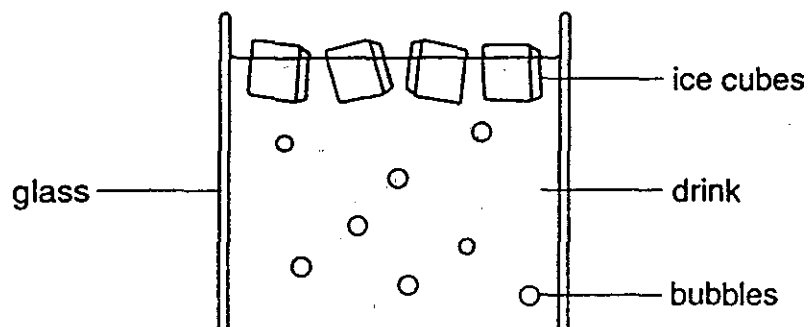
A copy of the Periodic Table is printed on page 16.

Any rough working should be done in this booklet.

1 In which substance are the particles furthest apart at room temperature?

- A ethanol
- B methane
- C salt
- D sugar

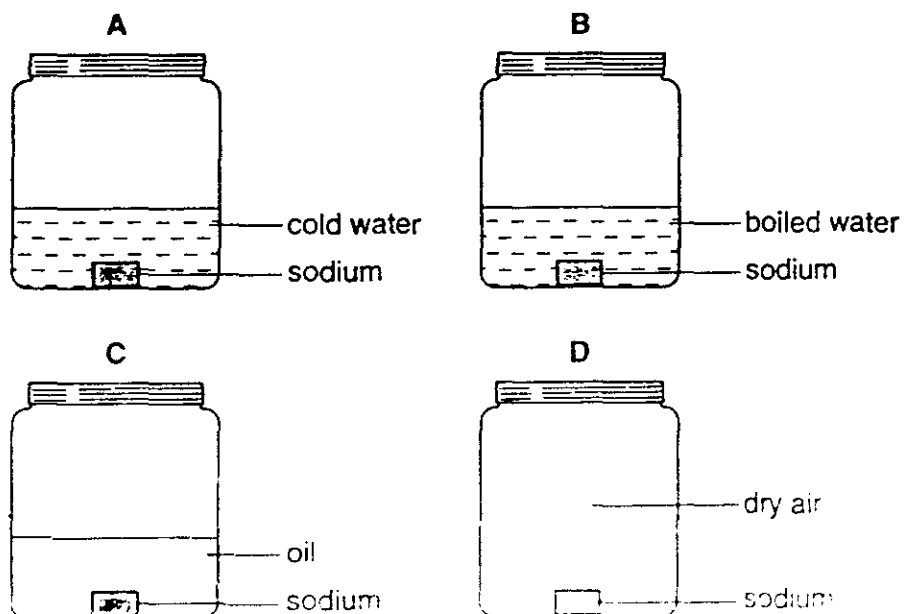
2 The diagram shows a glass containing ice cubes in a fizzy drink.



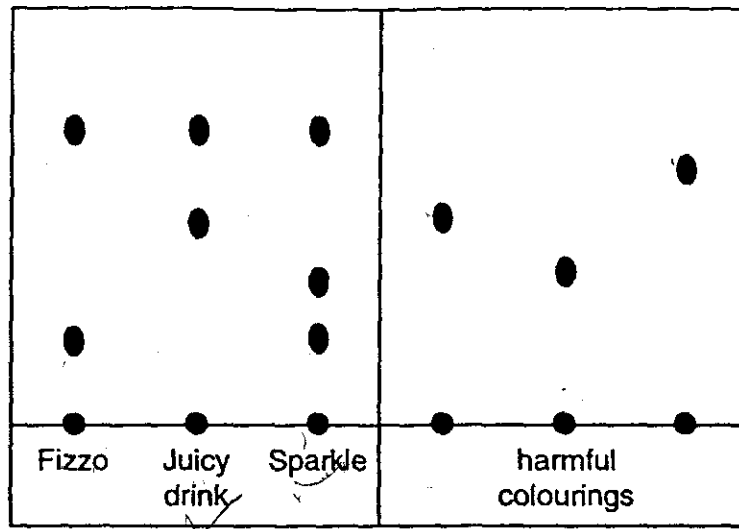
What has particles that are close together but free to move past each other?

- A bubbles
- B drink
- C glass
- D ice cubes

3 Which diagram shows how sodium should be stored?



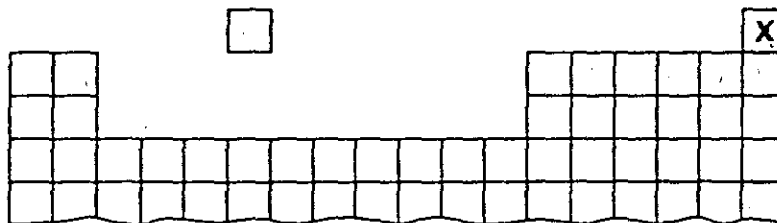
- 4 Chromatography is used to test three drinks for the presence of harmful colourings. The results are shown in the diagram.



Which of the drinks contain harmful colouring?

- A Fizzo only
- B Fizzo and Sparkle
- C Juicy only
- D Juicy and Sparkle

- 5 The diagram shows an outline of the Periodic Table.



Which diagram shows an atom of element X?

A B C D

key
 (e) = an electron
 (n) = a neutron
 (p) = a proton
 () = a nucleus

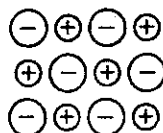
The diagrams show four atomic models labeled A, B, C, and D. Each model consists of a central nucleus (dashed circle) and an outer electron shell (solid circle).
 - Model A: 1 proton (p), 0 neutrons (n), 1 electron (e).
 - Model B: 2 protons (p), 2 neutrons (n), 2 electrons (e).
 - Model C: 3 protons (p), 3 neutrons (n), 3 electrons (e).
 - Model D: 4 protons (p), 4 neutrons (n), 4 electrons (e).

- 6 One isotope of cadmium is $^{112}_{48}\text{Cd}$.

Which particle is another isotope of cadmium?

	protons	neutrons
A	48	62
B	48	112
C	62	48
D	112	48

- 7 A substance has an ionic structure that can be represented as shown.



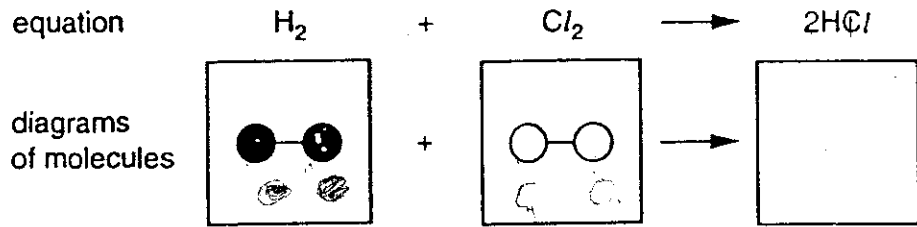
What could the substance be?

- A chlorine
 B diamond
 C sodium chloride
 D water
- 8 Elements X and Y combine to form a liquid with a boiling point of $114\text{ }^{\circ}\text{C}$.

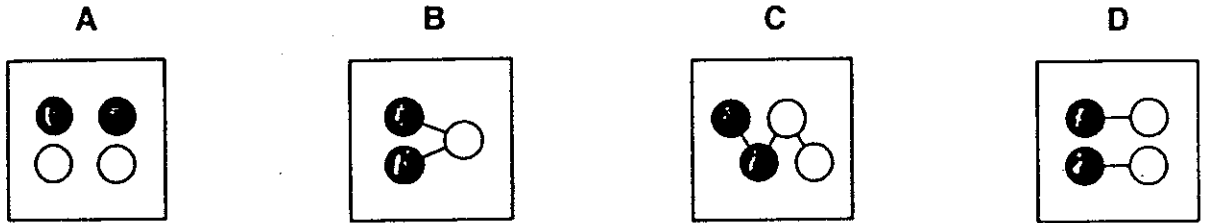
Which line in the table is correct?

	type of element		type of bonding
	X	Y	
A	metal	metal	covalent
B	metal	non-metal	ionic
C	non-metal	non-metal	covalent
D	non-metal	non-metal	ionic

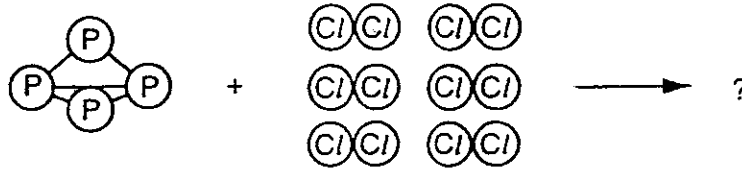
- 9 The equation shows the reaction between hydrogen molecules and chlorine molecules.



Which box shows the product molecules?



- 10 Phosphorus and chlorine combine to form phosphorus chloride.



one molecule of $P_4 +$ six molecules of $Cl_2 \rightarrow$ four molecules of phosphorus chloride

What is the formula of a phosphorus chloride molecule?

- A PCl_2 B PCl_3 C P_2Cl_6 D P_4Cl_{12}

$$\begin{array}{r} 4 \times 12 \\ \hline 48 \\ 7 \times 3 \\ \hline 21 \end{array}$$

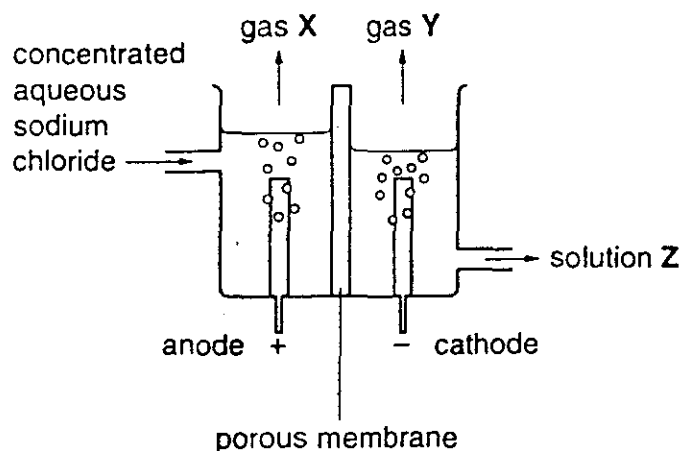
- 11 The symbols of three elements are ${}_1H$, ${}_2He$, ${}_3Li$

Which compound can be formed from these three elements?

- A HHe B HHe_2 C LiH D LiH_3

fluorine

- 12 The diagram shows a cell used for the industrial electrolysis of concentrated aqueous sodium chloride.



What are the products X, Y, and Z?

	X	Y	Z
A	chlorine	hydrogen	sodium hydroxide
B	chlorine	sodium hydroxide	hydrogen
C	hydrogen	chlorine	sodium hydroxide
D	hydrogen	sodium hydroxide	chlorine

- 13 Which method is used to obtain pure aluminium from aluminium oxide?

- A dissolving the oxide in an acid
- B electrolysis of the oxide ✓
- C heating the oxide in air
- D reducing the oxide with carbon

- 14 Butane, ethanol and hydrogen are fuels.

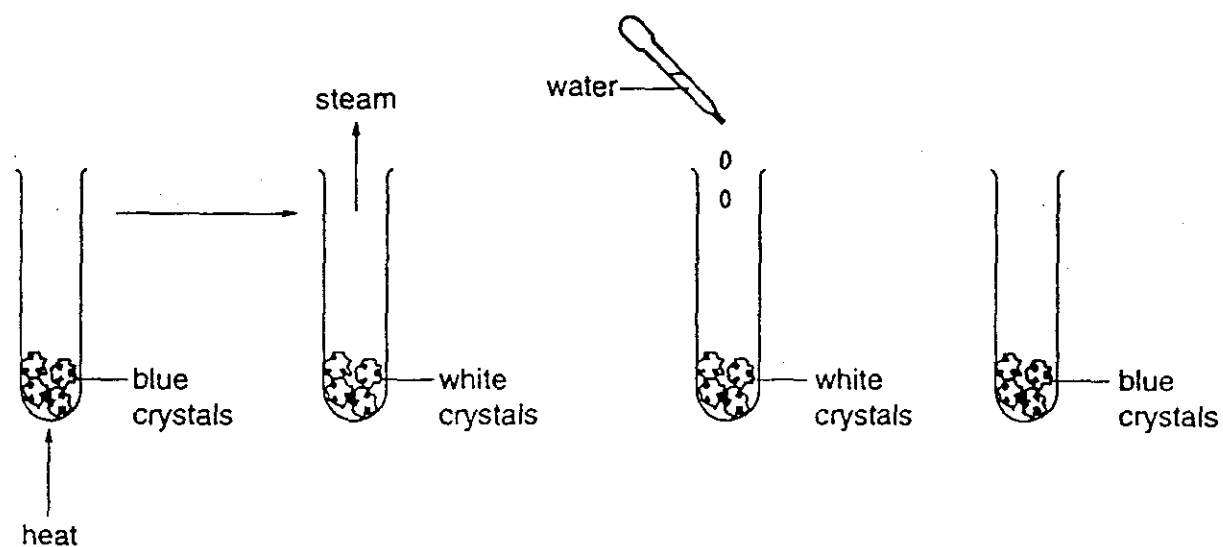
Which substances produce **both** carbon dioxide **and** water when used as fuels?

	butane	ethanol	hydrogen
A	✓	✓	x
B	✓	x	✓
C	x	✓	✓
D	✓	✓	✓

15 What happens in an exothermic reaction?

- A A catalyst is used.
- B A gas is given off.
- C Heat is produced. ✓
- D There is a colour change.

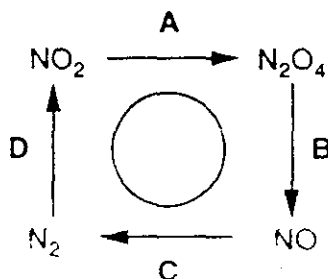
16 The diagrams show an experiment using copper(II) sulphate.



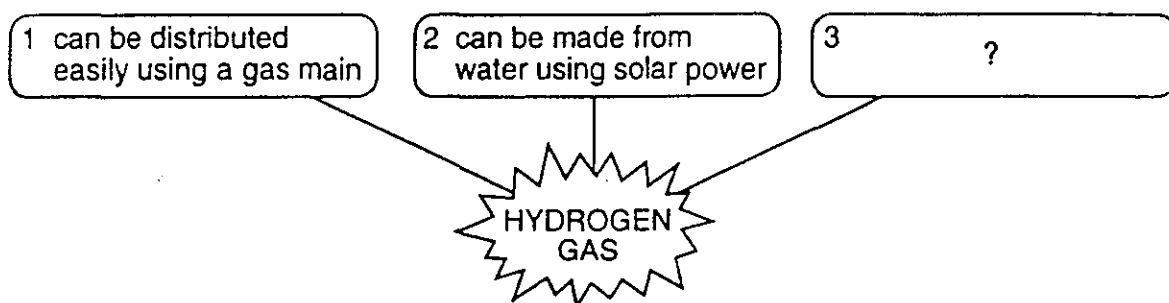
What do these diagrams represent?

- A a redox reaction
- B a reversible reaction
- C crystallisation
- D purification

17 Which change shows an oxidation?



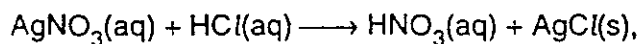
18 The diagram shows some of the advantages of using hydrogen as a fuel.



What is a third advantage?

- A Burning hydrogen does not produce pollution.
- B Burning hydrogen does not produce condensation.
- C Hydrogen is not biodegradable.
- D Hydrogen is not a compound.

19 The equation represents a reaction.



What is the residue when the reaction mixture is filtered?

- A AgCl B AgNO₃ C HCl D HNO₃

20 Which two elements are correctly listed to show the natures of their oxides?

	forms an acidic oxide	forms a basic oxide
A	magnesium	sulphur
B	phosphorus	sulphur
C	sulphur	phosphorus
D	sulphur	magnesium

21 The hydroxides of aluminium, chromium and iron are insoluble.

Aqueous solutions of the chlorides of these metals are tested with aqueous sodium hydroxide.

Which solutions form a coloured precipitate?

	AlCl ₃ (aq)	CrCl ₃ (aq)	FeCl ₃ (aq)
A	x	✓	✓
B	✓	✓	✓
C	✓	✓	✓
D	✓	✓	✓

22 Which facts about the elements are all correct?

A

Mg
manganese
hard, silvery metal
in Group II

B

Ne
neon
reactive monatomic gas
in Group 0

C

Fe
iron
soft metal which rusts
a transition metal

D

Cl
chlorine
green diatomic gas
in Group VII

23 The table shows the melting points and boiling points of some Group I elements.

Group I element	melting point/°C	boiling point/°C
lithium	180	1330
sodium	98	890
potassium	64	Y
rubidium	X	688

What is the value for X and for Y?

	X	Y
A	39	540
B	39	774
C	103	774
D	103	540

24 Five elements have proton (atomic) numbers 2, 4, 6, 8 and 10.

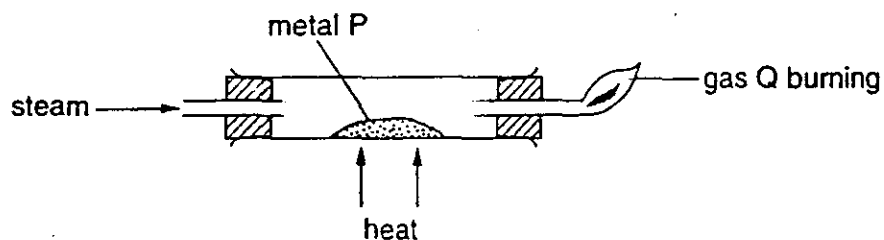
What are the proton numbers of the two least reactive of these elements?

- A 2 and 4 B 2 and 10 C 4 and 6 D 6 and 10

25 What are common physical properties of a metal wire?

	conductor of electricity	ease of bending
A	good	good
B	good	poor (wire breaks)
C	poor	good
D	poor	poor (wire breaks)

26 When steam is passed over a heated metal P, a gas Q is formed.



What are P and Q?

	metal P	gas Q
A	copper	hydrogen
B	iron	hydrogen
C	magnesium	oxygen
D	zinc	oxygen

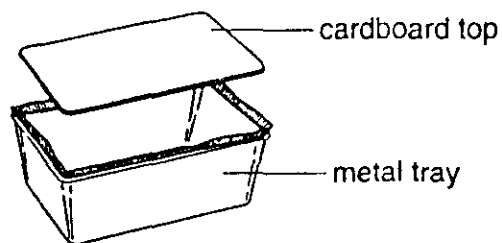
27 A reaction that occurs in the blast furnace for extracting iron may be written as shown.



What is X?

- A carbon dioxide
B coke
C limestone
D slag

- 28 The diagram shows a container for 'take-away' foods.



The tray of the container is lightweight and resists corrosion.

Which metal is the most suitable for the tray?

- A aluminium
 - B brass
 - C copper
 - D steel
- 29 What is removed in the filter bed during the purification of the water supply?
- A bacteria
 - B soluble salts
 - C fluorides
 - D suspended solids
- 30 Some air is polluted with sulphur dioxide. A sample of the polluted air is passed through water to dissolve the sulphur dioxide.

What is the pH of the solution formed and how does it affect litmus paper?

	pH	effect on litmus paper
A	above 7	blue to red
B	above 7	red to blue
C	below 7	blue to red
D	below 7	red to blue

- 31 Which gas, emitted from a car exhaust, is an atmospheric pollutant?
- A argon
 - B carbon monoxide
 - C nitrogen
 - D oxygen

32 Which statement does not apply to oxygen?

- A It is used in the manufacture of ammonia.
- B It is used to help patients breathe in hospital.
- C It reacts with iron during rusting.
- D It reacts with acetylene in the welding of metals.

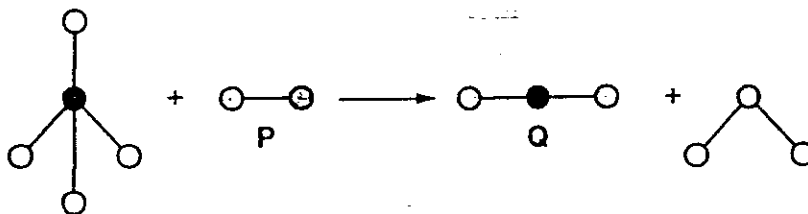
33 The table shows the pH range over which a plant takes up nutrients from fertilisers.

nutrient	pH range
nitrogen	6.0 to 8.0
phosphorus	6.5 to 7.5
potassium	7.0 to 8.0

Over which range of pH does the plant take up all three nutrients?

- A 5.0 to 6.0 B 6.0 to 6.5 C 7.0 to 7.5 D 7.5 to 8.0

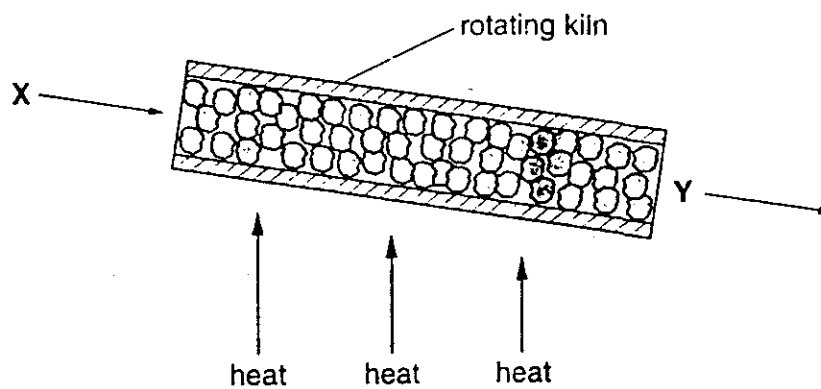
34 The diagram represents the combustion of methane.



What are P and Q?

	P	Q
A	hydrogen	carbon dioxide
B	hydrogen	water
C	oxygen	carbon dioxide
D	oxygen	water

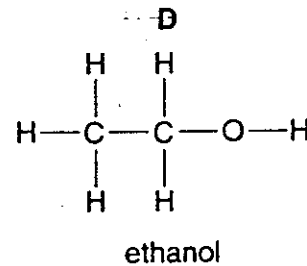
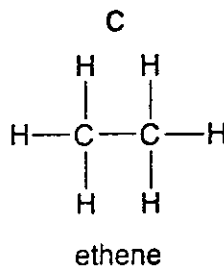
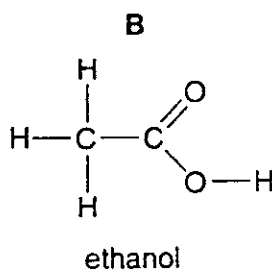
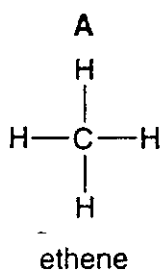
35 The diagram shows a lime kiln.



What are X and Y?

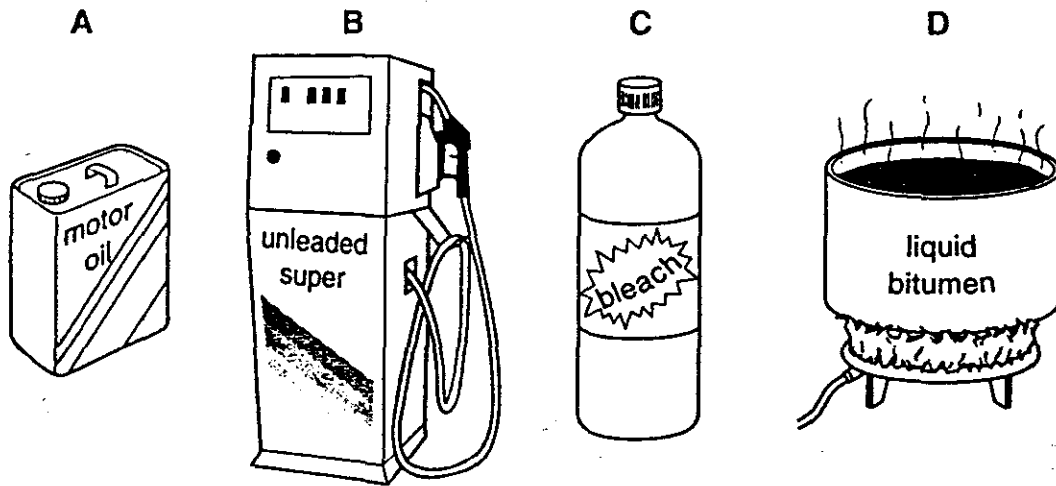
	X	Y
A	lime	limestone
B	lime	slaked lime
C	limestone	lime
D	slaked lime	lime

36 For which structure is the correct name shown?

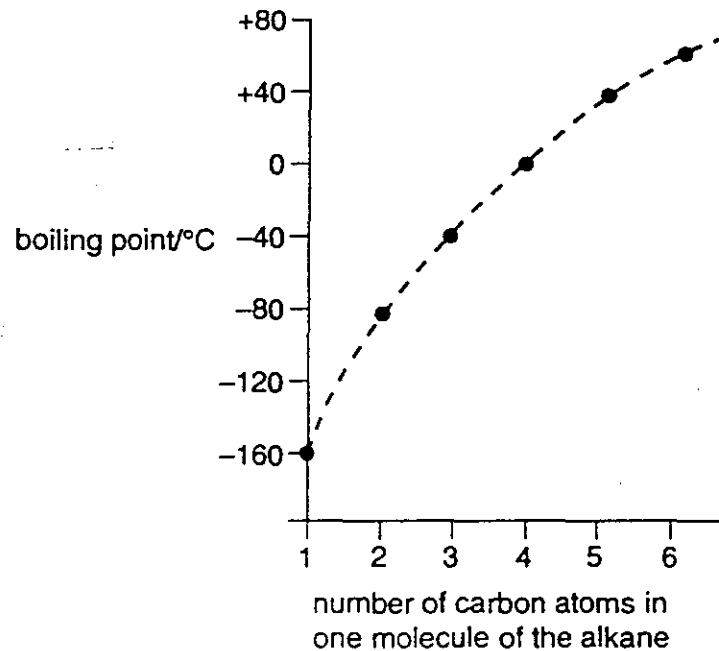


37 The diagrams show different liquids.

Which liquid is **not** made directly from petroleum?



38 The graph shows the way in which the boiling points of some alkanes depend on the number of carbon atoms in their molecules.



From the graph, what is likely to be the boiling point of propane?

- A -80°C B -40°C C 0°C D $+40^{\circ}\text{C}$

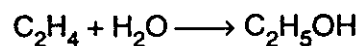
39 A hydrocarbon reacts as described.

- 1 It decolourises aqueous bromine.
- 2 It forms an addition polymer.

Which of these reactions are properties of an alkene?

- A 1 only B 2 only C both 1 and 2 D neither 1 nor 2

40 The equation for the manufacture of ethanol is as shown.



Three possible reaction conditions are listed.

- 1 using a temperature of 80 °C
- 2 using a temperature of 250 °C
- 3 using a catalyst of phosphoric acid

Which combination of these conditions is used?

	temperature	catalyst present
A	80 °C	no
B	80 °C	yes
C	250 °C	no
D	250 °C	yes

DATA SHEET

The Periodic Table of the Elements

		Group																
I	II											III	IV	V	VI	VII	0	
												1 H Hydrogen 1						2 He Helium 2
3 Li Lithium	4 Be Beryllium											5 B Boron	6 C Carbon	7 N Nitrogen	8 O Oxygen	9 F Fluorine	10 Ne Neon	
11 Na Sodium	12 Mg Magnesium											13 Al Aluminium	14 Si Silicon	15 P Phosphorus	16 S Sulphur	17 Cl Chlorine	18 Ar Argon	
19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton	
37 Rb Rubidium	38 Sr Strontium	39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybdenum	43 Tc Technetium	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon	
55 Cs Caesium	56 Ba Barium	57 La Lanthanum	72 Hf Hafnium	73 Ta Tantalum	74 W Tungsten	75 Re Rhenium	76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold	80 Hg Mercury	81 Tl Thallium	82 Pb Lead	83 Bi Bismuth	84 Po Polonium	85 At Astatine	86 Rn Radon	
87 Fr Francium	88 Ra Radium	89 Ac Actinium																

87-91 Lanthanoid series
89-103 Actinoid series

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60		150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
232 Th Thorium 90		238 U Uranium 92											
	234 Pa Protactinium 91		237 Np Neptunium 93	244 Pu Plutonium 94	243 Am Americium 95	247 Cm Curium 96	251 Bk Berkelium 97	259 Cf Californium 98	265 Es Einsteinium 99	271 Fm Fermium 100	288 Md Mendelevium 101	289 No Nobelium 102	289 Lr Lawrencium 103

a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

CHEMISTRY

0620/1

PAPER 1 Multiple Choice

Thursday

2 NOVEMBER 2000

Afternoon

45 minutes

Additional materials:

Mathematical tables

Multiple Choice answer sheet

Soft clean eraser

Soft pencil (type B or HB is recommended)

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are forty questions in this paper. Answer all questions. For each question, there are four possible answers, A, B, C and D. Choose the one you consider correct and record your choice in soft pencil on the separate answer sheet.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

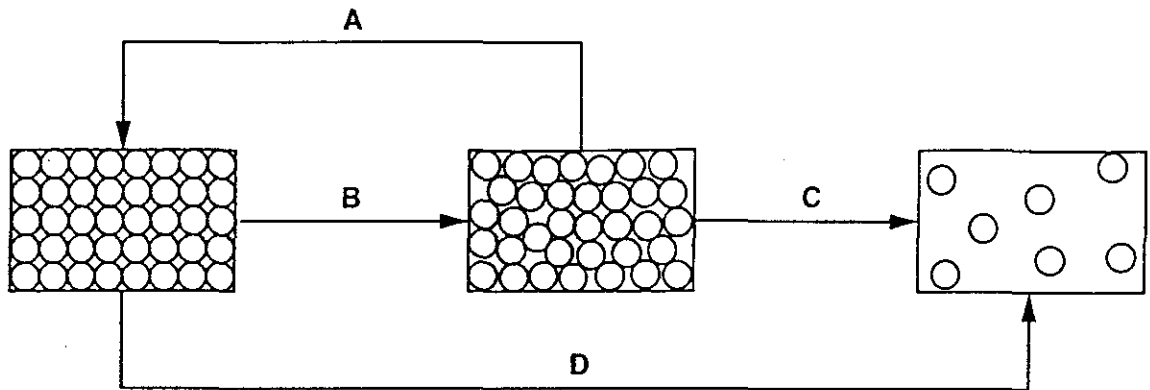
A copy of the Periodic Table is printed on page 16.

This question paper consists of 14 printed pages and 2 blank pages.

201

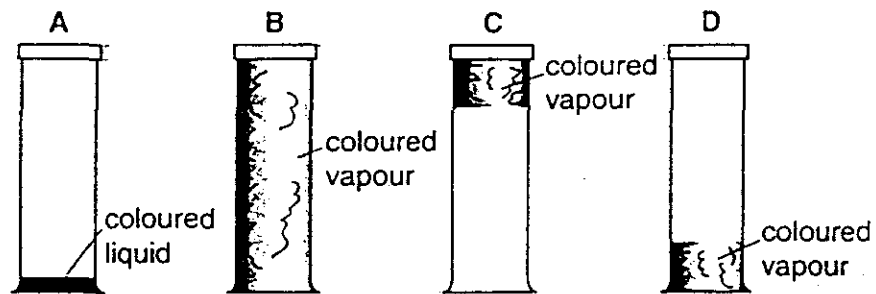
- 1 The diagram shows particles in a solid, a liquid and a gas.

Which arrow represents boiling?



- 2 A coloured liquid vaporises easily at room temperature. Some of the liquid is placed at the bottom of a sealed gas jar.

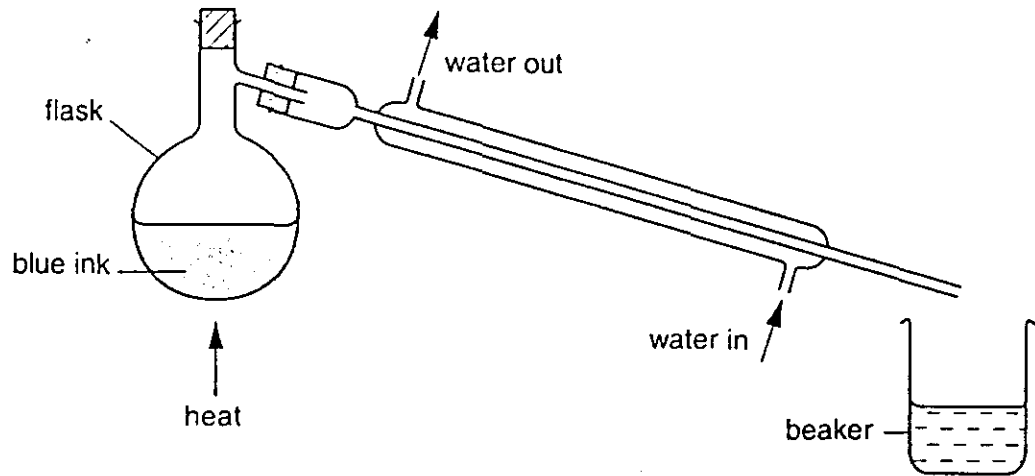
Which diagram shows the appearance of the jar after several hours?



- 3 Which method would be most suitable for the separation of a mixture of salt solution and sand to obtain the salt solution?

- A chromatography
- B crystallisation
- C evaporation
- D filtration

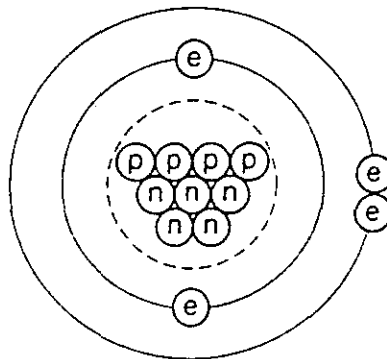
- 4 The diagram shows apparatus used to obtain pure water from blue ink.



What are the colours of the liquids in the flask and the beaker at the end of the experiment?

	flask	beaker
A	blue	blue
B	blue	colourless
C	colourless	blue
D	colourless	colourless

- 5 The diagram represents an atom.



key

- (p) = proton
 (n) = neutron
 (e) = electron
 () = nucleus

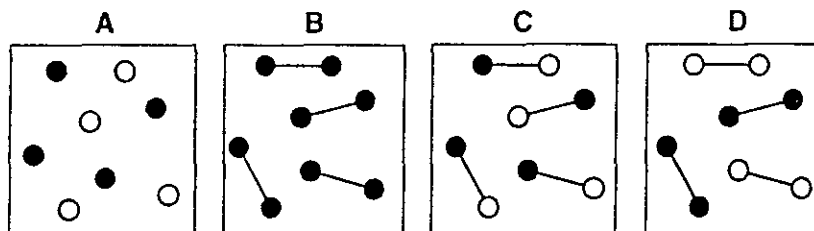
What is the proton number (atomic number) of this atom?

- A 2 B 4 C 9 D 13
- 6 Which atom has two more electrons than an atom of a noble gas?

- A aluminium
 B bromine
 C calcium

- 7 Two elements represented by \bigcirc and \bullet can form a compound.

Which diagram shows molecules of the compound?



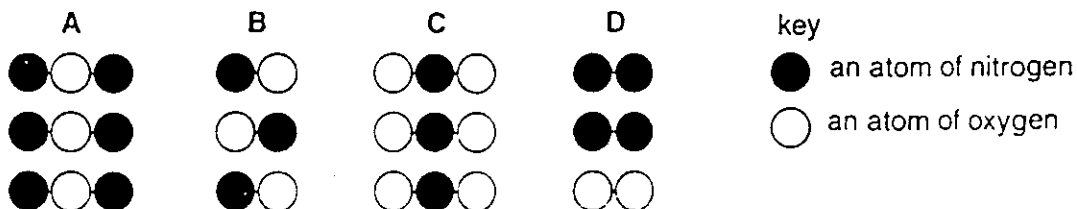
- 8 How many electrons are shared between the atoms in the molecules of methane, CH_4 , and of water, H_2O ?

	methane	water
A	4	2
B	4	4
C	8	2
D	8	4

- 9 For which compound is the formula correct?

	compound	formula
A	ammonia	NH_4
B	carbon dioxide	CO
C	potassium oxide	P_2O
D	zinc chloride	ZnCl_2

- 10 Which diagram shows molecules of a compound containing twice as many nitrogen atoms as oxygen atoms?



- 11 Which formula is of a compound containing three different elements?

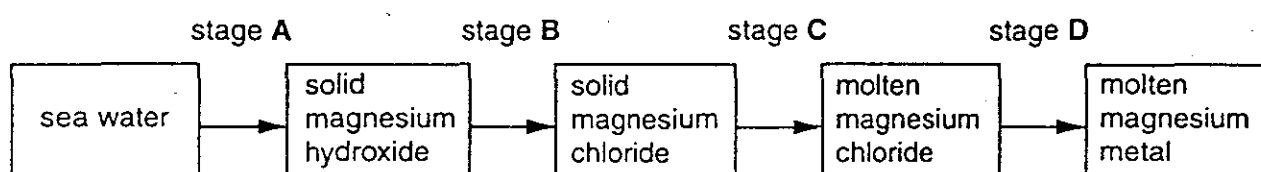
A LBH_2 B PH_2 C Si_2H_4 D SnO_2

12 An electric current is passed through concentrated hydrochloric acid.

Which gases are obtained at the electrodes?

	negative electrode	positive electrode
A	hydrogen	chlorine
B	hydrogen	oxygen
C	oxygen	chlorine
D	oxygen	hydrogen

13 At which stage in the manufacture of magnesium from sea-water can electrolysis be used?



14 In which process does an endothermic change take place?

- A combustion
- B evaporation
- C filtration
- D neutralisation

15 The equation shows what happens when a neutron collides with a nucleus of uranium-235.



What else is released during this change?

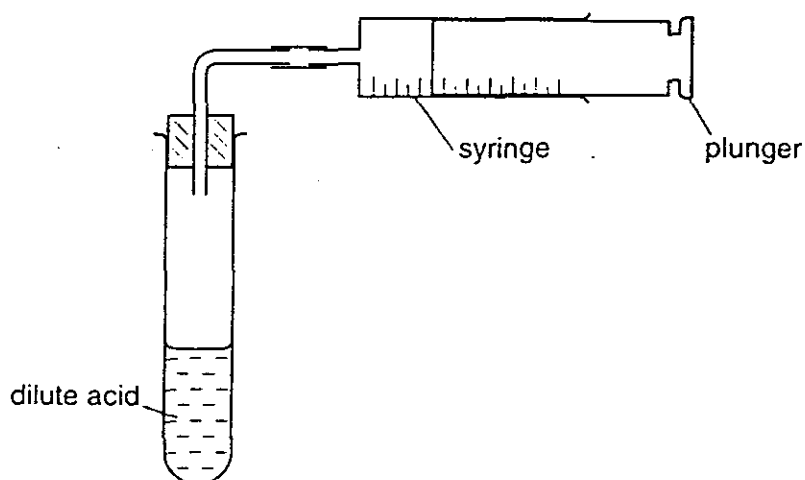
- A energy
- B hydrogen
- C oxygen
- D protons

16 When drops of water are added to a sample of an anhydrous salt, a reaction occurs.

How can the reaction be reversed?

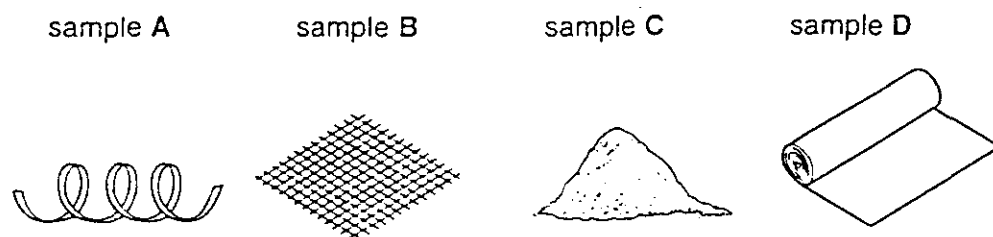
- A cool the salt
- B crystallise the salt
- C filter the salt
- D heat the salt

17 A sample of magnesium is added to dilute acid in a test-tube connected to a syringe.



The experiment is repeated with different samples of magnesium.

Which sample causes the plunger of the syringe to move out most quickly?



18 In which reaction does reduction of the underlined substance take place?

- A $\underline{\text{Cu}_2\text{O}} + \text{C} \rightarrow 2\text{Cu} + \text{CO}$
- B $2\underline{\text{Cu}_2\text{O}} + \text{O}_2 \rightarrow 4\text{CuO}$
- C $2\underline{\text{Cu}} + \text{O}_2 \rightarrow 2\text{CuO}$
- D $\text{CuO} + \underline{\text{CO}} \rightarrow \text{Cu} + \text{CO}_2$

19 Acidified lead(II) nitrate is added to a sample of wine. A yellow precipitate is formed.

What must the wine contain?

- A carbonate ions
- B chloride ions
- C iodide ions
- D sulphate ions

20 Which element has an oxide that reacts with an alkali?

- A K B Ne C Ni D P

21 Which property does an acid have?

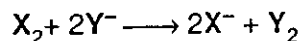
- A turns red litmus blue
- B neutralises a salt to form a base
- C reacts with ammonium sulphate to form ammonia
- D reacts with a carbonate to form carbon dioxide

22 An element has a melting point of $1084\text{ }^{\circ}\text{C}$ and a density of 8.93 g/cm^3 . Its oxide can be used as a catalyst.

In which position in the Periodic Table is the element found?

				A															B	C
D																				

- 23 The equation shows the reaction between a halogen and the aqueous ions of another halogen.



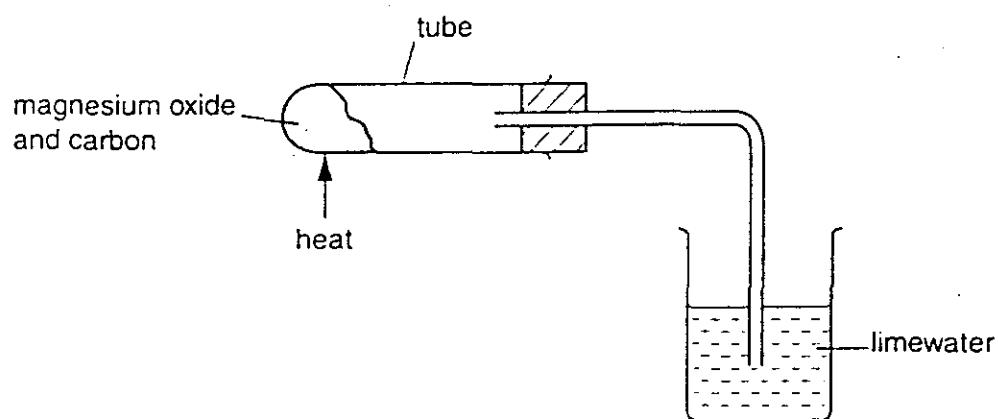
What is X_2 and how does the colour of the reaction mixture change?

	X_2	colour change
A	chlorine	brown to colourless
B	chlorine	colourless to brown
C	iodine	brown to colourless
D	iodine	colourless to brown

- 24 In which direction in the Periodic Table do the properties of the elements change from metallic to non-metallic?

- A across a period from left to right
- B across a period from right to left
- C down Group I
- D up Group I

- 25 A mixture of magnesium oxide and carbon is strongly heated in the apparatus shown.



Which observations are made?

	in the tube	in the limewater
A	mixture remains black	no change
B	mixture remains black	turns cloudy
C	silvery solid forms	no change
D	silvery solid forms	turns cloudy

- 26 Brass is an alloy of copper with another element. It is used to make the contact pins of electrical plugs because it is harder than copper.

In brass, the other element is aX..... thatY..... with the copper.

What are X and Y?

	X	Y
A	metal	mixes
B	metal	reacts
C	non-metal	mixes
D	non-metal	reacts

- 27 What is used to remove carbon from molten iron during steelmaking?

- A argon
- B hydrogen
- C nitrogen
- D oxygen

- 28 Different alloys are used to make car bodies, surgical instruments and cutlery.

Which element is present in all these alloys?

- A aluminium
- B copper
- C iron
- D zinc

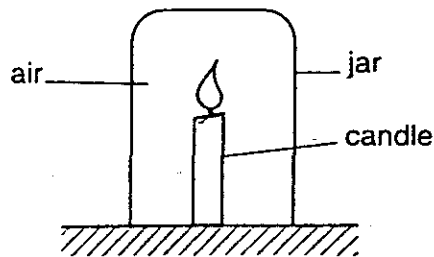
- 29 Some tests for water are given.

- 1 Measure its melting point.
- 2 Measure its boiling point.
- 3 Add anhydrous copper(II) sulphate.

Which of these are chemical tests?

- A 1 only
- B 2 only
- C 3 only
- D 1, 2 and 3

- 30 Which element is removed during the refining of crude oil (petroleum) to limit the formation of acid rain?
- A carbon
 - B hydrogen
 - C nitrogen
 - D sulphur
- 31 The diagram shows a candle burning inside a sealed jar.



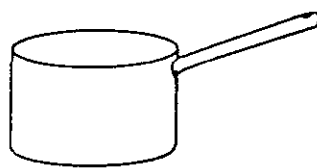
The mass of one gas in the jar does not change.

Which gas is this?

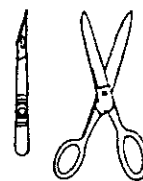
- A carbon dioxide
 - B nitrogen
 - C oxygen
 - D water vapour
- 32 The diagram shows three types of item.



cutlery



cooking pan

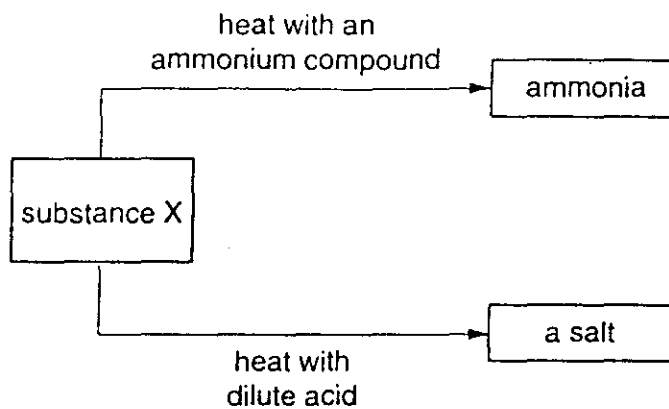


instruments used
in hospitals

Which method of rust prevention can be used for all three types?

- A coating with plastic
- B covering with grease
- C galvanising
- D using stainless steel

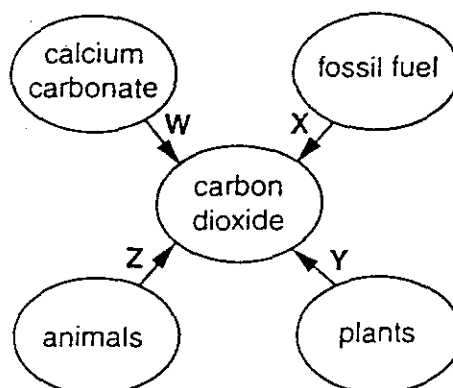
33 The diagram shows reactions of substance X.



Which type of substance is X?

- A an alcohol
- B a base
- C a catalyst
- D a metal

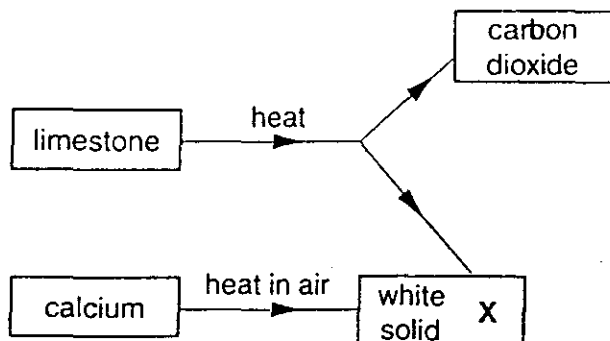
34 The diagram shows four processes by which carbon dioxide can be formed.



Which two processes involve respiration?

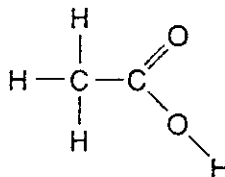
- A W and X
- B X and Y
- C Y and Z
- D Z and W

35 The diagram shows some reactions.



What is X?

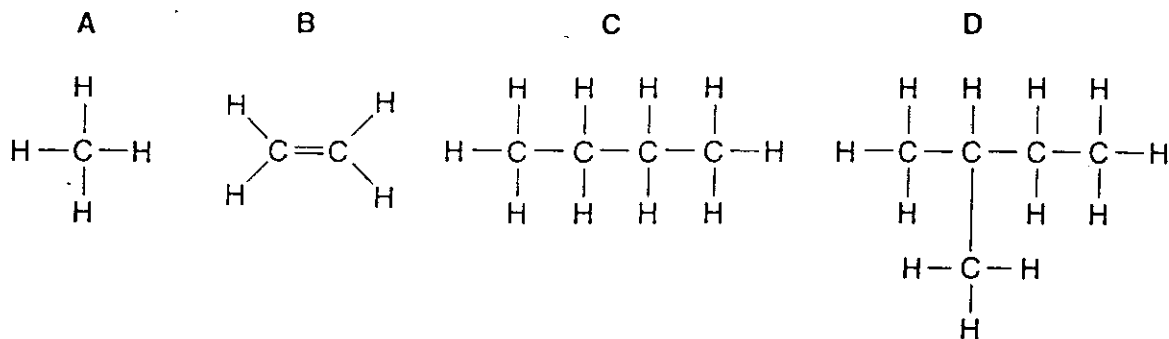
- A calcium carbonate
 - B calcium hydroxide
 - C calcium nitride
 - D calcium oxide
- 36 Which compound has the structural formula in the diagram?



- A ethane
 - B ethanoic acid
 - C ethanol
 - D ethene
- 37 Are acetylene and ethanol used as fuels?

	acetylene	ethanol
A	✓	✓
B	✓	x
C	x	✓
D	x	x

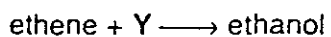
- 38 Which structure shows a compound that belongs to a **different** homologous series to propane, C_3H_8 ?



- 39 One molecule of an alkane, X, can be cracked to form two molecules of ethene, C_2H_4 , and one molecule of methane, CH_4 , as the only products.

What is the formula of alkane X?

- A C_3H_8 B C_4H_8 C C_4H_{12} D C_5H_{12}
- 40 Ethene reacts with Y to produce ethanol.



What is Y?

- A hydrogen
B oxygen
C steam
D yeast

DATA SHEET

The Periodic Table of the Elements

		Group										III	IV	V	VI	VII	0	
	II																	
		1 H Hydrogen 1																4 He Helium 2
Li	9 Be Beryllium											11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10	
Na	11 Mg Magnesium											27 Al Aluminum 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 16	35 Cl Chlorine 17	40 Ar Argon 18	
K	19 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton	
Rb	37 Sr Strontium	39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybdenum	43 Tc Technetium	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon	
Cs	55 Ba Barium	57 La Lanthanum	72 Hf Hafnium	73 Ta Tantalum	74 W Tungsten	75 Re Rhenium	76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold	80 Hg Mercury	81 Tl Thallium	82 Pb Lead	83 Bi Bismuth	84 Po Polonium	85 At Astatine	86 Rn Radon	
Fr	87 Ra Radium	89 Ac Actinium																

1 Lanthanoid series

13 Actinoid series

- a = relative atomic mass
- X = atomic symbol
- Z = proton (atomic) number

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	150 Pm Promethium 61	152 Sm Samarium 62	157 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
232 Th Thorium 90	238 Pa Protactinium 91	238 U Uranium 92	238 Np Neptunium 93	238 Pu Plutonium 94	238 Am Americium 95	238 Cm Curium 96	238 Bk Berkelium 97	238 Cf Californium 98	238 Es Einsteinium 99	238 Fm Fermium 100	238 Md Mendelevium 101	238 No Nobelium 102	238 Lr Lawrencium 103

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

CHEMISTRY

0620/1

PAPER 1 Multiple Choice

MAY/JUNE SESSION 2001

45 minutes

Additional materials:

Multiple choice answer sheet

Soft clean eraser

Soft pencil (type B or HB is recommended)

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are **forty** questions in this paper. Answer **all** questions. For each question, there are four possible answers, A, B, C and D. Choose the **one** you consider correct and record your choice in **soft pencil** on the separate answer sheet.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

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A copy of the Periodic Table is printed on page 20.

1 In which states do particles diffuse rapidly?

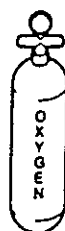
	in a gas	in a solid
A	✓	✓
B	✓	x
C	x	✓
D	x	x

2 Which object contains substances in all three states of matter?

A



B



C



D

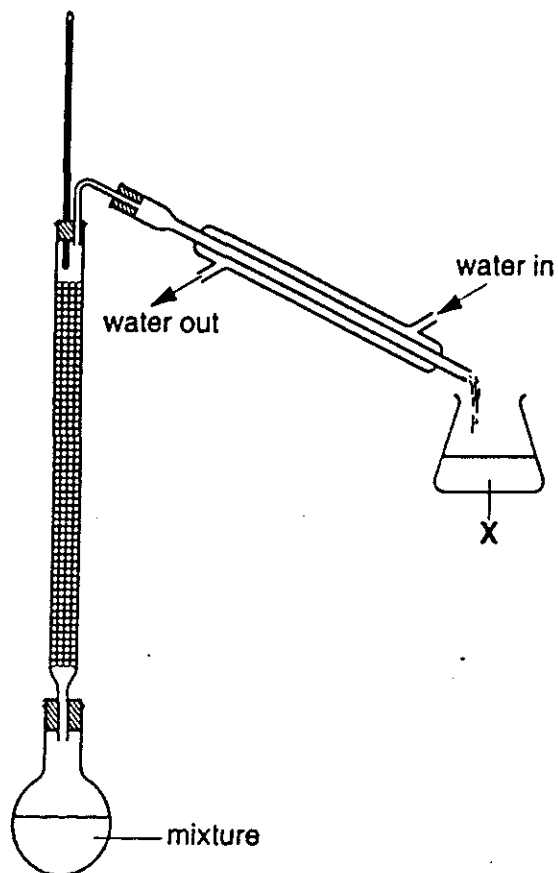


3 Green copper(II) carbonate decomposes on heating, leaving a residue of black copper(II) oxide. Carbon dioxide is given off.

Which observation shows that a heated sample of copper(II) carbonate has completely decomposed?

- A The gas given off turns lime-water cloudy.
- B The mass of the sample becomes larger and then constant.
- C The mass of the sample becomes smaller and then constant.
- D The sample turns black.

- 4 A mixture contains water and substance X. Substance X is separated from the mixture by using the apparatus shown.



What could the mixture and X be?

	mixture	X
A	ethanol and water	ethanol
B	ink and water	ink
C	salt and water	salt
D	sand and water	sand

- 5 The table shows the particles in an atom.

particle	charge	approximate relative mass
proton	+1	1
electron		$\frac{1}{2000}$
neutron	0	1

Which number completes the table?

- A -1 B 0 C +1 D +2
- 6 The table gives the numbers of protons, neutrons and electrons in four particles, 1, 2, 3 and 4.

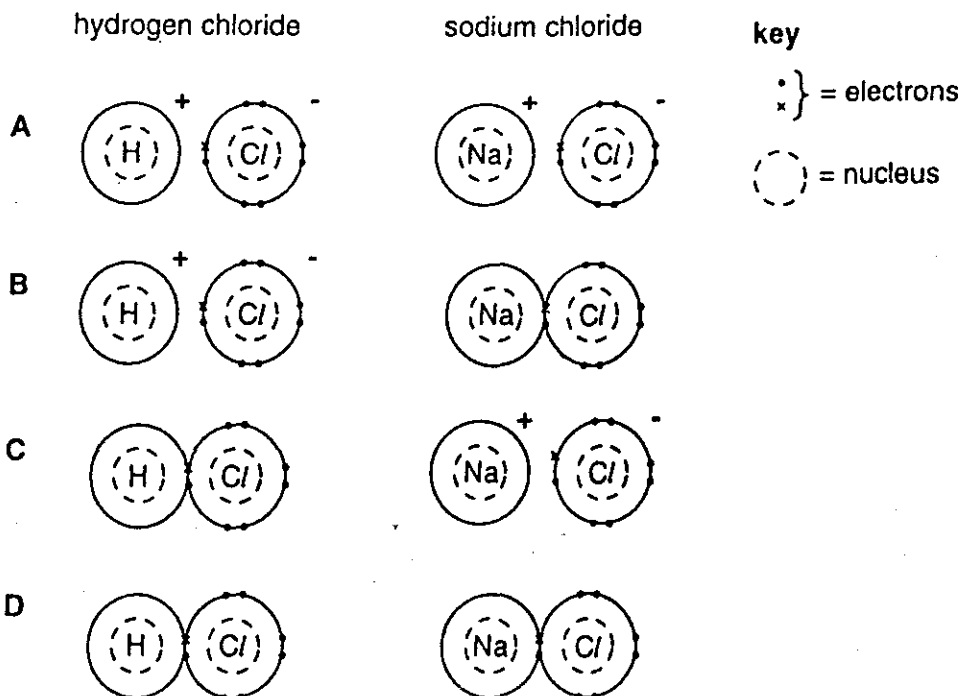
particle	number of		
	protons	neutrons	electrons
1	11	12	10
2	11	12	11
3	11	13	11
4	12	11	10

Which particles are atoms that are isotopes of each other?

- A 1 and 2
 B 1 and 4
 C 2 and 3
 D 3 and 4
- 7 Are ammonia and lime covalent compounds?

	ammonia	lime
A	✓	✓
B	✓	x
C	x	✓
D	x	x

8 How are the outer electrons in gaseous hydrogen chloride and solid sodium chloride arranged?



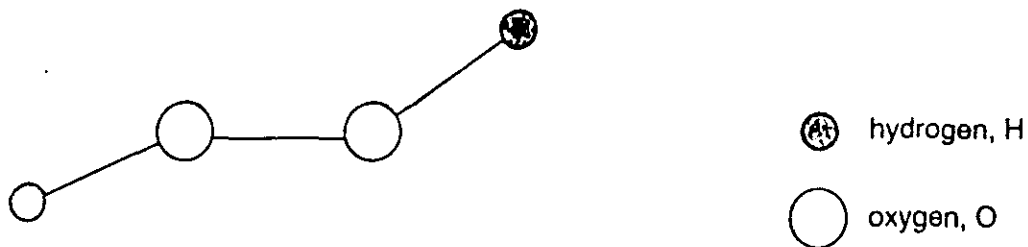
9 The table gives information about methanol and ethanol.

name	formula	X
methanol	CH ₃ OH	32
ethanol	C ₂ H ₅ OH	46

What is the column heading X in the table?

- A number of atoms in one molecule
- B relative atomic mass
- C relative molecular mass
- D relative number of atoms in one mole

10 A model of a compound is shown.

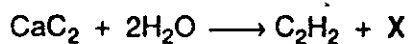


What is the molecular formula of the compound?

- A H_2O B 2HO C $2\text{H}_2\text{O}$ D H_2O_2

11 Acetylene, C_2H_2 , is used in welding.

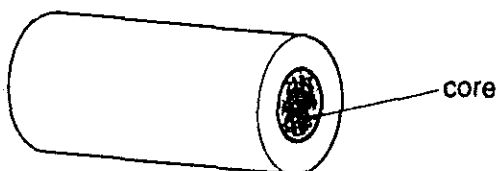
Many years ago, it was used to light bicycle lamps. It was made by the reaction below.



What is X?

- A CaO_2
 B CaOH
 C CaOH_2
 D $\text{Ca}(\text{OH})_2$

12 The diagram shows an electricity cable made of aluminium and steel.

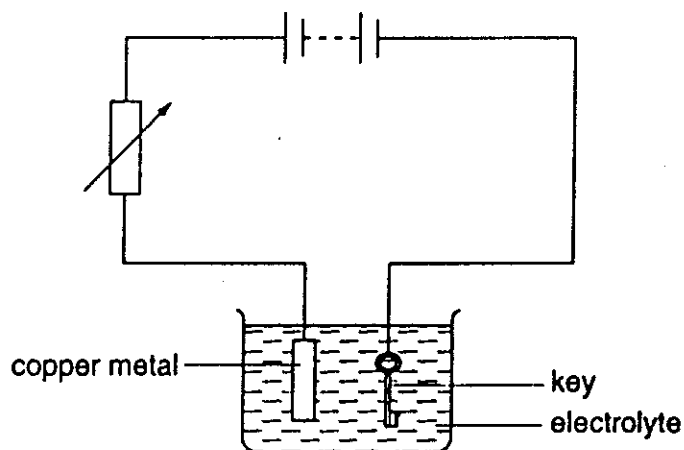


Which of these materials is used for the core and why?

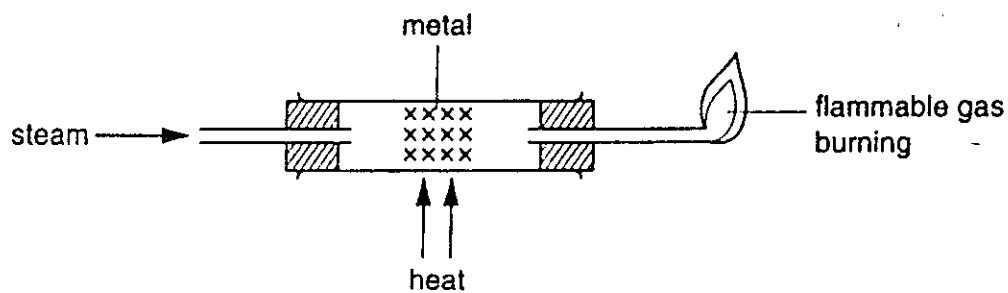
- A Aluminium, because it is a good conductor.
 B Aluminium, because it is strong.
 C Steel, because it is a good conductor.
 D Steel, because it is strong.

13 The diagram shows how a key is electroplated.

What is used as the electrolyte?



- A aqueous copper(II) sulphate
 B dilute hydrochloric acid
 C molten copper(II) chloride
 D aqueous sodium chloride
- 14 When steam is passed over a heated metal, the oxide of the metal and a flammable gas are formed.



Which statements about the steam and the flammable gas are correct?

	steam	flammable gas
A	oxidised	hydrogen
B	oxidised	oxygen
C	reduced	hydrogen
D	reduced	oxygen

- 15 Some fuels have to react with oxygen for energy to be released.

To which fuel does this statement not apply?

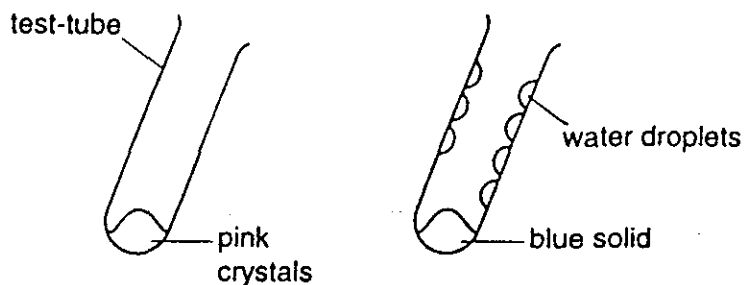
- A ethanol
 - B hydrogen
 - C methane
 - D uranium
- 16 In an experiment, different conditions were used to dissolve equal masses of zinc in equal volumes of dilute sulphuric acid of the same concentration. The results are shown.

reaction	temperature of acid	type of zinc	time taken for zinc to dissolve
1	19°C	foil	3 min
2	47°C	powder	1 min
3	47°C	foil	?

How long did it take for the zinc in reaction 3 to dissolve?

- A 1 min
 - B 2 min
 - C 3 min
 - D 4 min
- 17 Iron(II) ions in FeO react with oxygen to form Fe₂O₃.
- Which statement about the iron ions is correct?
- A Iron(II) ions are oxidised because they gain oxygen.
 - B Iron(II) ions are reduced because they lose oxygen.
 - C Iron(III) ions are oxidised because they gain oxygen.
 - D Iron(III) ions are reduced because they lose oxygen.


18 The diagram shows what happens to some pink crystals when heated.



Where do the water droplets come from?

- A the air
 - B the burner flame
 - C the glass test-tube
 - D the pink crystals
- 19 What should be added to neutralise aqueous ammonia?
- A dilute sodium hydroxide
 - B dilute sulphuric acid
 - C distilled water
 - D Universal Indicator solution
- 20 The soil in a garden has a pH 6.5. A gardener adds lime to some parts of the garden and an acidic fertiliser to other parts.

The diagram shows the pH results of testing the soil in parts W, X, Y and Z after the treatment.

W pH 6.0	6.5 pH	X pH 7.0
Y pH 5.5	 house	Z pH 7.5

To which parts of the garden was lime added?

- A W and X
- B W and Y
- C X and Z
- D Y and Z

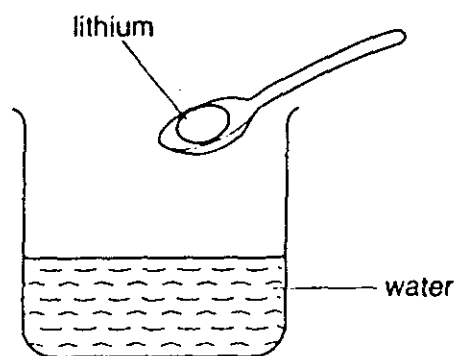
21 Which results show that nitric acid and lead(II) nitrate have leaked into a river?

	results of testing river water with	
	Universal Indicator pH	aqueous potassium iodide
A	5	yellow precipitate
B	5	no reaction
C	9	yellow precipitate
D	9	no reaction

22 Which element is a transition metal?

	density of element	properties of oxide of element
A	high	colourless gas
B	high	red solid
C	low	colourless gas
D	low	red solid

23 In the experiment shown, solution X and gas Y are formed.



What are X and Y?

	X	Y
A	lithium hydroxide	hydrogen
B	lithium hydroxide	oxygen
C	lithium oxide	hydrogen
D	lithium oxide	oxygen

- 24 The proton number (atomic number) of yttrium, Y, is 39 and that of tellurium, Te, is 52.

What can be deduced about yttrium and tellurium from their positions in the Periodic Table?

	yttrium	tellurium
A	metal	metal
B	metal	non-metal
C	non-metal	metal
D	non-metal	non-metal

- 25 Which statement is correct for all metals?

- A They are soluble in water.
- B They conduct electricity.
- C They have a high melting point.
- D They react with acids.

- 26 When metal X is placed in aqueous YSO_4 , a brown deposit is formed.

When metal X is placed in aqueous ZSO_4 , there is no reaction.

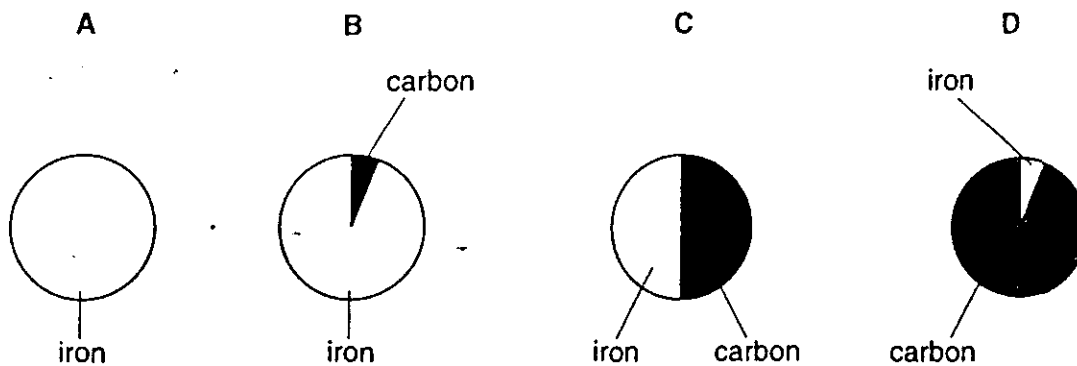
Which metal is most reactive and which metal is least reactive?

	most reactive	least reactive
A	X	Z
B	Y	Z
C	Z	X
D	Z	Y

- 27 Which method is used to extract metals from their oxides?

- A alloying
- B burning
- C oxidation
- D reduction

28 Which pie chart represents the composition of steel?

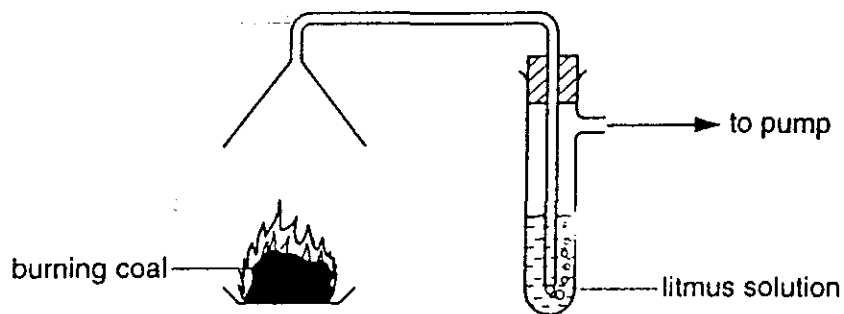


29 Four samples of sea water are treated.

Which treatment removes **all** of the dissolved salts?

- A chlorination
- B distillation
- C filtration
- D neutralisation

30 The apparatus shown is used to test the gases formed when coal is burned.



The litmus solution turns red.

Which of the following gases caused this change?

- A ammonia
- B chlorine
- C nitrogen
- D sulphur dioxide

31 The table shows the composition of natural gas from four different countries.

natural gas	hydrocarbons %	nitrogen %	sulphur compounds %
A	89	10	1
B	85	15	0
C	83	15	2
D	81	11	8

Which natural gas would cause the most pollution when burned?

32 Which treatment of iron does **not** prevent rusting?

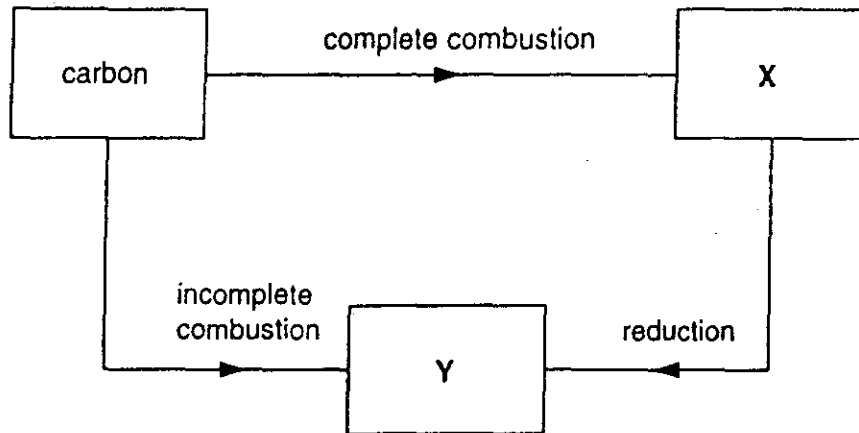
- A coating with zinc
- B covering with grease
- C painting
- D washing with distilled water

33 Two solutions are mixed and then heated. Ammonia is given off.

What could the two solutions contain?

- A NH_4Cl and H_2SO_4
- B NH_4Cl and NaOH
- C NaNO_3 and H_2SO_4
- D NaNO_3 and NaOH

34 The diagram shows some reactions.



What are X and Y?

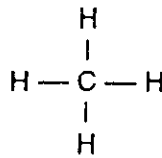
	X	Y
A	carbon dioxide	carbon monoxide
B	carbon dioxide	methane
C	carbon monoxide	carbon dioxide
D	carbon monoxide	methane

35 In extracting iron from iron ore, limestone (calcium carbonate) is used.

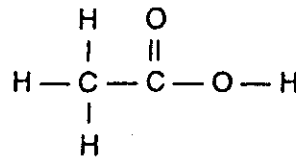
Why is this?

- A Limestone causes the ore to melt.
- B Limestone oxidises the ore.
- C Limestone removes impurities from the ore.
- D Limestone stops the rusting of iron.

36 Two structures are shown.



P

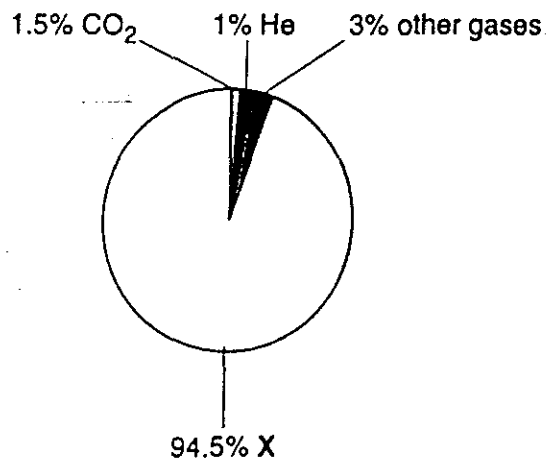


Q

What are the names of P and Q?

	P	Q
A	methane	ethanoic acid
B	methane	ethanol
C	ethane	ethanoic acid
D	ethane	ethanol

37 The diagram shows the composition by volume of natural gas.



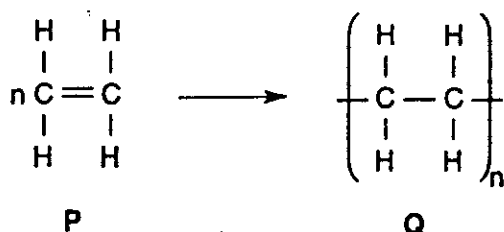
What is X?

- A ethane, C₂H₆
- B hydrogen, H₂
- C methane, CH₄
- D propane, C₃H₈

38 Which three substances belong to the same homologous series?

- A C, CO, CO₂
 B CH₄, C₂H₆, C₃H₈
 C Li, Na, K
 D Na, Mg, Al

39 The equation shows how a useful compound Q is formed from compound P.

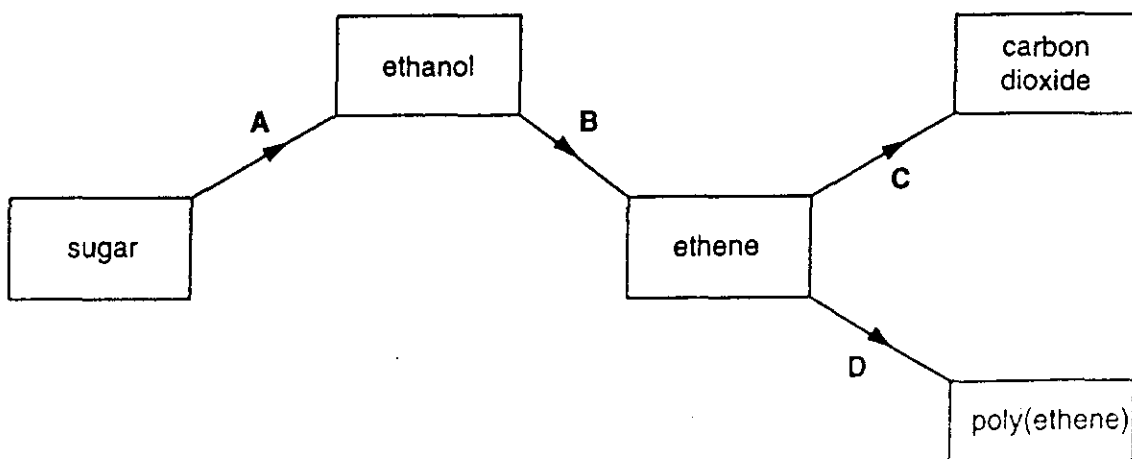


Compound P is _____ 1 _____ and forms Q by _____ 2 _____.

Which words correctly complete gaps 1 and 2?

	gap 1	gap 2
A	saturated	addition polymerisation
B	saturated	condensation
C	unsaturated	addition polymerisation
D	unsaturated	condensation

40 Which change in the diagram involves fermentation?



DATA SHEET The Periodic Table of the Elements

		Group																
I	II											III	IV	V	VI	VII	0	
												1 H Hydrogen						2 He Helium
3 Li Lithium	4 Be Beryllium											5 B Boron	6 C Carbon	7 N Nitrogen	8 O Oxygen	9 F Fluorine	10 Ne Neon	
11 Na Sodium	12 Mg Magnesium											13 Al Aluminium	14 Si Silicon	15 P Phosphorus	16 S Sulphur	17 Cl Chlorine	18 Ar Argon	
19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton	
37 Rb Rubidium	38 Sr Strontium	39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybdenum	43 Tc Technetium	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon	
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90-101 Lanthanoid series
102-103 Actinoid series

140 Ce Cerium	141 Pr Praseodymium	144 Nd Neodymium	Pm Promethium	150 Sm Samarium	152 Eu Europium	157 Gd Gadolinium	159 Tb Terbium	162 Dy Dysprosium	165 Ho Holmium	167 Er Erbium	169 Tm Thulium	173 Yb Ytterbium	175 Lu Lutetium
90 Th Thorium	Pa Protactinium	238 U Uranium	Np Neptunium	Pu Plutonium	Am Americium	Cm Curium	Bk Berkelium	Cf Californium	Es Einsteinium	Fm Fermium	Md Mendelevium	No Nobelium	Lr Lawrencium
58	59	60	61	62	63	64	65	66	67	68	69	70	71
90	91	92	93	94	95	96	97	98	99	100	101	102	103

a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

CHEMISTRY

0620/1

PAPER 1 Multiple Choice

OCTOBER/NOVEMBER SESSION 2001

45 minutes

Additional materials:

- Mathematical tables
- Multiple choice answer sheet
- Soft clean eraser
- Soft pencil (type B or HB is recommended)

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

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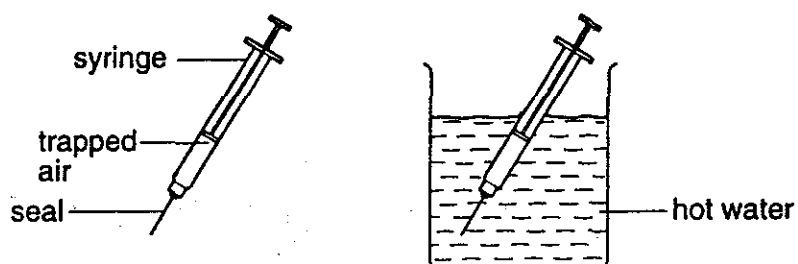
This question paper consists of 17 printed pages and 3 blank pages.

232

1 In which of the following are the particles arranged in a regular pattern?

- A a crystal
- B a gas
- C a liquid
- D a solution

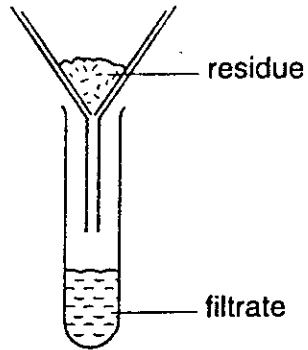
2 A sealed syringe, containing trapped air, is placed in a beaker of hot water.



What happens to the trapped air and the air particles?

	trapped air	air particles
A	expands	get larger
B	expands	move more quickly
C	contracts	get smaller
D	contracts	move more slowly

- 3 Some solid lead(II) iodide and solid potassium iodide are added to water. The mixture is shaken and then filtered.



Which statements about the filtrate and residue are correct?

	filtrate	residue
A	colourless	lead(II) iodide
B	colourless	potassium iodide
C	yellow	lead(II) iodide
D	yellow	potassium iodide

- 4 The diagram shows a chromatogram obtained from three orange sweets, 1, 2 and 3.

	● red	● red
● yellow	● yellow	● yellow
● red		● red
sweet 1	sweet 2	sweet 3

How many different red dyes are present in the sweets?

- A** 1 **B** 2 **C** 3 **D** 4

5 Which types of substance conduct electricity when solid?

- A halogens
- B metals
- C plastics
- D salts

6 How are the electrons arranged in a neon atom and a sodium ion?

	neon atom	sodium ion
A		
B		
C		
D		
	<p>⊖ = electron = nucleus</p>	

7 Which particle is a positive ion?

particle	number of electrons	number of protons	number of neutrons
A	1	1	0
B	2	3	4
C	6	6	7
D	10	9	10

8 Which of air, ammonia, coal and copper are mixtures?

- A air and coal
- B air and copper
- C ammonia and coal
- D ammonia and copper

9 What is the equation for the reaction between calcium and water?

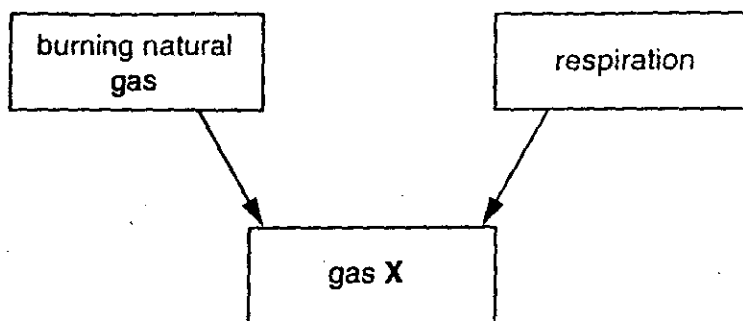
- A $\text{Ca} + \text{H}_2\text{O} \longrightarrow \text{CaOH} + \text{H}_2$
- B $\text{Ca} + \text{H}_2\text{O} \longrightarrow \text{Ca}(\text{OH})_2 + \text{H}_2$
- C $\text{Ca} + 2\text{H}_2\text{O} \longrightarrow \text{CaOH} + \text{H}_2$
- D $\text{Ca} + 2\text{H}_2\text{O} \longrightarrow \text{Ca}(\text{OH})_2 + \text{H}_2$

10 For each atom of carbon present in a molecule, there is an equal number of atoms of oxygen but twice as many atoms of hydrogen.

What is the formula of the molecule?

- A $\text{C}_2\text{H}_2\text{O}_2$
- B $\text{C}_2\text{H}_2\text{O}_4$
- C $\text{C}_2\text{H}_4\text{O}_2$
- D $\text{C}_2\text{H}_6\text{O}$

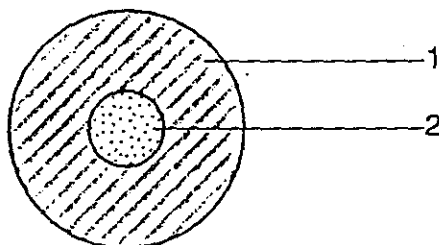
- 11 The diagram shows two processes which produce gas X.



What is the formula of gas X?

- A CH_4 B CO_2 C O_2 D SO_2

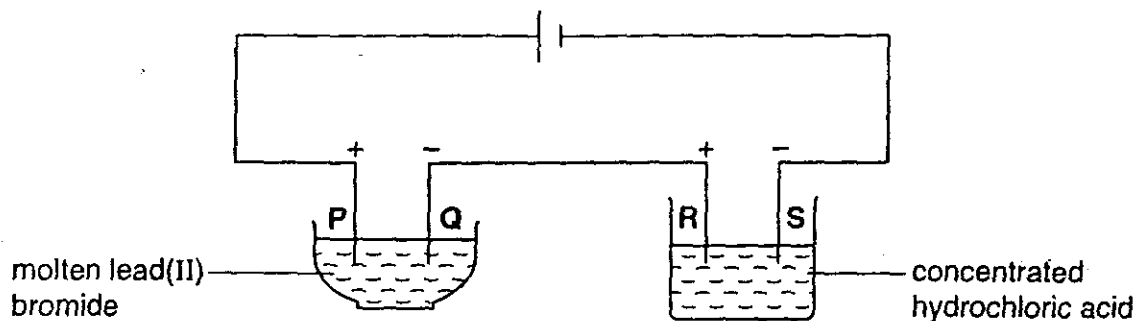
- 12 The diagram shows a cross-section of an electricity power cable.



What are parts 1 and 2 made of?

	1	2
A	aluminium	insulator
B	aluminium	steel
C	insulator	aluminium
D	steel	aluminium

- 13 The following electrolysis circuit is set up, using inert electrodes P, Q, R and S.



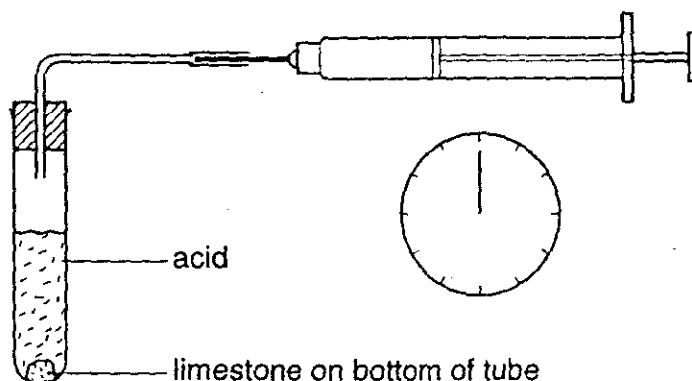
At which of the electrodes is a Group VII element produced?

- A P only B P and R C Q only D Q and S
- 14 Which statement describes an exothermic reaction?
- A The products have less energy than the reactants.
 B The products have more energy than the reactants.
 C The reaction vessel becomes colder during the reaction.
 D The reaction vessel absorbs energy from the surroundings.
- 15 A piece of copper sheet is heated gently in air and then cooled.

What happens to the mass of the copper sheet and why?

	the mass	because the copper is
A	decreases	oxidised
B	decreases	reduced
C	increases	oxidised
D	increases	reduced

- 16 A student used the apparatus shown to investigate the speed of a reaction.



What would make the reaction faster?

- A use an alkali instead of an acid
 - B use a more dilute acid
 - C use a larger syringe
 - D use powdered limestone
- 17 The sign \rightleftharpoons is used in some equations to show that a reaction can be reversed.

Two incomplete equations are given.

	reagents	products
P	$C + O_2$	CO_2
Q	$CoCl_2 + 2H_2O$	$CoCl_2 \cdot 2H_2O$

For which of these reactions can a \rightleftharpoons sign be correctly used to complete the equation?

	P	Q
A	✓	✓
B	✓	x
C	x	✓
D	x	x

- 18 In separate experiments, a catalyst is added to a reaction mixture and the temperature of the mixture is decreased.

What is the effect of these changes on the speed of the reaction?

	catalyst added	temperature decreased
A	faster	faster
B	faster	slower
C	slower	faster
D	slower	slower

- 19 Which of the following reactions is an example of neutralisation?

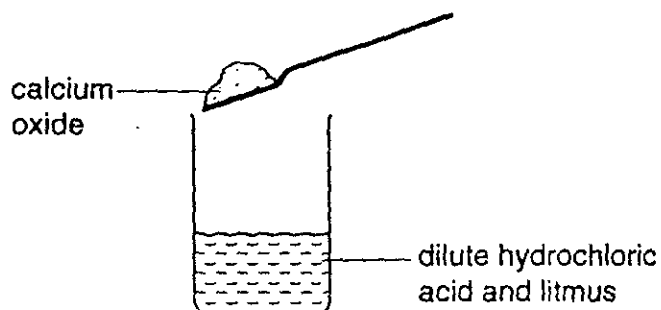
- A $\text{KMnO}_4(\text{s}) + \text{H}_2\text{O}(\text{l}) \longrightarrow \text{KMnO}_4(\text{aq})$
 B $2\text{Na}(\text{s}) + \text{Cl}_2(\text{g}) \longrightarrow 2\text{NaCl}(\text{s})$
 C $\text{PbBr}_2(\text{l}) \longrightarrow \text{Pb}(\text{s}) + \text{Br}_2(\text{g})$
 D $\text{H}_2\text{SO}_4(\text{aq}) + \text{CuO}(\text{s}) \longrightarrow \text{CuSO}_4(\text{aq}) + \text{H}_2\text{O}(\text{l})$

- 20 Samples of sodium oxide and sulphur dioxide are dissolved in water.

What are the pH values of the solutions formed?

	sodium oxide	sulphur dioxide
A	13	13
B	13	3
C	3	13
D	3	3

- 21 An excess of calcium oxide is added to dilute hydrochloric acid containing some litmus.



What happens?

	product	colour change of litmus
A	calcium chloride	red \longrightarrow blue
B	carbon dioxide	blue \longrightarrow red
C	oxygen	red \longrightarrow blue
D	hydrogen	blue \longrightarrow red

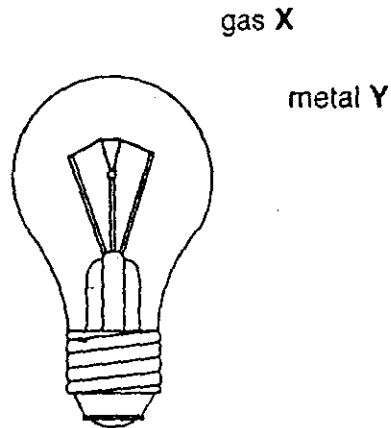
- 22 Which compound is coloured?

- A iron(III) sulphate
- B potassium iodide
- C silver chloride
- D sodium chloride

- 23 Which Group I metal and which Group VII non-metal react together most vigorously?

	Group I	Group VII
A	lithium	bromine
B	lithium	chlorine
C	potassium	bromine
D	potassium	chlorine

24 The diagram shows a light bulb.



Where are X and Y in the Periodic Table?

	X	Y
A	Group 0	Group I
B	Group 0	transition element
C	Group VII	Group I
D	Group VII	transition element

25 Which of the following is an alloy?

- A brass
- B copper
- C iron
- D silver

- 26 A student added dilute hydrochloric acid to four metals and recorded his results. Not all of his results are correct.

	results	
	metal	gas given off
1	copper	yes
2	iron	yes
3	magnesium	yes
4	zinc	no

Which two results are correct?

- A - 1 and 3
 B 1 and 4
 C 2 and 3
 D 2 and 4
- 27 Haematite is reduced to iron in the blast furnace.



What is X?

- A carbon
 B carbon dioxide
 C hydrogen
 D oxygen
- 28 Which properties of aluminium make it suitable for manufacturing aircraft bodies?

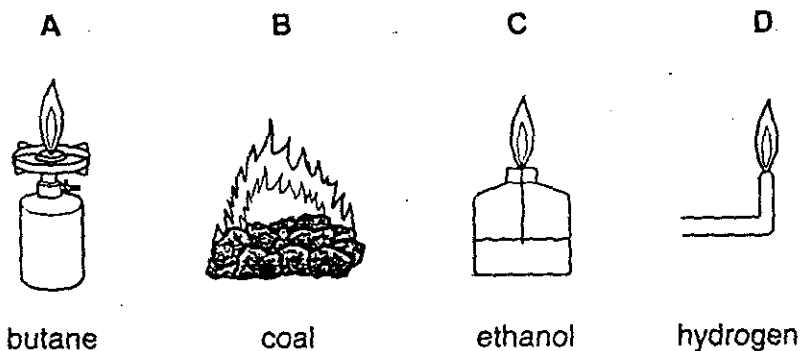
	high strength	low density
A	✓	✓
B	✓	x
C	x	✓
D	x	x

- 29 In the purification of the mains water supply, suspended solids are removed and micro-organisms destroyed.

What are the two main processes that do this?

- A distillation and chlorination
 B distillation and evaporation
 C filtration and chlorination
 D filtration and evaporation
- 30 Burning some fuels leads to the formation of acid rain.

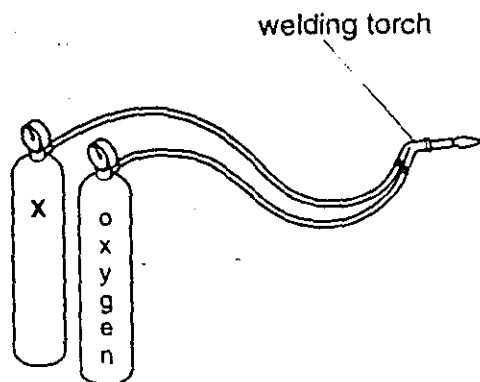
Which of these fuels does this?



- 31 Which gases are present in clean air?

	carbon dioxide	helium	hydrogen
A	✓	✓	✓
B	x	✓	✓
C	✓	x	✓
D	✓	✓	x

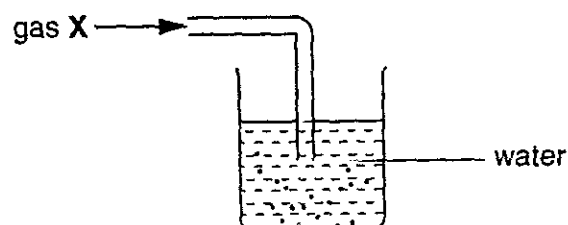
32 The diagram shows some welding apparatus.



What is gas X?

- A acetylene
- B ethane
- C ethanol
- D methane

33 Gas X is passed into water as shown.

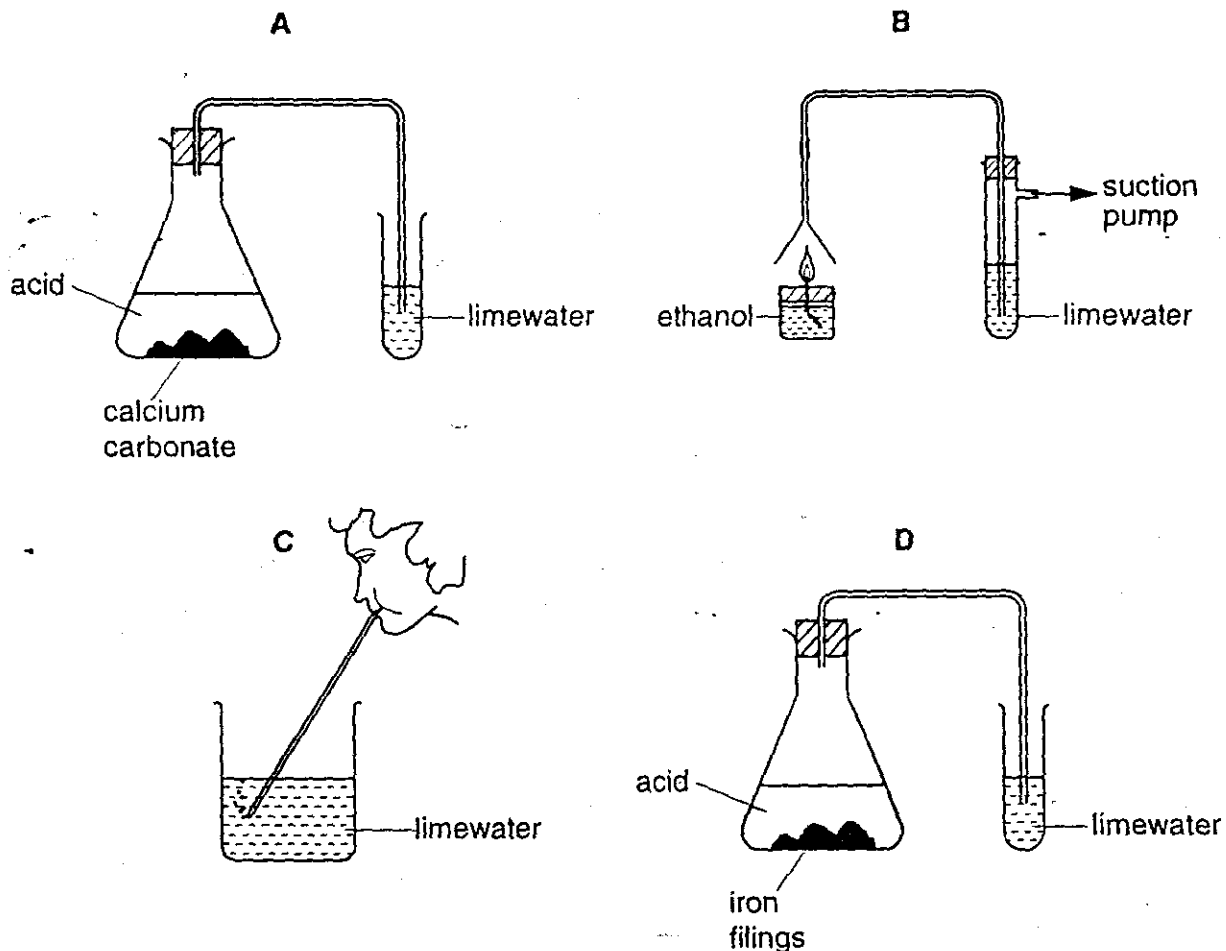


The pH of the water changes from 7 to 10.

What is gas X?

- A ammonia
- B carbon dioxide
- C nitrogen
- D sulphur dioxide

34 In which experiment does the limewater **not** turn milky?

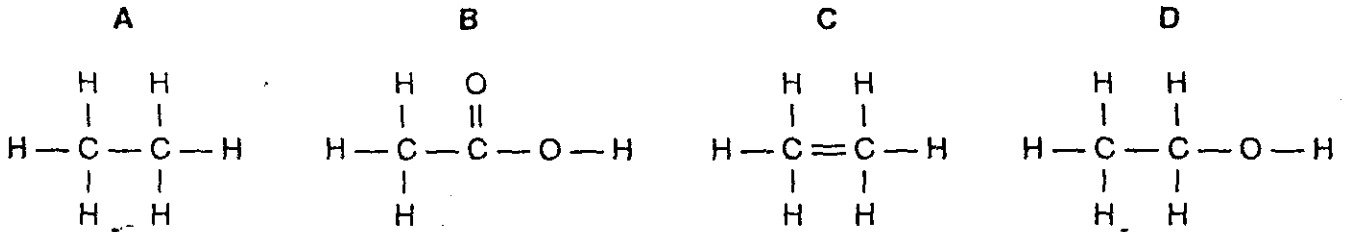


35 When limestone is heated very strongly, lime is made.

What is the formula of limestone and of lime?

	limestone	lime
A	CaO	CaCO ₃
B	CaCO ₃	CaO
C	CaCO ₃	Ca(OH) ₂
D	Ca(OH) ₂	CaCO ₃

36 Which of the structures is incorrect?



37 Which fuel is a mixture of hydrocarbons?

- A coal
- B methane
- C petroleum
- D wood

38 Methanol and ethanol belong to the same homologous series.

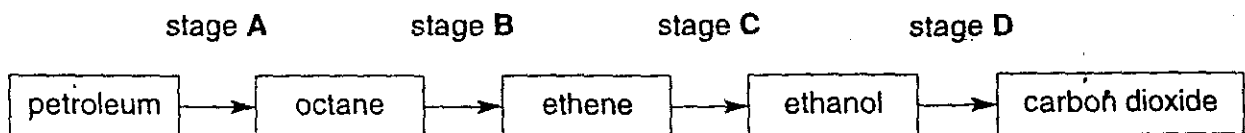
What does this mean?

- A Their molecules contain atoms only of carbon and hydrogen.
- B Their molecules the same number of carbon atoms.
- C They have the same functional group.
- D They melt at the same temperature.

39 Which process can be used to manufacture hydrogen?

- A cracking an alkane
- B distilling petroleum
- C fermentation of sugar
- D polymerisation of an alkene

40 The diagram shows four stages in a reaction scheme.



Which stage involves the catalytic addition of steam?

CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CHEMISTRY

PAPER 1 Multiple Choice

0620/1

MAY/JUNE SESSION 2002

45 minutes

Additional materials:

Multiple Choice answer sheet

Soft clean eraser

Soft pencil (type B or HB is recommended)

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are **forty** questions in this paper. Answer **all** questions. For each question, there are four possible answers, **A, B, C** and **D**. Choose the **one** you consider correct and record your choice in **soft pencil** on the separate answer sheet.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

Each correct answer will score **one** mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 20.

This question paper consists of 17 printed pages and 3 blank pages.

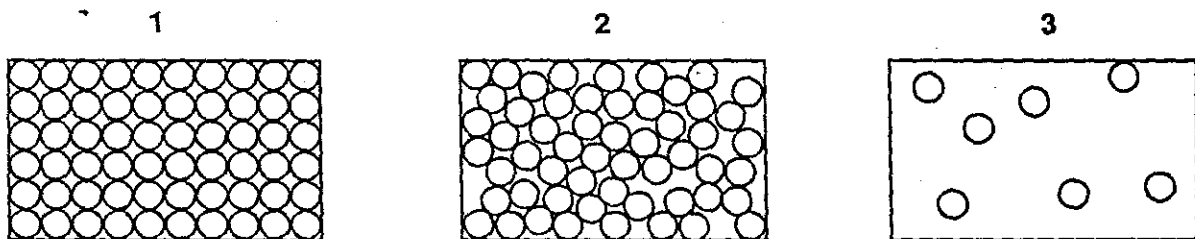
248



1 When water is warmed, what happens to its molecules?

	movement of molecules	size of molecules
A	faster	decreases
B	faster	stays the same
C	slower	decreases
D	slower	stays the same

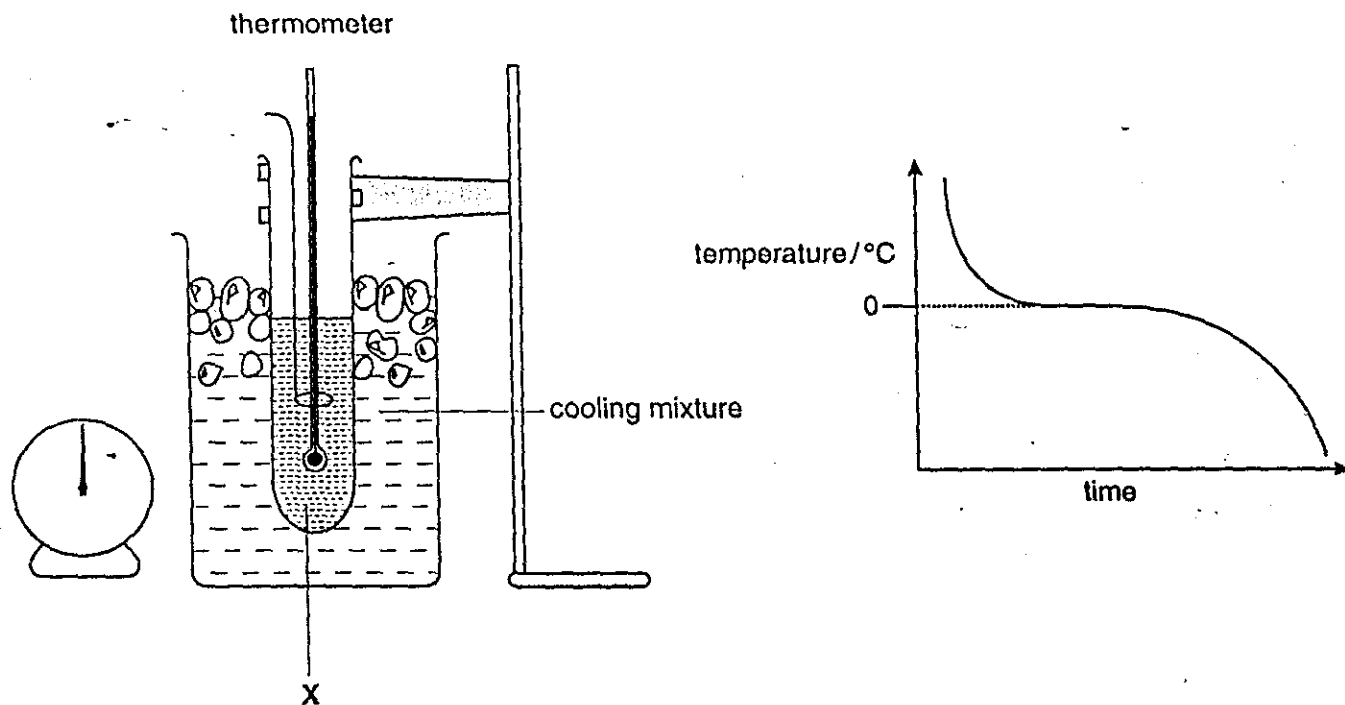
2 Diagrams 1, 2 and 3 represent the three states of matter.



For which states can diffusion be demonstrated by using simple laboratory apparatus?

- A 1 only
 - B 1 and 2
 - C 2 and 3
 - D 1, 2 and 3
- 3 How can crystals be obtained from a hot, concentrated solution of a salt?
- A by adding cold water
 - B by cooling and then filtering
 - C by filtering only
 - D by filtering and drying the residue

4 The diagrams show a cooling experiment and the results.



What liquid could X be?

	H ₂ O(l)	NaCl(aq)
A	✓	✓
B	✓	X
C	X	✓
D	X	X

5 The symbol of an element is ${}_{21}^{45}\text{Sc}$.

How many electrons does one atom of this element contain?

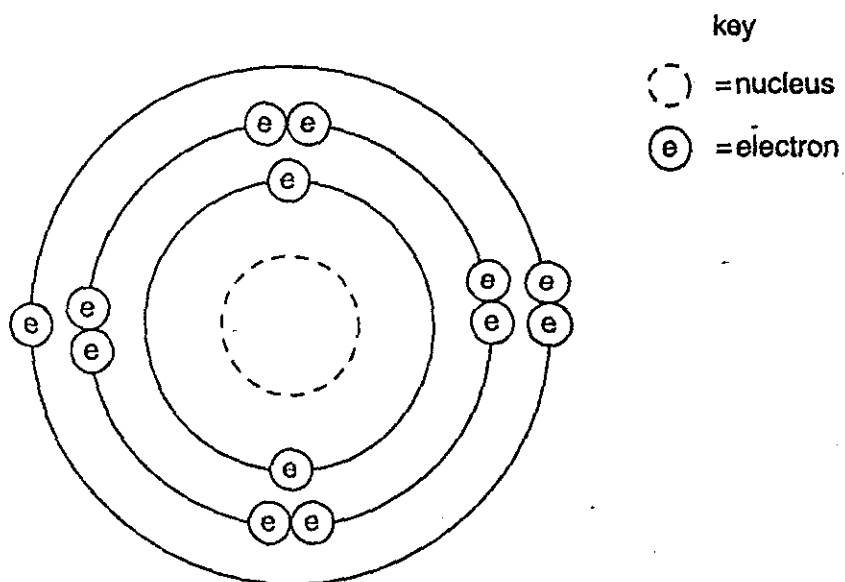
A 21

B 24

C 45

D 66

6 The diagram shows the electronic structure of an atom.



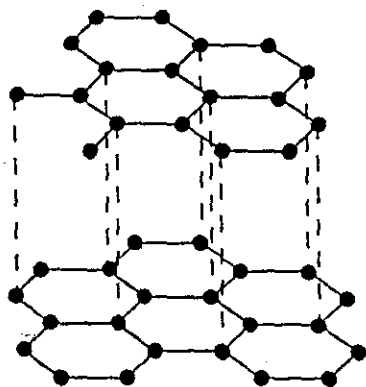
What is the number of protons in the nucleus?

- A 2 B 3 C 8 D 13

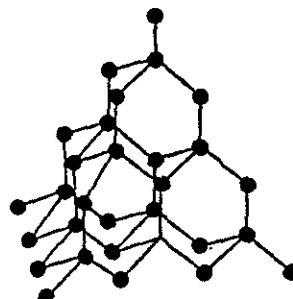
7 Which substance is a good conductor of electricity when solid?

- A a halogen
B a metal
C a plastic
D a salt

- 8 The diagrams show the structures of two forms, X and Y, of a solid element.



X



Y

What are suitable uses of X and Y, based on their structures?

	use of solid X	use of solid Y
A	drilling	drilling
B	drilling	lubricating
C	lubricating	drilling
D	lubricating	lubricating

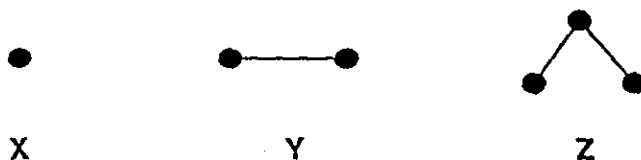
- 9 Which compound has the largest relative molecular mass, M_r ?

- A CO_2
- B NO_2
- C SiO_2
- D SO_2

- 10 What is the formula of copper(II) oxide and of sulphur hexafluoride?

	copper(II) oxide	sulphur hexafluoride
A	CuO	S_6F
B	CuO	SF_6
C	Cu_2O	S_6F
D	Cu_2O	SF_6

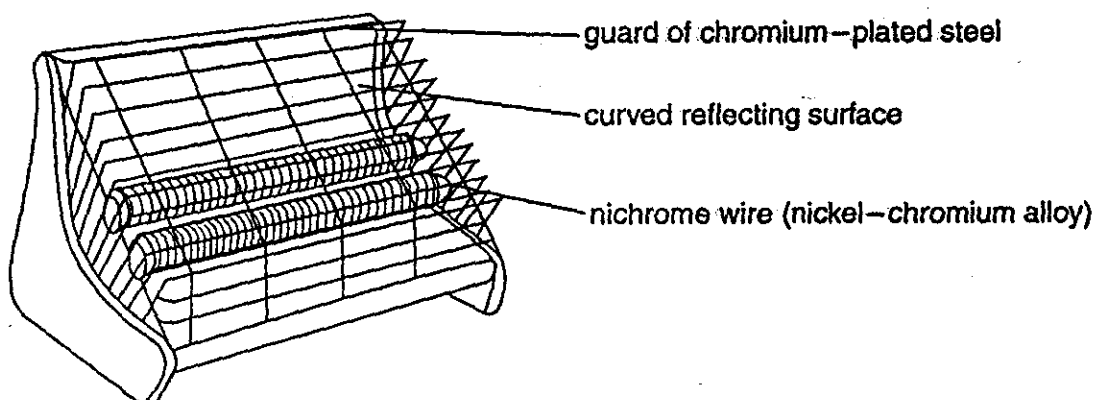
11 The diagrams show models of molecules.



Which molecules could the above models represent?

	X	Y	Z
A	helium	chlorine	water
B	helium	hydrogen chloride	methane
C	hydrogen	chlorine	water
D	hydrogen	hydrogen chloride	methane

12 The diagram shows an electric heater.



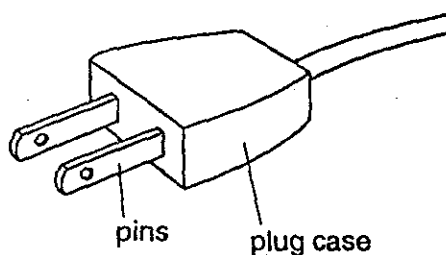
Which method would be used to plate the chromium on to the steel?

- A alloying
- B electrolysis
- C galvanising
- D oxidation

13 The table shows some properties of four materials.

material	melting point / °C	electrical conductivity when solid
W	-39	good
X	-20 to -10	poor
Y	170 to 220	poor
Z	1083	good

Which of these materials are most suitable to make the pins and the case of an electric plug?



	<i>pins</i>	<i>case</i>
A	W	X
B	X	Z
C	Y	W
D	Z	Y

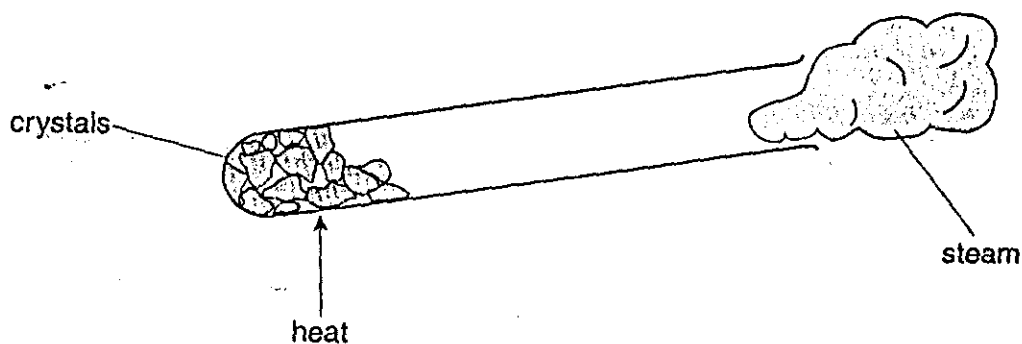
14 Samples of four different substances are added to separate volumes of water.

The temperature changes are measured.

For which substance does an exothermic reaction occur?

	substance added	temperature change
A	ammonium chloride	decrease
B	ethanol	none
C	ice	decrease
D	sodium	increase

- 15 The diagram shows crystals of copper(II) sulphate, $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, being heated.



The crystals change colour.

Which two terms describe this change?

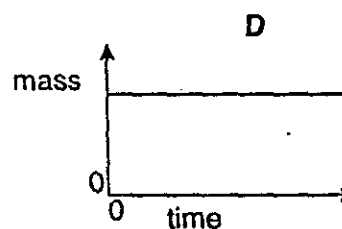
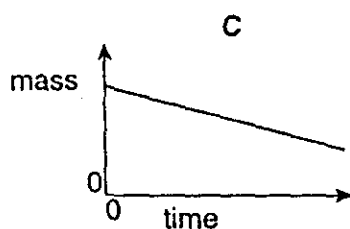
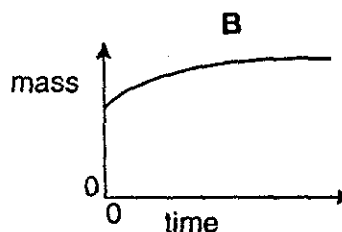
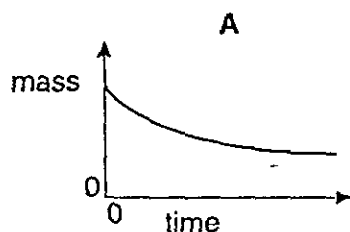
- A endothermic and dehydration
 - B endothermic and hydration
 - C exothermic and dehydration
 - D exothermic and hydration
- 16 A television news programme shows an explosion at a flour mill.

What could have increased the risk of such an explosion?

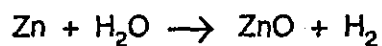
- A adding salt to the flour
- B employing more staff in the mill
- C grinding the flour more finely
- D opening the windows

17 The graphs show the mass of a beaker and its contents plotted against time.

Which graph could represent the reaction between magnesium and dilute hydrochloric acid in an open beaker?



18 Zinc reacts with steam to form zinc oxide and hydrogen.



During the reaction, which substance is oxidised?

- A hydrogen
- B water
- C zinc
- D zinc oxide

19 Hydrochloric acid is used to clean metals.

The acid reacts with the oxide layer on the surface of the metal, forming a salt and water.

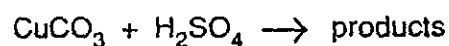
Which word describes the metal oxide?

- A alloy
- B base
- C element
- D indicator

20 Which substance reacts with calcium to form a salt?

- A hydrochloric acid
- B oxygen
- C sodium hydroxide
- D water

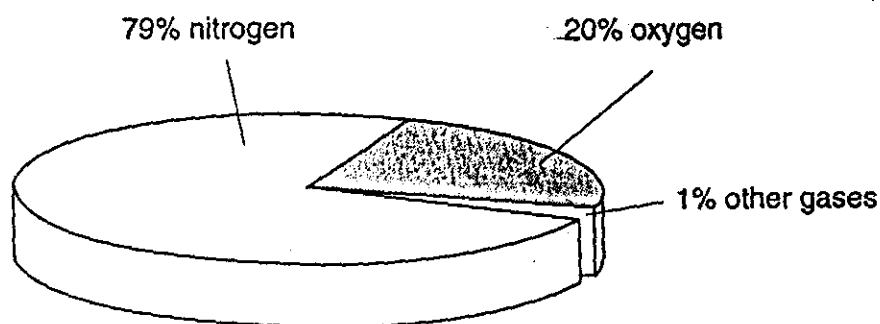
21 The incomplete equation shows a reaction.



What are the products of this reaction?

- A copper(II) oxide, sulphur dioxide, hydrogen
- B copper(II) oxide, sulphur dioxide, water
- C copper(II) sulphate, carbon dioxide, hydrogen
- D copper(II) sulphate, carbon dioxide, water

22 Air is a mixture of gases.



Which substance is present in the 'other gases' and is also unreactive?

- A argon
- B carbon dioxide
- C hydrogen
- D water vapour

23 The proton numbers of four elements are shown.

Which element is a metal?

element	proton number
A	34
B	35
C	36
D	37

24 The table shows the properties of four metals.

Which metal would be the best to make the body of an aircraft?

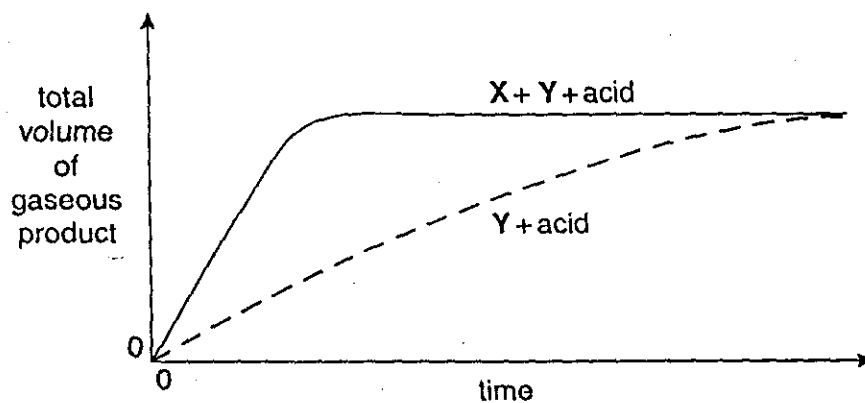
metal	resistance to corrosion	density
A	high	high
B	high	low
C	low	high
D	low	low

25 Which oxide can be reduced by heating it with carbon?

- A aluminium oxide
- B calcium oxide
- C copper(II) oxide
- D potassium oxide

- 26 Substance X does not react with dilute acid but substance Y does, forming a gaseous product.

The graph shows the results of experiments with X, Y and dilute acid.



What do these results show about X?

	X is a catalyst	X is quickly used up
A	✓	✓
B	✓	X
C	X	✓
D	X	X

- 27 The following items are all made from metals.

Which items are made from stainless steel?

- A aircraft bodies
- B drink cans
- C knives and forks
- D motor car bodies

28 A student suggests three uses of calcium carbonate (limestone).

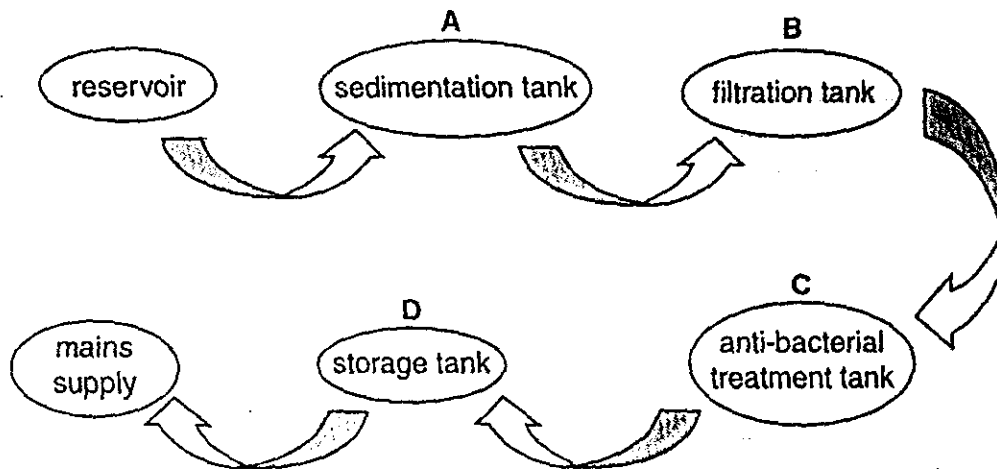
- 1 manufacture of cement
- 2 manufacture of iron
- 3 treating alkaline soils

Which of these suggestions are correct?

- A 1 and 2 only
- B 1 and 3 only
- C 2 and 3 only
- D 1, 2 and 3

29 The diagram shows stages in producing drinking water.

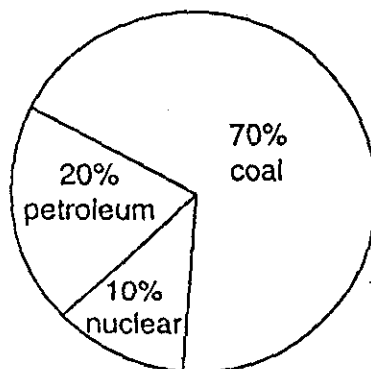
In which tank is chlorine added to the water?



30 Which gas is produced by the incomplete combustion of coal?

- A carbon dioxide
- B carbon monoxide
- C nitrogen dioxide
- D sulphur dioxide

- 31 The diagram shows the sources of energy a country uses to generate electricity.



What is the total percentage of fuels used which, when burned, could cause 'acid rain'?

- A 20% B 80% C 90% D 100%
- 32 Which of the following does not need a supply of oxygen in use?
- A breathing apparatus in hospitals
 B a fire extinguisher
 C an acetylene welding torch
 D a petrol engine
- 33 To grow tomatoes, a fertiliser containing nitrogen, phosphorus and potassium is needed. For a good yield, the fertiliser should contain a high percentage of potassium.

Which fertiliser is best for tomatoes?

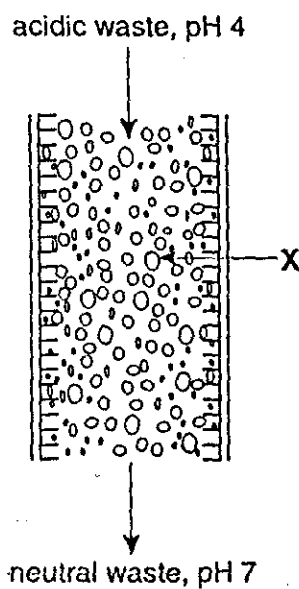
fertiliser	percentage by mass		
	N	P	K
A	29	13	0
B	29	5	5
C	13	13	20
D	9	0	25

- 34 Buildings made of calcium carbonate can react with 'acid rain'.

Which gas is formed as a result of this?

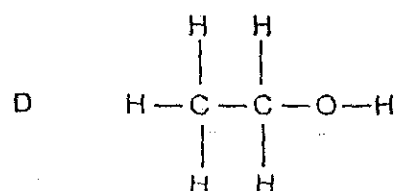
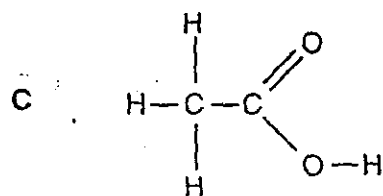
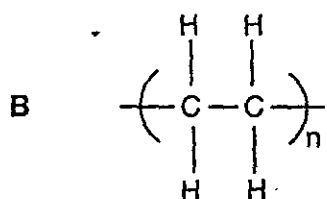
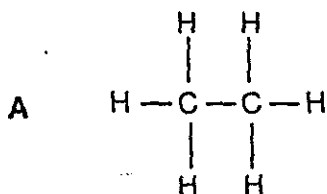
- A carbon dioxide
 B carbon monoxide
 C nitrogen dioxide
 D sulphur dioxide

- 35 Acidic waste gases from a factory are treated with substance X as shown.



What is X?

- A polythene
 - B slaked lime
 - C vinegar
 - D water
- 36 What is the structure of the product of the catalytic addition of steam to ethene?



37 Which process is used at an oil refinery?

- A cracking
- B electrolysis
- C fermentation
- D neutralisation

38 Which statement is correct **both** for methane **and** for ethane?

- A They are alcohols.
- B They are alkenes.
- C They are in the same homologous series.
- D They can undergo addition polymerisation.

39 Which reaction is an example of the **cracking** of an alkane?

- A $3\text{C}_2\text{H}_4 \rightarrow \text{C}_6\text{H}_{12}$
- B $\text{C}_6\text{H}_{14} \rightarrow 6\text{C} + 7\text{H}_2$
- C $\text{C}_6\text{H}_{12} + \text{H}_2 \rightarrow \text{C}_6\text{H}_{14}$
- D $\text{C}_6\text{H}_{14} \rightarrow \text{C}_2\text{H}_4 + \text{C}_4\text{H}_{10}$

40 In ripe fruit, the conversion of sugars into alcohol can occur naturally.

What is the name of this process?

- A addition
- B cracking
- C fermentation
- D polymerisation

DATA SHEET
The Periodic Table of the Elements

Group																		
I	II											III	IV	V	VI	VII	0	
		1 H Hydrogen 1																2 He Helium 2
3 Li Lithium	4 Be Beryllium											5 B Boron	6 C Carbon	7 N Nitrogen	8 O Oxygen	9 F Fluorine	10 Ne Neon	
11 Na Sodium	12 Mg Magnesium											13 Al Aluminium	14 Si Silicon	15 P Phosphorus	16 S Sulphur	17 Cl Chlorine	18 Ar Argon	
19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton	
37 Rb Rubidium	38 Sr Strontium	39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybdenum	43 Tc Technetium	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon	
55 Cs Caesium	56 Ba Barium	57 La Lanthanum	72 Hf Hafnium	73 Ta Tantalum	74 W Tungsten	75 Re Rhenium	76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold	80 Hg Mercury	81 Tl Thallium	82 Pb Lead	83 Bi Bismuth	84 Po Polonium	85 At Astatine	86 Rn Radon	
87 Fr Francium	88 Ra Radium	89 Ac Actinium																
*58-71 Lanthanoid series †90-103 Actinoid series																		
		58 Ce Cerium	59 Pr Praseodymium	60 Nd Neodymium	61 Pm Promethium	62 Sm Samarium	63 Eu Europium	64 Gd Gadolinium	65 Tb Terbium	66 Dy Dysprosium	67 Ho Holmium	68 Er Erbium	69 Tm Thulium	70 Yb Ytterbium	71 Lu Lutetium			
		90 Th Thorium	91 Pa Protactinium	92 U Uranium	93 Np Neptunium	94 Pu Plutonium	95 Am Americium	96 Cm Curium	97 Bk Berkelium	98 Cf Californium	99 Es Einsteinium	100 Fm Fermium	101 Md Mendelevium	102 No Nobelium	103 Lr Lawrencium			

(continued)

20

Key

a	a = relative atomic mass
X	X = atomic symbol
b	b = proton (atomic) number

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

International General Certificate of Secondary Education
CAMBRIDGE INTERNATIONAL EXAMINATIONS

CHEMISTRY

0620/1

PAPER 1 Multiple Choice

OCTOBER/NOVEMBER SESSION 2002

45 minutes

Additional materials:

Multiple Choice answer sheet

Soft clean eraser

Soft pencil (type B or HB is recommended)

TIME 45 minutes

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Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 16.

This question paper consists of 16 printed pages.



- 1 Heating a liquid causes it to become a vapour.

What happens to the molecules of the liquid during this process?

	the molecules become bigger	the molecules move further apart
A	✓	✓
B	✓	X
C	X	✓
D	X	X

- 2 Some sugar is dissolved in water.

Which diagram shows how the particles are arranged in the solution?

key

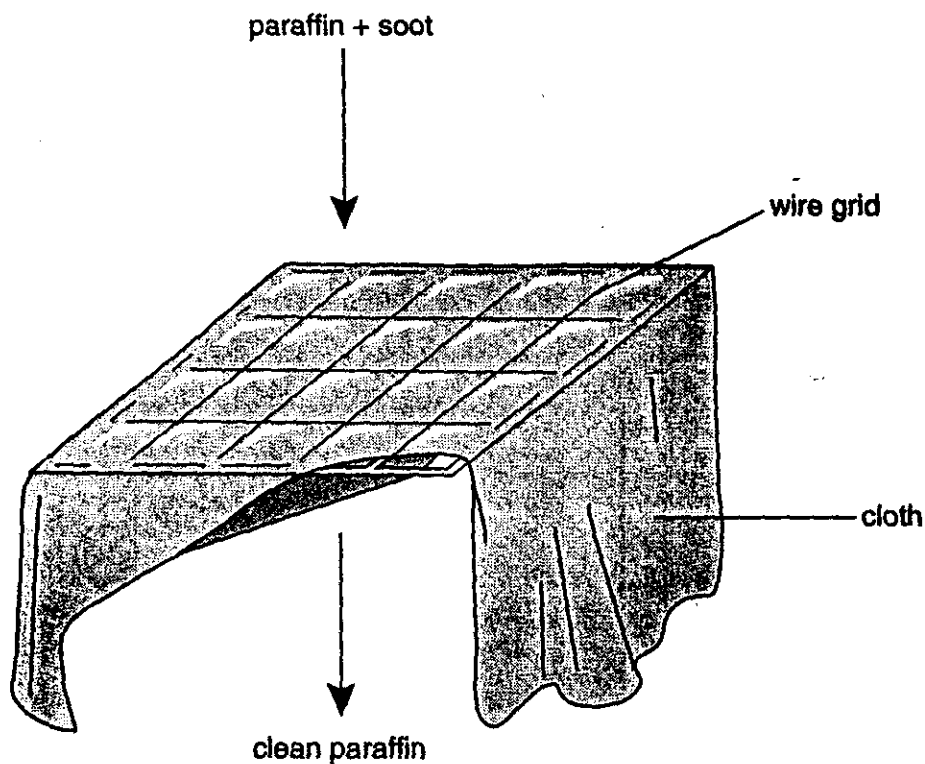
- sugar particle
- water particle

A B C D

- 3 Which stages occur in distillation?

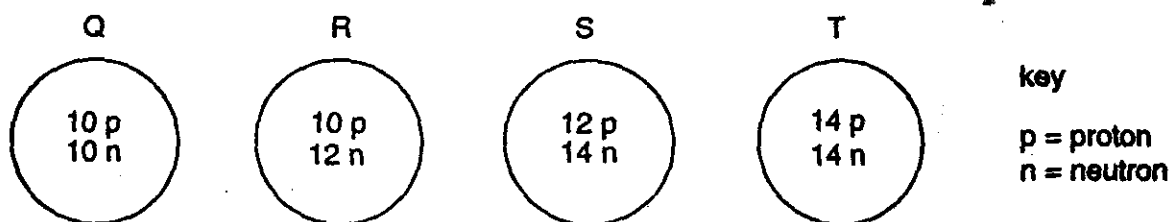
- A condensation then evaporation
- B condensation then filtration
- C evaporation then condensation
- D filtration then evaporation

- 4 Some paraffin is contaminated with soot (carbon). The soot is removed as shown.



Which method is used to remove the soot?

- A cracking
 - B crystallisation
 - C diffusion
 - D filtration
- 5 The diagrams show the nuclei of four different atoms.



Which two atoms are isotopes of each other?

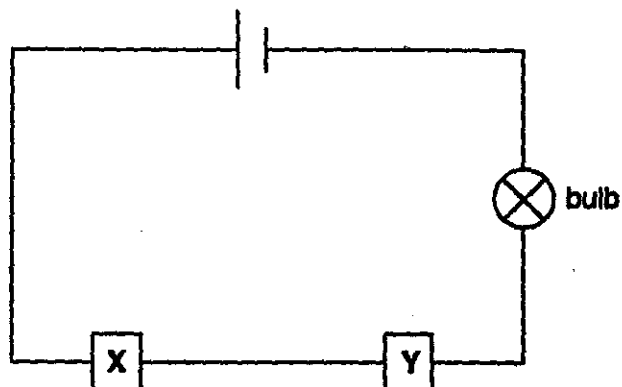
- A Q and R
 - B Q and T
 - C R and S
 - D S and T
- 6 Which atom has twice as many neutrons as protons?

- A ${}^1_1\text{H}$
- B ${}^2_1\text{H}$
- C ${}^3_1\text{H}$
- D ${}^4_2\text{He}$

7 Which change takes place when an atom becomes a positive ion?

- A An electron is added.
- B An electron is removed.
- C A proton is added.
- D A proton is removed.

8 The diagram shows an electric circuit.



For which two substances at X and Y does the bulb light up?

	X	Y
A	copper	graphite
B	copper	poly(ethene)
C	rubber	graphite
D	rubber	poly(ethene)

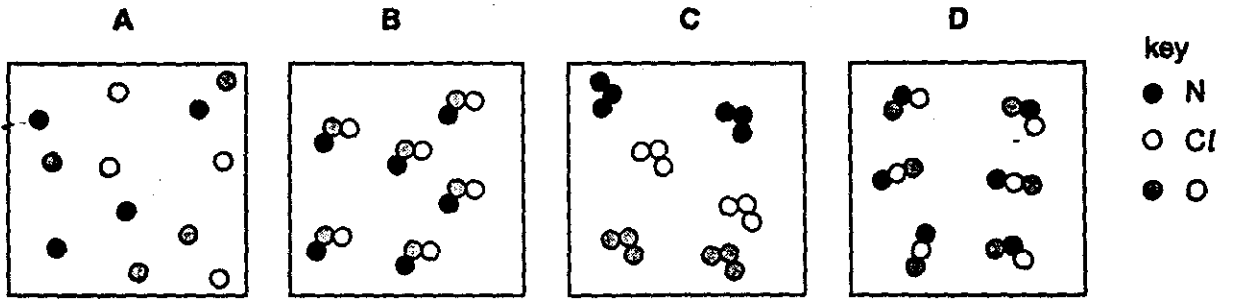
9 One method of producing carbon dioxide is to react calcium carbonate with dilute hydrochloric acid.

What is the balanced chemical equation for the reaction?

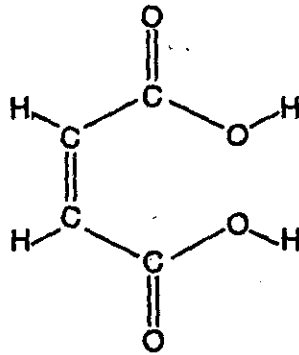
- A $\text{CaCO}_3 + \text{HCl} \rightarrow \text{CaO} + \text{CO}_2 + \text{HCl}$
- B $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$
- C $\text{CaCO}_3 + 4\text{HCl} \rightarrow \text{CaCl}_4 + \text{CO}_2 + \text{H}_2 + \text{H}_2\text{O}$
- D $\text{Ca}(\text{HCO}_3)_2 + \text{HCl} \rightarrow \text{CaCl} + 2\text{CO}_2 + \text{H}_2\text{O}$

10 A gas has the molecular formula NOCl.

Which diagram could show molecules of the pure gas NOCl?



11 Butenedioic acid has the structure shown.



What is the molecular formula of butenedioic acid?

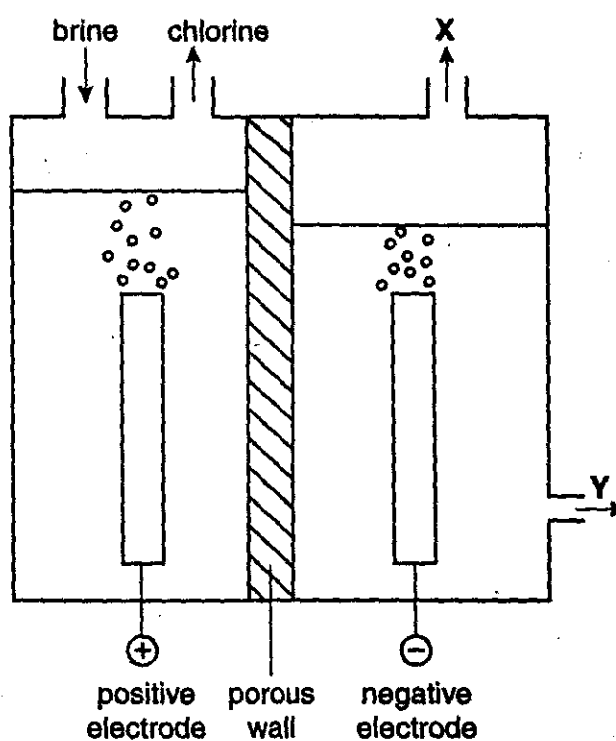
A CHO

B $C_4H_4O_4$

C $C_6H_4O_2$

D $C_6H_4O_6$

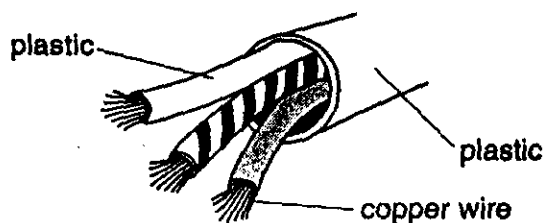
12 The diagram represents the electrolysis of brine (aqueous sodium chloride).



What are products X and Y?

	X	Y
A	hydrogen	aqueous sodium hydroxide
B	hydrogen	hydrochloric acid
C	oxygen	aqueous sodium hydroxide
D	oxygen	hydrochloric acid

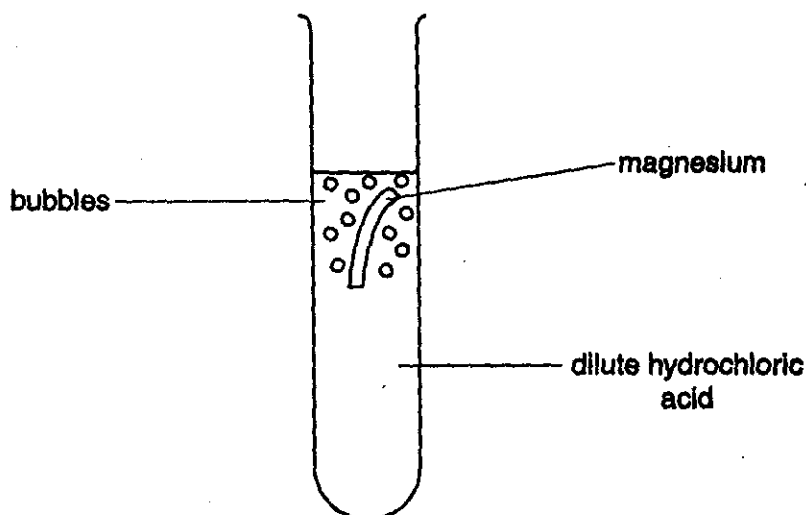
13 Copper wires in an electricity cable are covered in plastic.



Why is plastic used?

- A** It is an insulator.
- B** It is a polymer.
- C** It is hard.
- D** It melts easily.

- 14 A piece of magnesium is dropped into a test-tube containing dilute hydrochloric acid.



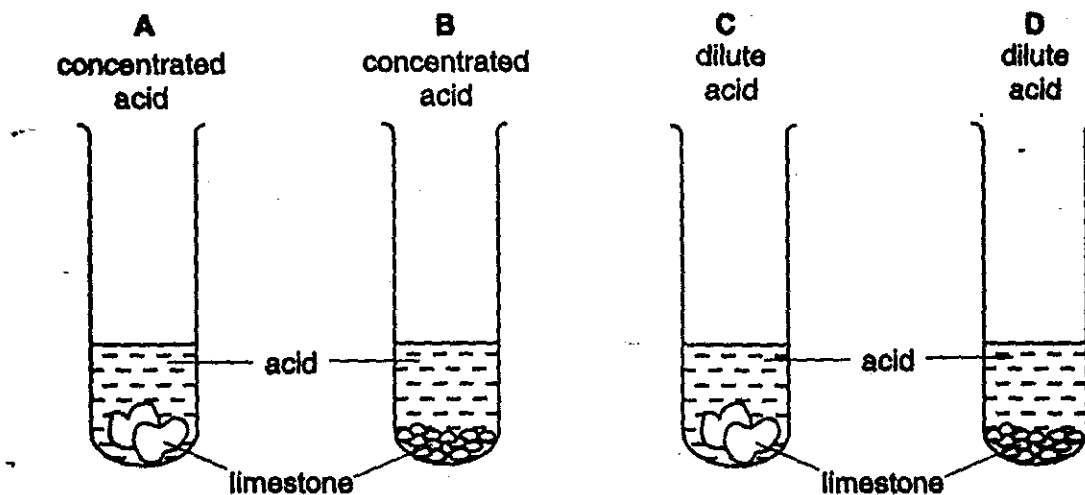
Why does the test-tube become warm?

- A Hydrogen is produced.
 - B The magnesium neutralises the acid.
 - C The reaction is endothermic.
 - D The reaction is exothermic.
- 15 An explosion in a coal mine was caused by the ignition of a mixture of methane and air.

Why did the mixture explode?

- A The heat absorbed by burning decreased the rate of burning.
- B The heat absorbed by burning increased the rate of burning.
- C The heat liberated by burning decreased the rate of burning.
- D The heat liberated by burning increased the rate of burning.

- 16 The diagram shows an experiment to compare the speed of reaction when limestone chips are added to acid.



In which test-tube is the reaction most rapid?

- 17 Which properties does a transition element have?

	density	melting point
A	high	high
B	high	low
C	low	high
D	low	low

- 18 Which metals can be obtained by heating their oxides with carbon?

	copper	iron	magnesium
A	X	✓	✓
B	✓	✓	X
C	X	X	✓
D	✓	X	X

- 19 Aqueous lead(II) nitrate is added to a solution containing iodide ions. Lead(II) iodide is formed.

Which type of reaction takes place?

- A neutralisation
- B oxidation
- C precipitation
- D reduction

20 Which element reacts with dilute sulphuric acid to produce hydrogen?

- A carbon
- B chlorine
- C copper
- D zinc

21 For which pH change is there the largest increase in acidity?

	initial pH	final pH
A	1	3
B	2	6
C	3	1
D	6	2

22 Which statement about the electrical conductivity of non-metals and the charge on their ions is correct?

	electrical conductivity	charge on ions
A	good	positive
B	good	negative
C	poor	positive
D	poor	negative

23 The corrosion of iron and its extraction from hematite are important processes.

Which terms describe the corrosion of iron and its extraction from hematite?

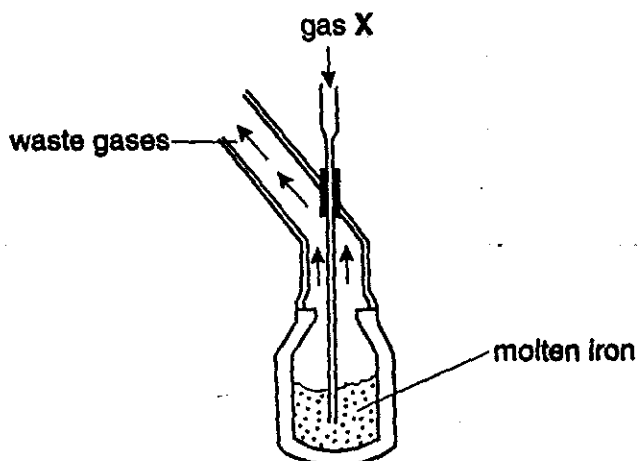
	corrosion	extraction
A	oxidation	oxidation
B	oxidation	reduction
C	reduction	oxidation
D	reduction	reduction

- 24 A few drops of aqueous bromine are added to separate aqueous solutions of potassium chloride, potassium bromide and potassium iodide.

Which solutions do not remove the colour of the bromine?

- A KBr and KCl only
 - B KBr and KI only
 - C KCl and KI only
 - D KBr, KCl and KI
- 25 Which metal produces a solution of a metal hydroxide when added to water?
- A calcium
 - B copper
 - C iron
 - D zinc
- 26 A highly reactive metal is likely to
- A form negative ions,
 - B occur naturally as an element,
 - C occur only as an oxide,
 - D oxidise rapidly in air.

27 The diagram shows the manufacture of steel.



What could gas X be?

- A carbon dioxide
- B chlorine
- C hydrogen
- D oxygen

28 A student writes the following statements.

- 1 Aluminium is used in the manufacture of aircraft bodies.
- 2 Aluminium is used to make stainless steel.
- 3 Mild steel is used in the manufacture of car bodies.

Which statements are correct?

- A 1 and 2 only
- B 1 and 3 only
- C 2 and 3 only
- D 1, 2 and 3

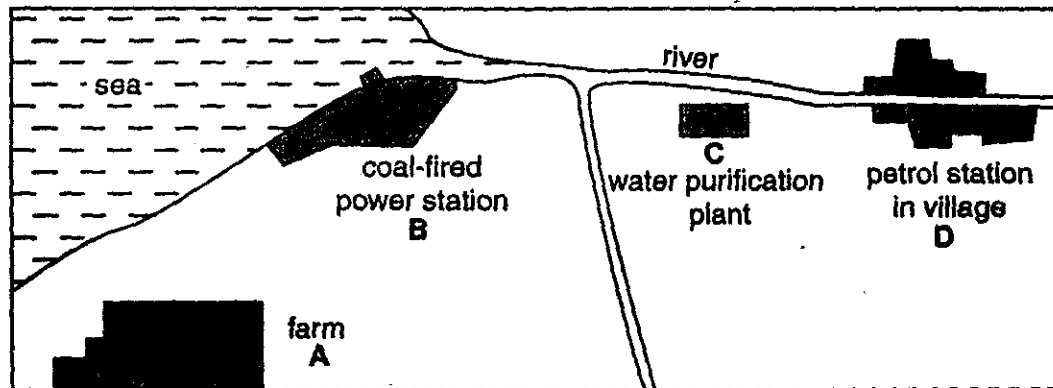
29 Which substance is used in the purification of water?

- A calcium sulphate
- B carbon dioxide
- C chlorine
- D sodium chloride

30 Which pollutant, found in car exhaust fumes, does not come from the fuel?

- A carbon monoxide
- B hydrocarbons
- C lead compounds
- D nitrogen oxides

31 Which place on the map is most likely to be producing large quantities of sulphur dioxide?



32 Why does a bicycle chain that is coated with oil not rust?

- A Oil dissolves any rust that forms.
- B Oil reacts with rust causing oxidation.
- C Oil reacts with oxygen so no rust forms.
- D Oil stops oxygen and water getting to the chain.

33 Which two other compounds should be added to ammonium sulphate to make a complete NPK fertiliser?

- A KNO_3 , Na_2HPO_4
- B K_2SO_4 , KNO_3
- C NaCl , $\text{Ca}_3(\text{PO}_4)_2$
- D NH_4Cl , Na_2HPO_4

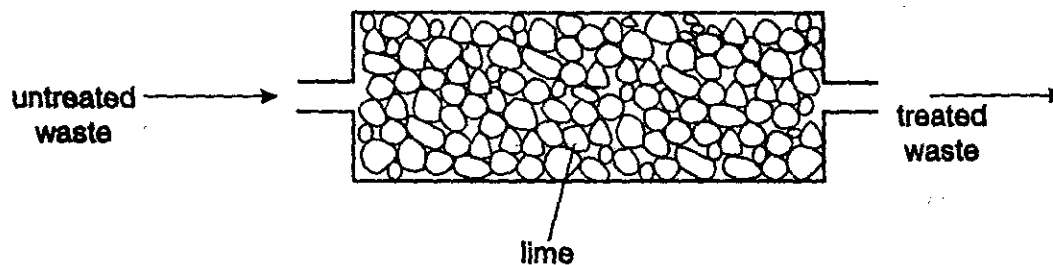
34 Two uses of oxygen are

- 1 burning acetylene in welding,
- 2 helping the breathing of hospital patients.

Which of these uses form carbon dioxide?

	use 1	use 2
A	✓	✓
B	✓	X
C	X	✓
D	X	X

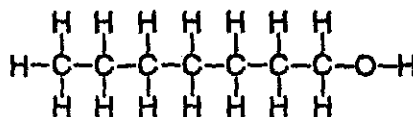
35 Lime is used to treat an industrial waste.



Which pH change occurs in the treatment?

	<u>untreated waste</u>	→	<u>treated waste</u>
A	acidic	→	neutral
B	alkaline	→	acidic
C	alkaline	→	neutral
D	neutral	→	acidic

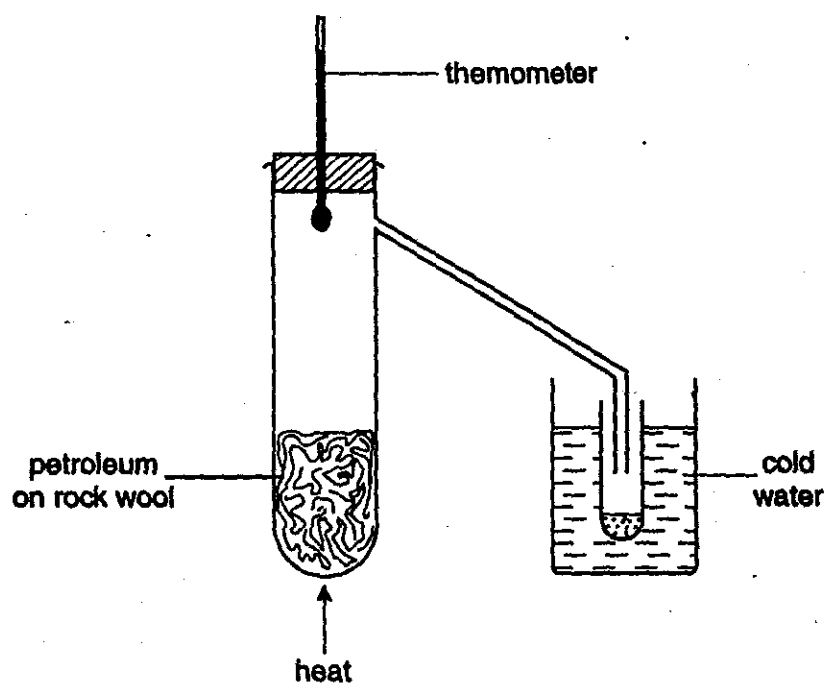
36 A compound Q has the structure shown.



What is the name of Q?

- A heptane
- B heptanoic acid
- C heptanol
- D heptene

37 A student sets up the apparatus shown to separate petroleum into its different liquid parts.



Why does this method of separation work?

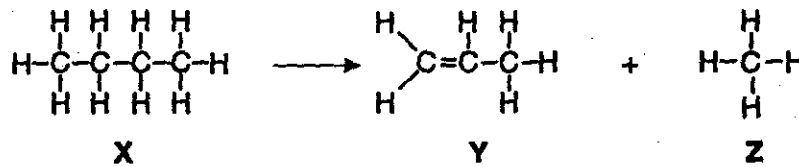
The liquids in petroleum have different

- A boiling points,
- B densities,
- C functional groups,
- D melting points.

38 Which row in the table correctly shows properties of decane?

	burns	is unsaturated
A	✓	✓
B	✓	x
C	x	✓
D	x	x

39 The equation shows the cracking of a hydrocarbon.



Which compounds are unsaturated?

- A X only B Y only C X and Z D Y and Z

40 A student states that

ethanol reacts with water to form beer and wine;

ethanol and water are used as solvents in industry.

Which of the underlined words are correct?

	reacts	solvents
A	✓	✓
B	✓	X
C	X	✓
D	X	X

CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CHEMISTRY

0620/01

Paper 1 Multiple Choice

May/June 2003

45 minutes

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has been done for you.

There are forty questions on this paper. Answer **all** questions. For each question, there are four possible answers **A, B, C, and D**.

Choose the **one** you consider correct and record your choice in **soft pencil** on the separate answer sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

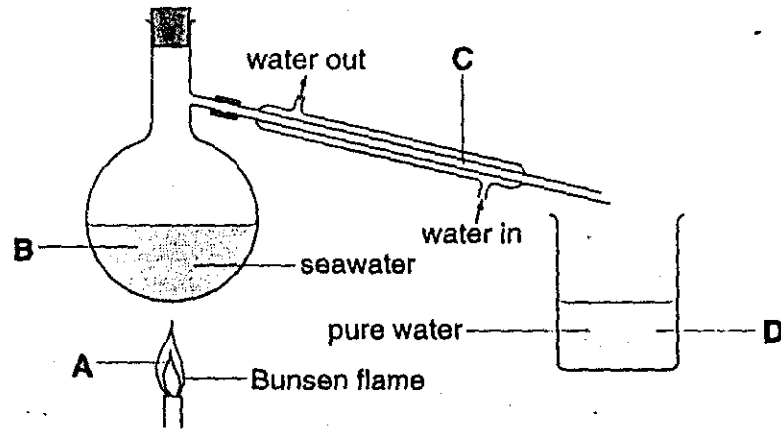
A copy of the Periodic Table is printed on page 20.

This document consists of 18 printed pages and 2 blank pages.



- 1 The diagram shows how to obtain pure water from seawater.

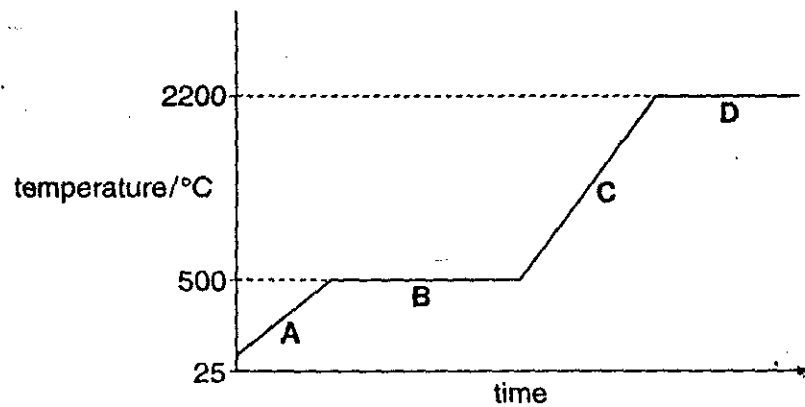
Where do water molecules lose energy?



- 2 A solid metal is heated until it turns to vapour.

The graph shows the temperature of the metal during this process.

Which part of the graph shows the melting of the metal?



- 3 Some chemical compounds are purified by recrystallisation.

What can be used to test the purity of the crystals?

- A melting point
- B colour of crystals
- C size of crystals
- D solubility

- 4 What could be the melting point and boiling point of water containing a dissolved impurity?

	melting point / °C	boiling point / °C
A	+3	96
B	+3	104
C	-3	96
D	-3	104

- 5 Which number in the table is -1?

particle	charge	relative mass
electron	A	B
neutron	C	1
proton	D	1

- 6 What is the electronic structure of an atom with a proton number 5 and a nucleon number 11?

A 1, 8, 2

B 2, 8, 1

C 2, 3

D 3, 2

- 7 What changes when an ion is made from an atom?

A the number of electrons only

B the number of neutrons only

C the number of protons only

D the number both of protons and of neutrons

- 8 Strontium, Sr, is a metal that forms an ionic chloride SrCl_2 .

Sulphur, S, is a non-metal that forms a covalent chloride SCl_2 .

Which compound is likely to have the higher melting point (m.p.) and which is more soluble in water?

	higher m.p.	more soluble in water
A	SrCl_2	SrCl_2
B	SrCl_2	SCl_2
C	SCl_2	SrCl_2
D	SCl_2	SCl_2

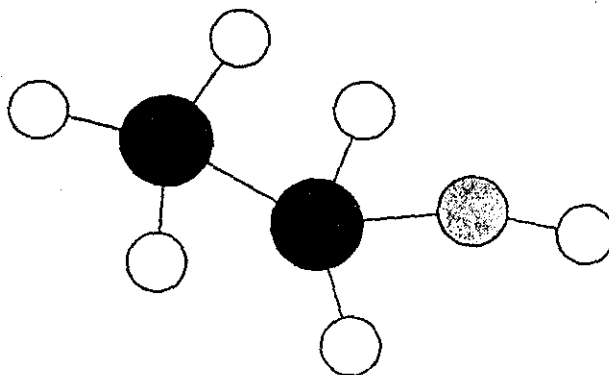
- 9 The relative atomic mass of oxygen is 16 and that of hydrogen is 1.

This means that ... (i) ... of oxygen has the same mass as ... (ii) ... of hydrogen.

Which words correctly complete the gaps?

	gap (i)	gap (ii)
A	an atom	thirty-two molecules
B	an atom	eight molecules
C	a molecule	sixteen atoms
D	a molecule	eight atoms

- 10 The diagram shows a model of a molecule containing carbon, hydrogen and oxygen.



How many atoms of each element are in the molecule?

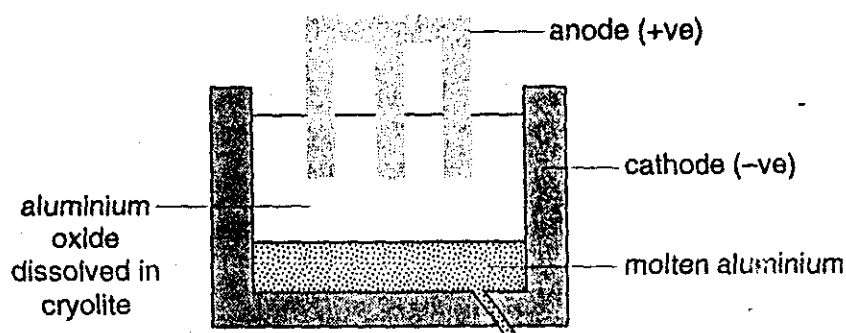
	carbon	hydrogen	oxygen
A	1	6	2
B	2	5	1
C	2	6	1
D	6	2	1

- 11 Water is formed when 48 g of oxygen combine with 6 g of hydrogen.

What mass of oxygen combines with 2 g of hydrogen?

- A** 12 g **B** 16 g **C** 96 g **D** 144 g

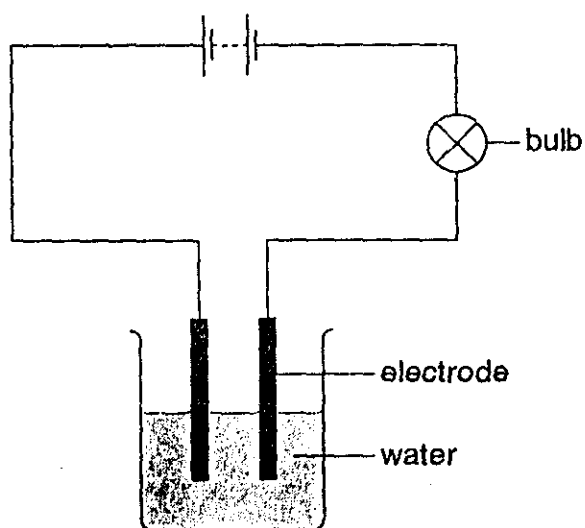
12 The diagram shows how aluminium is manufactured by electrolysis.



What are the anode and cathode made of?

	anode	cathode
A	aluminium	aluminium
B	aluminium	graphite
C	graphite	aluminium
D	graphite	graphite

13 A student sets up the apparatus shown. The bulb does not light.



After the student adds substance X to the water, the bulb lights.

What is X?

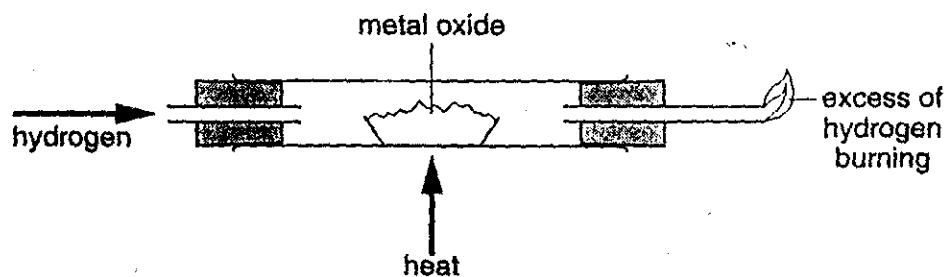
- A calcium carbonate
- B carbon
- C copper(II) sulphate
- D ethanol

14 The following elements have radioactive isotopes.

Which element is used as a source of energy because of its radioactivity?

- A carbon
- B hydrogen
- C iodine
- D uranium

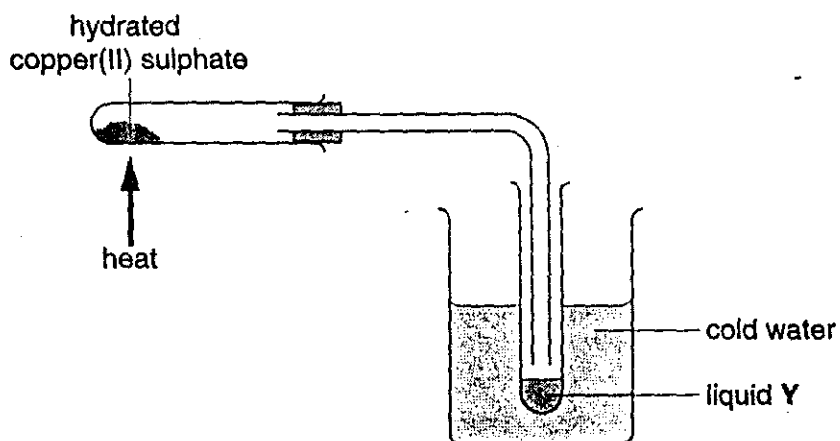
15 When hydrogen is passed over a heated metal oxide, the metal and steam are formed.



What happens to the hydrogen and to the metal oxide?

	hydrogen	metal oxide
A	oxidised	oxidised
B	oxidised	reduced
C	reduced	oxidised
D	reduced	reduced

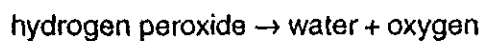
- 16 When hydrated copper(II) sulphate is heated in the apparatus shown, solid X and liquid Y are produced.



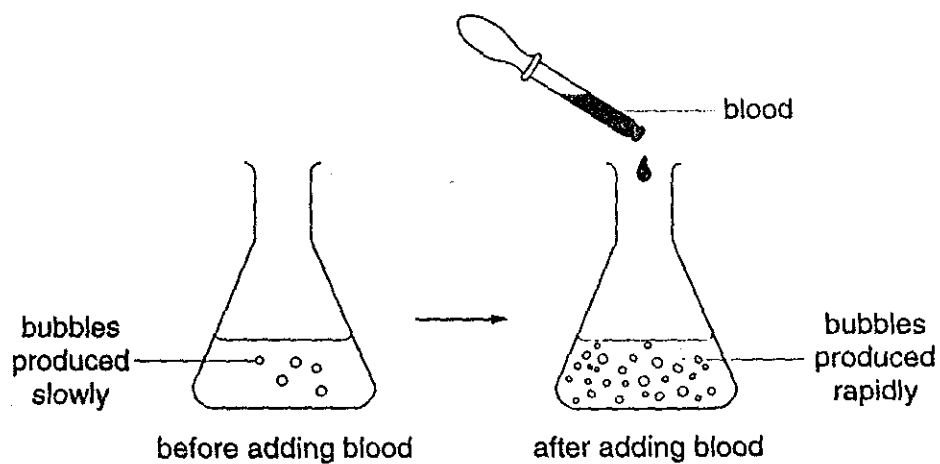
Which changes are noticed when liquid Y is added to cold solid X?

	colour change	heat change
A	blue to white	heat given out
B	blue to white	heat taken in
C	white to blue	heat given out
D	white to blue	heat taken in

17 A solution of hydrogen peroxide releases oxygen slowly at room temperature.



The diagrams show the effect of adding blood to the solution.

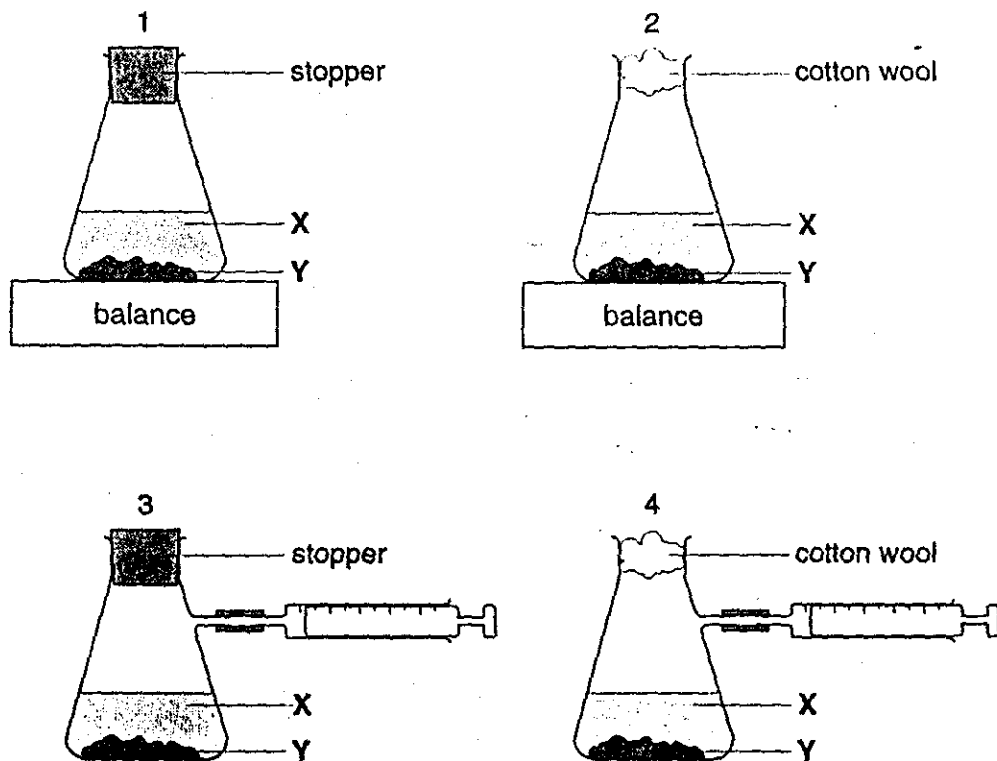


What could be the reason for the observed change?

- A Blood contains an enzyme.
- B Blood contains water.
- C The hydrogen peroxide becomes more concentrated.
- D The hydrogen peroxide is neutralised by blood.

18 A liquid X reacts with solid Y to form a gas.

Which two diagrams show suitable methods for investigating the speed of the reaction?



- A 1 and 3
- B 1 and 4
- C 2 and 3
- D 2 and 4

19 Which substance does not form copper(II) sulphate with warm, dilute sulphuric acid?

- A copper
- B copper(II) carbonate
- C copper(II) hydroxide
- D copper(II) oxide

20 Which test method and gas are correctly linked?

	test method	gas
A	a lighted splint	oxygen
B	a glowing splint	hydrogen
C	damp litmus paper	chlorine
D	limewater	ammonia

21 Water is added to a test-tube containing dilute sulphuric acid of pH 4.

What could be the pH of the resulting solution?

A 8

B 6

C 4

D 2

22 Magnesium, on the left of Period Two of the Periodic Table, is more metallic than chlorine on the right of this Period.

Why is this?

Magnesium has

A fewer electrons.

B fewer protons.

C fewer full shells of electrons.

D fewer outermost electrons.

23 An inert gas X is used to fill weather balloons.

Which descriptions of X are correct?

	number of outer electrons in atoms of X	structure of gas X
A	2	single atoms
B	2	diatomic molecules
C	8	single atoms
D	8	diatomic molecules

24 A student is asked to complete two sentences.

Metallic and non-metallic elements are classified in the ... (i) ... This can be used to ... (ii) ... the properties of elements.

Which words correctly complete the gaps?

	gap (i)	gap (ii)
A	Periodic Table	measure
B	Periodic Table	predict
C	reactivity series	measure
D	reactivity series	predict

25 Which material is an alloy that contains a non-metallic element?

- A brass
- B haematite
- C manganese
- D steel

26 The table gives information about the reactivity of three metals P, Q and R.

metal	reaction with air	reaction with steam	reaction with dilute hydrochloric acid
P	burns with sparks	forms an oxide	forms hydrogen
Q	slowly forms an oxide	no reaction	no reaction
R	slowly forms an oxide	no reaction	forms hydrogen

What is the order of reactivity of P, Q and R?

	most reactive	→	least reactive
A	P	Q	R
B	P	R	Q
C	Q	R	P
D	R	Q	P

27 The bodies of aircraft are often made using aluminium.

Which **two** properties of aluminium make it suitable for this purpose?

	property 1	property 2
A	good conductor of electricity	good conductor of heat
B	good conductor of electricity	strong
C	good conductor of heat	low density
D	strong	low density

28 Which raw materials are used in the manufacture of iron?

- A** bauxite and lime
- B** bauxite and limestone
- C** haematite and lime
- D** haematite and limestone

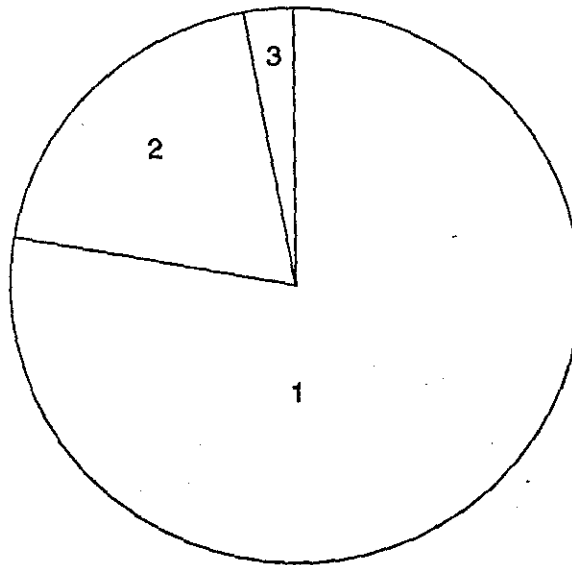
29 In a car industry, approximately 45000 litres of water are required to produce a single car.

This water does not need to be very pure.

Which purification methods would be suitable and economic to use?

	chlorinated	distilled
A	✓	✓
B	✓	x
C	x	✓
D	x	x

30 The pie-chart shows the composition of air.



What are the gases in parts 1, 2 and 3 of the pie-chart?

	1	2	3
A	nitrogen	other gases	oxygen
B	nitrogen	oxygen	other gases
C	oxygen	other gases	nitrogen
D	oxygen	nitrogen	other gases

31 A steel works and a chemical works are built near to a city. The limestone buildings in the city begin to crumble.

Which gas is most likely to cause this damage?

- A carbon dioxide
- B carbon monoxide
- C oxygen
- D sulphur dioxide

32 Which methods can be used to prevent the rusting of an iron girder of a bridge?

	coat it with grease	electroplate it	paint it
A	✓	✓	✓
B	✓	✓	x
C	x	✓	✓
D	x	x	✓

33 A student heats a mixture of ammonium chloride and calcium hydroxide. She tests the gas given off with damp red litmus paper.

What is the name of the gas and the final colour of the litmus paper?

	gas	colour
A	ammonia	blue
B	ammonia	red
C	chlorine	red
D	chlorine	white

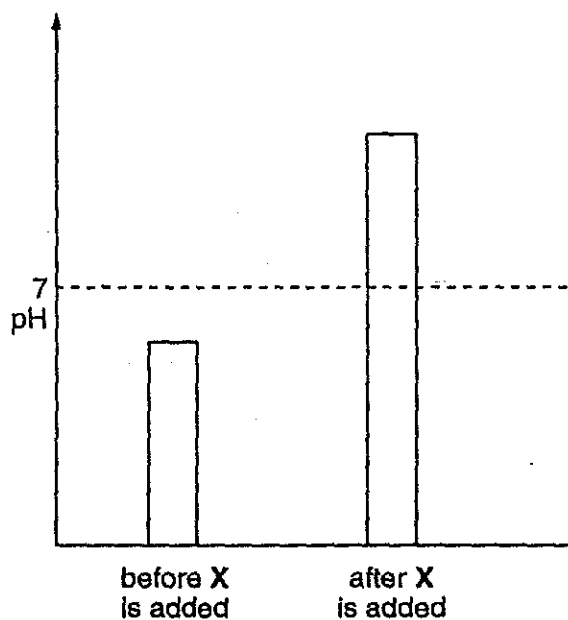
34 A newspaper article claims that carbon dioxide is formed as follows.

- 1 during respiration
- 2 when calcium carbonate reacts with hydrochloric acid
- 3 when methane burns in air

Which statements are correct?

- A 1, 2 and 3
- B 1 and 2 only
- C 1 and 3 only
- D 2 and 3 only

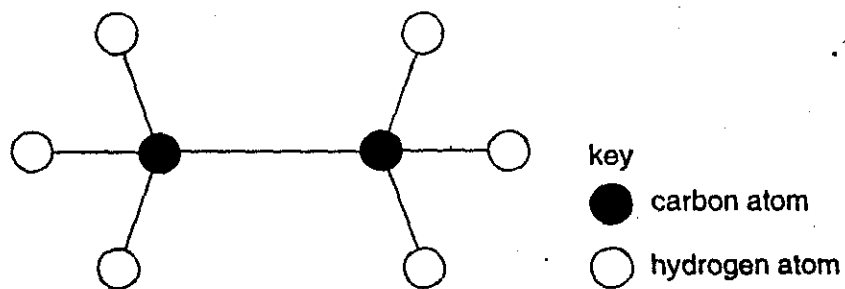
35 The diagram shows how the pH of an industrial waste changes when substance X is added to it.



What is substance X?

- A coal
- B lime
- C salt
- D water

36 The diagram shows a model of an organic compound.



What is the name of this compound?

- A ethane
- B ethanoic acid
- C ethanol
- D ethene

37 Bitumen is a substance obtained from the fractional distillation of petroleum.

What are the boiling points and the sizes of the molecules in bitumen?

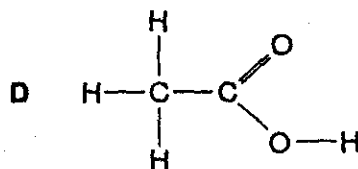
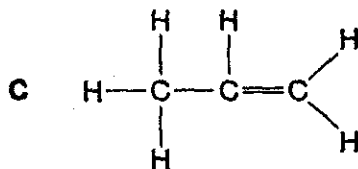
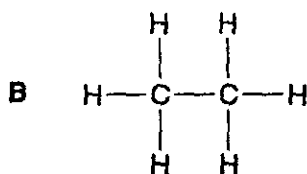
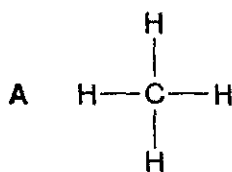
	boiling points	sizes of molecules
A	high	large
B	high	small
C	low	large
D	low	small

38 Which hydrocarbons in the table are members of the same homologous series?

hydrocarbon	1	2	3	4
state at room temperature	gas	gas	liquid	liquid
reaction with oxygen	burns	burns	burns	burns
aqueous reaction with bromine	decolourises bromine	no reaction	decolourises bromine	no reaction

- A** 1 and 2
- B** 1 and 3
- C** 3 and 4
- D** 1, 2, 3 and 4

39 Which of the molecules shown can be polymerised?



40 Which conditions are necessary to ferment sugar into ethanol?

	yeast	temperature/ °C
A	absent	30
B	absent	70
C	present	30
D	present	70

DATA SHEET

The Periodic Table of the Elements

Group																	
I	II											III	IV	V	VI	VII	0
											1 H Hydrogen 1						2 He Helium 2
3 7 Li Lithium	4 9 Be Beryllium											5 11 B Boron	6 12 C Carbon	7 14 N Nitrogen	8 16 O Oxygen	9 19 F Fluorine	10 20 Ne Neon
11 23 Na Sodium	12 24 Mg Magnesium											13 27 Al Aluminium	14 28 Si Silicon	15 31 P Phosphorus	16 32 S Sulphur	17 35.5 Cl Chlorine	18 40 Ar Argon
19 39 K Potassium	20 40 Ca Calcium	21 45 Sc Scandium	22 48 Ti Titanium	23 51 V Vanadium	24 52 Cr Chromium	25 55 Mn Manganese	26 56 Fe Iron	27 59 Co Cobalt	28 59 Ni Nickel	29 64 Cu Copper	30 65 Zn Zinc	31 70 Ga Gallium	32 73 Ge Germanium	33 75 As Arsenic	34 79 Se Selenium	35 80 Br Bromine	36 84 Kr Krypton
37 85 Rb Rubidium	38 88 Sr Strontium	39 89 Y Yttrium	40 91 Zr Zirconium	41 93 Nb Niobium	42 96 Mo Molybdenum	43 96 Tc Technetium	44 101 Ru Ruthenium	45 103 Rh Rhodium	46 106 Pd Palladium	47 108 Ag Silver	48 112 Cd Cadmium	49 115 In Indium	50 119 Sn Tin	51 122 Sb Antimony	52 128 Te Tellurium	53 127 I Iodine	54 131 Xe Xenon
55 133 Cs Caesium	56 137 Ba Barium	57 139 La Lanthanum	72 178 Hf Hafnium	73 181 Ta Tantalum	74 184 W Tungsten	75 186 Re Rhenium	76 190 Os Osmium	77 192 Ir Iridium	78 195 Pt Platinum	79 197 Au Gold	80 201 Hg Mercury	81 204 Tl Thallium	82 207 Pb Lead	83 209 Bi Bismuth	84 Po Polonium	85 At Astatine	86 Rn Radon
87 Fr Francium	88 226 Ra Radium	89 227 Ac Actinium															

58 140 Ce Cerium	59 141 Pr Praseodymium	60 144 Nd Neodymium	61 Pm Promethium	62 150 Sm Samarium	63 152 Eu Europium	64 157 Gd Gadolinium	65 159 Tb Terbium	66 162 Dy Dysprosium	67 165 Ho Holmium	68 167 Er Erbium	69 169 Tm Thulium	70 173 Yb Ytterbium	71 175 Lu Lutetium
90 232 Th Thorium	91 Pa Protactinium	92 238 U Uranium	93 Np Neptunium	94 Pu Plutonium	95 Am Americium	96 Cm Curium	97 Bk Berkelium	98 Cf Californium	99 Es Einsteinium	100 Fm Fermium	101 Md Mendelevium	102 No Nobelium	103 Lr Lawrencium

*58-71 Lanthanoid series
†90-103 Actinoid series

Key
a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CHEMISTRY

0620/01

Paper 1 Multiple Choice

October/November 2003

45 minutes

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has been done for you.

There are forty questions on this paper. Answer all questions.

For each question there are four possible answers A, B, C, and D. Choose the one you consider correct and record your choice in **soft pencil** on the separate answer sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

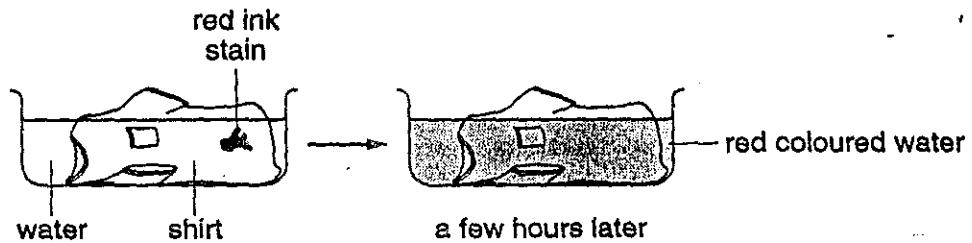
A copy of the Periodic Table is printed on page 20.

This document consists of 19 printed pages and 1 blank page.



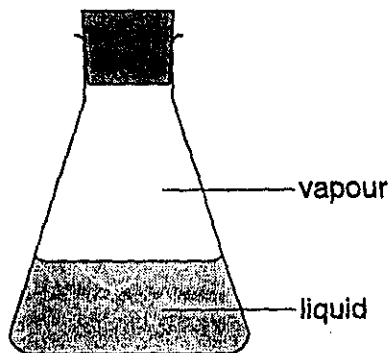
- 1 A shirt is stained with red ink from a pen.

The shirt is left to soak in a bowl of water.



Which process causes the red colour to spread?

- A diffusion
 - B evaporation
 - C melting
 - D neutralisation
- 2 A sealed conical flask contains a liquid and its vapour, as shown.



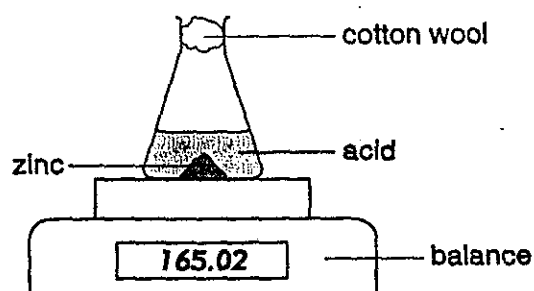
What happens when a molecule in the vapour enters the liquid?

	the molecule stops moving	the molecule becomes smaller
A	✓	✓
B	✓	x
C	x	✓
D	x	x

3 Which mixture can be separated by adding water, stirring and filtering?

- A barium chloride and sodium chloride
- B calcium carbonate and sodium chloride
- C copper and magnesium
- D ethane and ethene

4 A student investigates the speed of the reaction between a lump of zinc and an acid at room temperature.



Which other item of apparatus does the student need for this experiment?

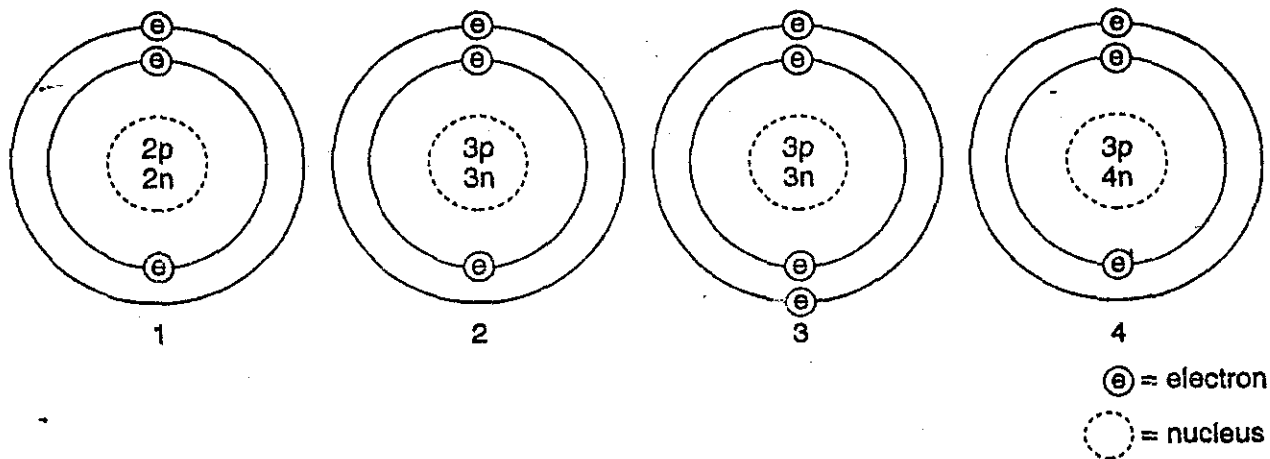
- A Bunsen burner
- B measuring cylinder
- C stop clock
- D thermometer

5 The table shows the electronic structures of four elements.

Which element is a noble gas?

element	number of electrons	
	shell 1	shell 2
A	1	0
B	2	0
C	2	2
D	2	6

6 The diagrams show four particles.



Which two diagrams show atoms that are isotopes of each other?

- A 1 and 2
- B 1 and 3
- C 2 and 3
- D 2 and 4

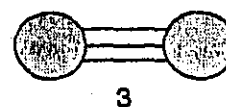
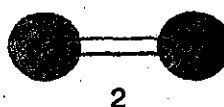
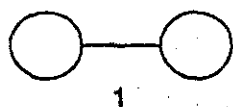
7 Which of the following can be used as a lubricant?

	graphite	a liquid fraction from petroleum
A	✓	✓
B	✓	x
C	x	✓
D	x	x

8 Which element is a solid non-metal?

element	melting point /°C	boiling point /°C	electrical conductance
A	-210	-183	no
B	-7	58	no
C	119	445	no
D	1539	2887	yes

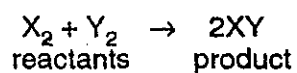
9 The diagrams show the bonding in three covalent molecules.



Which of these molecules combine to form ammonia?

- A 1 and 2
- B 1 and 3
- C 2 and 3
- D 1, 2 and 3

10 Two gases react as shown.



When measured at the same temperature and pressure, what is the value of

$$\frac{\text{volume of product}}{\text{volume of reactants}} ?$$

- A $\frac{1}{2}$
- B 1
- C 2
- D 4

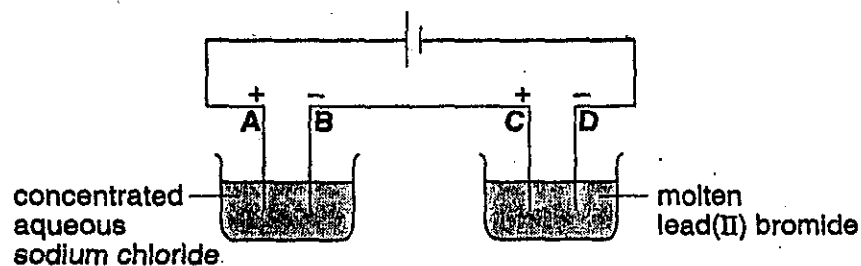
- 11 Carbon and chlorine form a chloride.

What is the formula of this chloride?

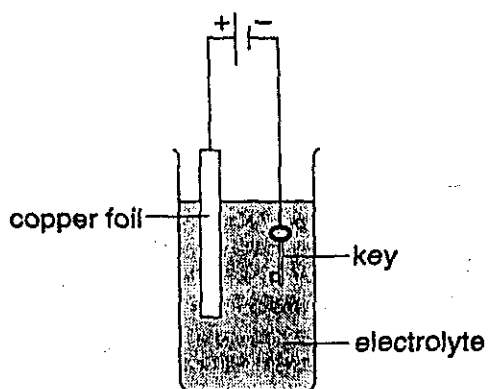
- A CCl_2
- B CCl_4
- C CaCl_2
- D CaCl_4

- 12 The following electrolysis circuit is set up, using inert electrodes.

At which electrode is a metal deposited?



- 13 The diagram shows a method used to electroplate a key with copper.

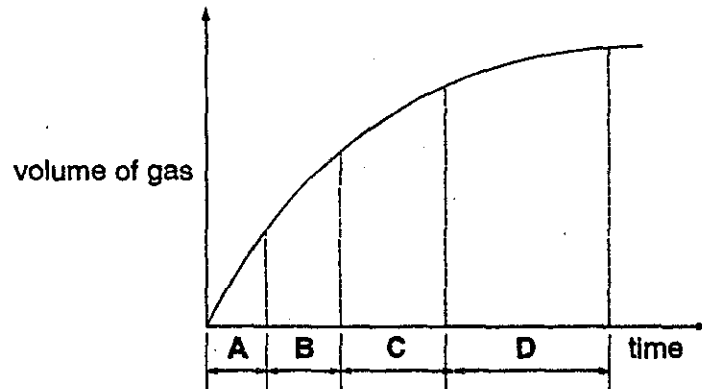


Which aqueous solution is most suitable for the electrolyte?

- A *copper(II) sulphate*
- B ethanol
- C sodium hydroxide
- D sulphuric acid

14 The graph shows how the total volume of a gas given off from a reaction changes with time.

In which time interval is **least** gas given off?

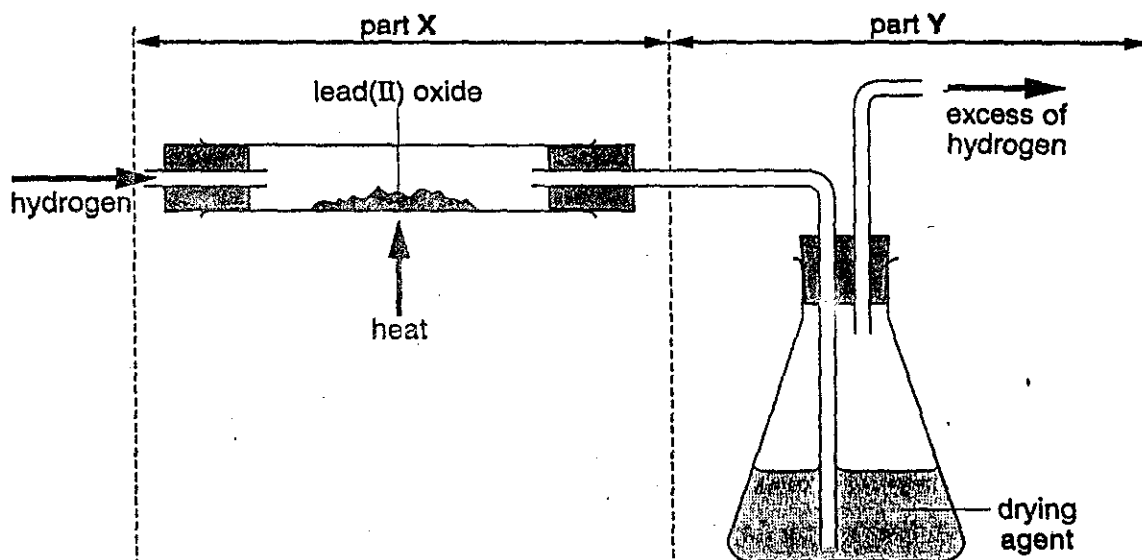


15 Potassium nitrate is a salt and dissolves in water in an endothermic process.

What happens to the temperature and pH of the water as the salt dissolves?

	temperature increases	pH falls
A	✓	✓
B	✓	x
C	x	✓
D	x	x

- 16 Lead(II) oxide is reduced in the apparatus shown.



How do the masses of parts X and Y of the apparatus change?

	X	Y
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

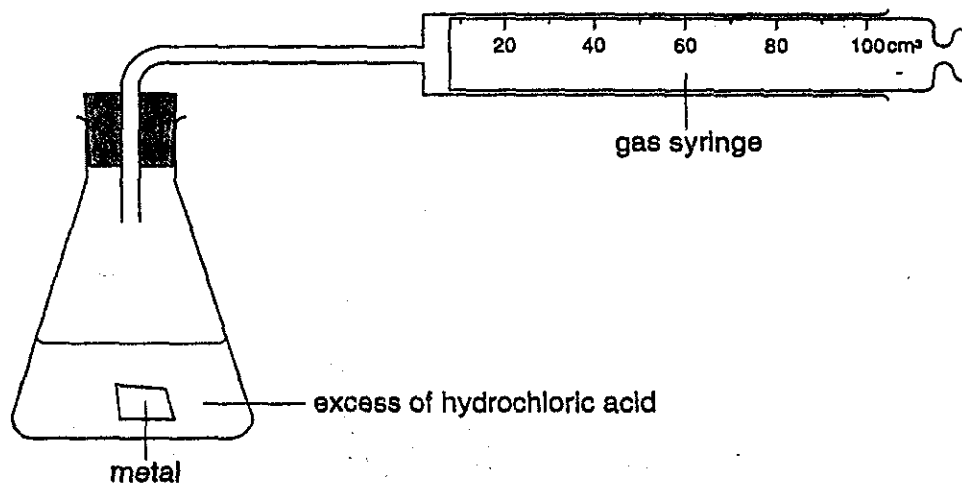
- 17 The equation shows what happens when hydrated copper(II) sulphate is heated.



What can be deduced from the equation?

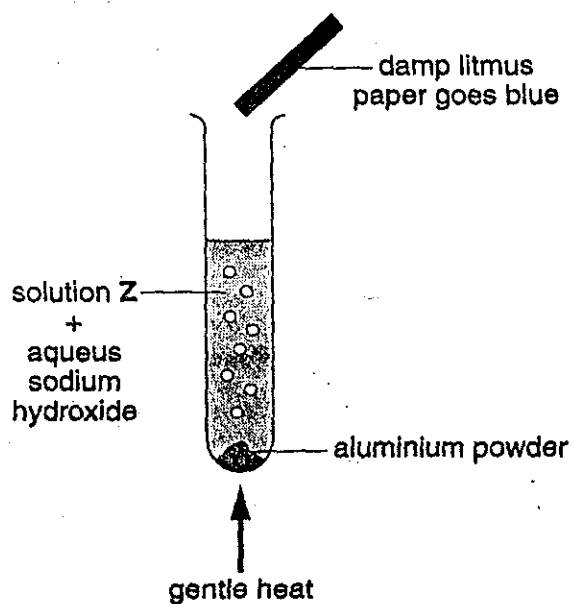
- A The hydrated copper(II) sulphate is oxidised.
- B The hydrated copper(II) sulphate is reduced.
- C The reaction is reversible.
- D There is no colour change.

18 The diagram shows an experiment.



- Which metal would fill the syringe with 100 cm³ of gas in the shortest time?
- A 5 g of copper
 - B 5 g of iron
 - C 5 g of magnesium
 - D 5 g of zinc
- 19 Which two processes are involved in the preparation of magnesium sulphate crystals from dilute sulphuric acid and an excess of magnesium oxide?
- A decomposition and filtration
 - B decomposition and oxidation
 - C neutralisation and filtration
 - D neutralisation and oxidation

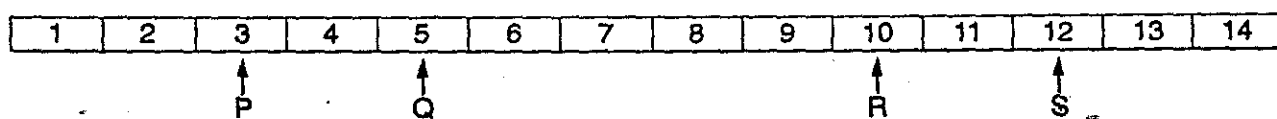
20 The diagram shows the result of testing an aqueous solution Z.



Which ion is present in solution Z?

- A carbonate
- B chloride
- C nitrate
- D sulphate

21 The pH values of four solutions are shown.



Mixing combinations of these solutions can give a solution of pH 6.

Which combination of solutions could not do this?

- A P and R
- B P and S
- C Q and R
- D R and S

22 Eight elements are numbered in the diagram of a Periodic Table.

Which numbers represent two relatively soft metals in the same group?

- A 1 and 2
- B 3 and 4
- C 5 and 6
- D 7 and 8

23 Vanadium is a transition metal.

What are its likely properties?

	density	appearance of compounds
A	0.61 g/cm ³	coloured
B	0.61 g/cm ³	white
C	6.1 g/cm ³	coloured
D	6.1 g/cm ³	white

24 The table gives information about four elements.

Which element could be in Group 1 in the Periodic Table?

element	metallic or non-metallic	reaction with water
A	metal	reacts
B	metal	no reaction
C	non-metal	reacts
D	non-metal	no reaction

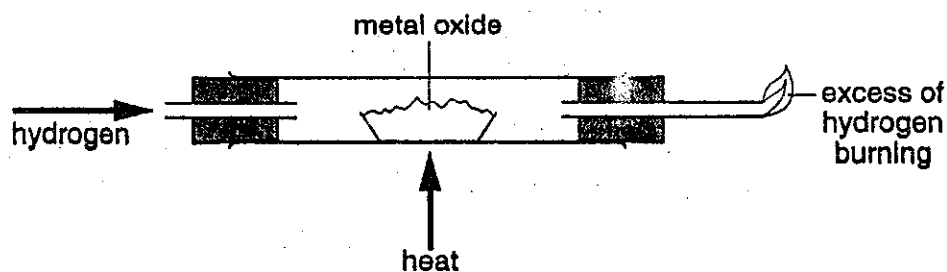
25 Element X

- forms an alloy.
- has a basic oxide.
- is below hydrogen in the reactivity series.

What could X and the alloy be?

	X	alloy
A	carbon	steel
B	copper	brass
C	iron	steel
D	sulphur	brass

26 The diagram shows a method for changing a metal oxide into a metal.



Which oxide can be changed into a metal by using this method?

- A calcium oxide
- B copper(II) oxide
- C magnesium oxide
- D potassium oxide

27 The table shows properties of four elements.

Which element is used to make aircraft bodies?

element	density g/cm ³	brittle or malleable
A	2.1	brittle
B	2.7	malleable
C	4.9	brittle
D	7.9	malleable

- 28 Three metals X, Y, and Z are correctly placed in the reactivity series as shown.

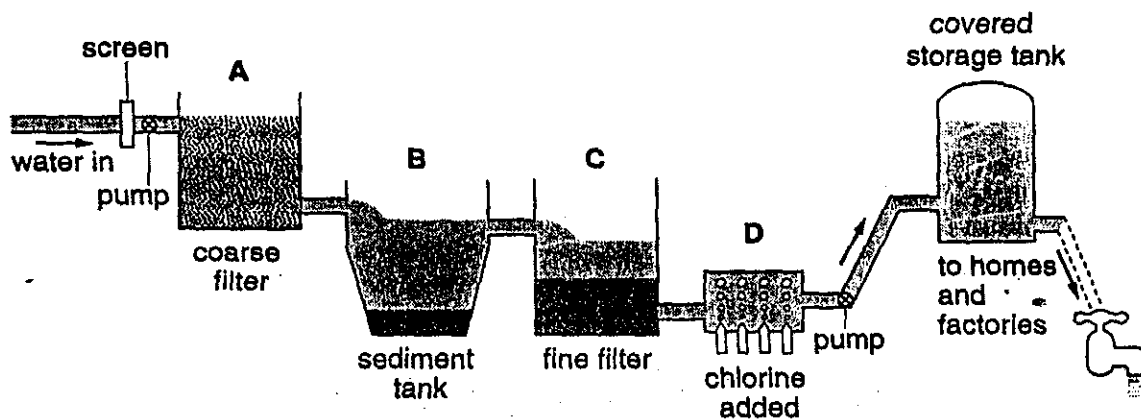
most reactive	potassium
	X
	sodium
	zinc
	Y
	iron
	copper
least reactive	Z

How are X, Y and Z obtained from their ores?

	electrolysis	reduction with carbon	found uncombined
A	X	Y	Z
B	X	Z	Y
C	Y	X	Z
D	Z	X	Y

- 29 The diagram shows how water is purified.

At which stage are bacteria in the water killed?



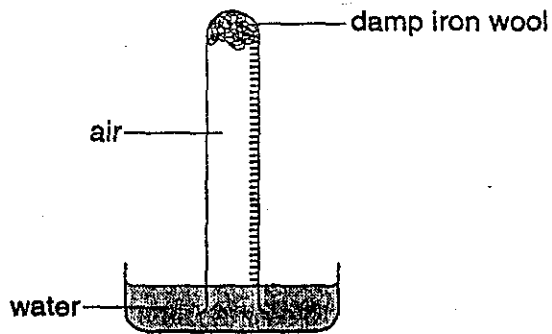
- 30 Which two fuels each produce both carbon dioxide and water when separately burned in air?

- A charcoal and hydrogen
- B charcoal and petrol
- C natural gas and hydrogen
- D natural gas and petrol

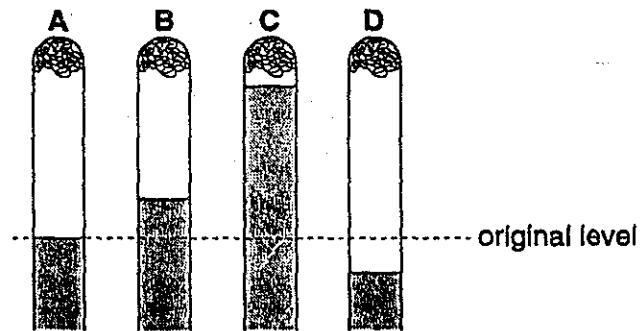
31 Which compound in polluted air can damage stonework and kill trees?

- A carbon dioxide
- B carbon monoxide
- C lead compounds
- D sulphur dioxide

32 The apparatus shown is set up and left for a week.



Where would the water level be at the end of the week?



33 An NPK fertiliser contains three elements required for plant growth.

Which two compounds, when mixed, provide the three elements?

- A ammonium phosphate + potassium nitrate
- B ammonium sulphate + potassium nitrate
- C ammonium sulphate + sodium nitrate
- D sodium phosphate + potassium chloride

34 Two processes are listed.

- 1 treating acidic soil with slaked lime
- 2 using limestone to extract iron

In which of these processes is carbon dioxide produced?

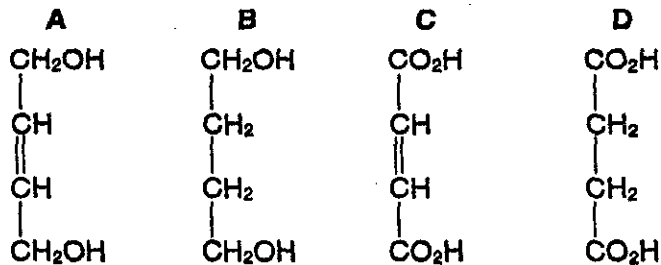
	1	2
A	✓	✓
B	✓	x
C	x	✓
D	x	x

35 Organic compounds may have names ending in -ane, -ene, -ol or -oic acid.

How many of these endings indicate the compounds contain double bonds in their molecules?

- A 1 B 2 C 3 D 4

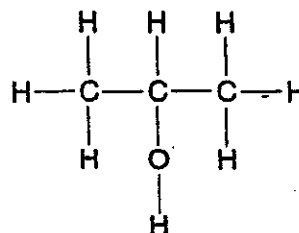
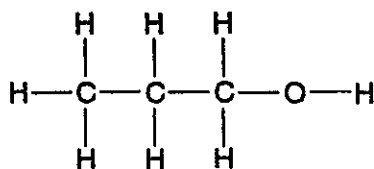
36 Which compound is unsaturated and forms a neutral solution in water?



37 Which fraction produced by the distillation of petroleum is used as aircraft fuel?

- A bitumen
- B diesel
- C paraffin
- D petrol

38 The diagram shows the structures of two compounds.



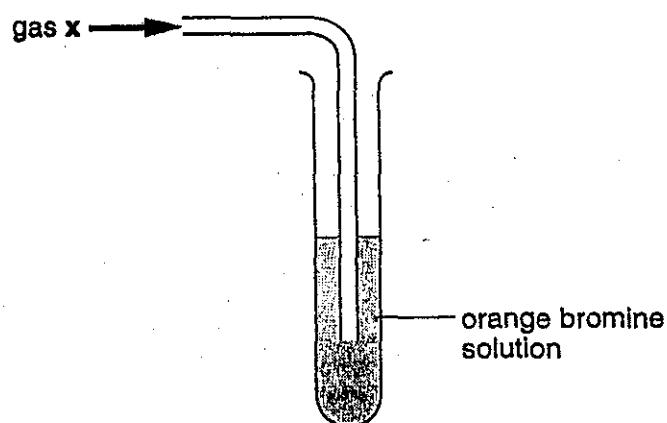
The two compounds have similar chemical properties.

Why is this?

Their molecules have the same

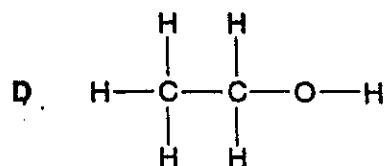
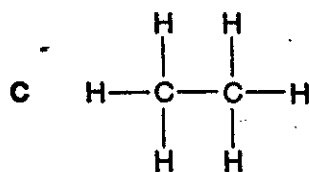
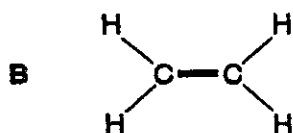
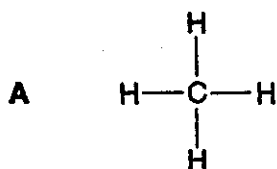
- A functional group.
- B number of carbon atoms.
- C number of oxygen atoms.
- D relative molecular mass.

39 The apparatus shows an experiment used to test gas X.

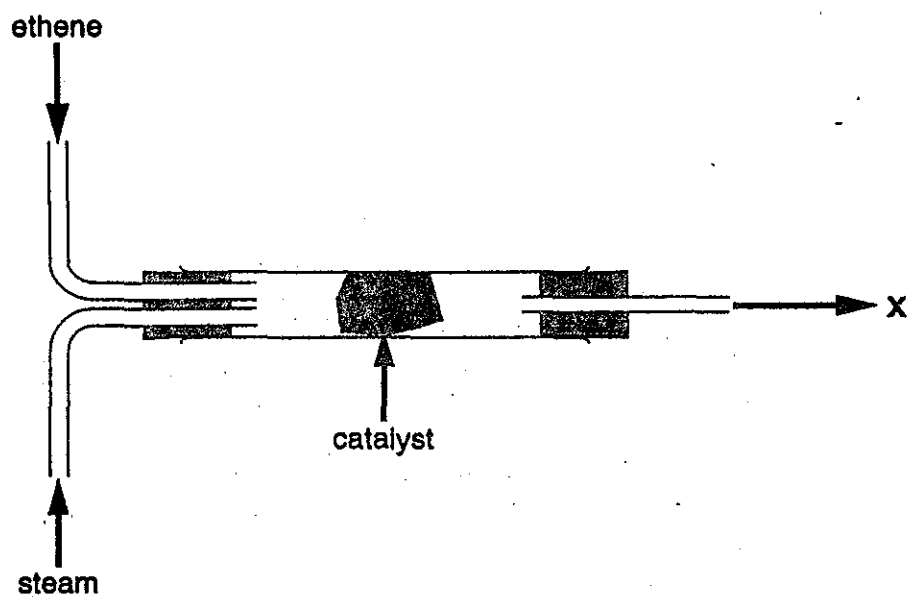


The bromine solution quickly becomes colourless.

What is the structure of gas X?



40 The diagram shows the manufacture of an important organic chemical X.



What is X?

- A ethane
- B ethanol
- C methane
- D methanol

DATA SHEET

The Periodic Table of the Elements

Group																		
I	II											III	IV	V	VI	VII	0	
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7 Li Lithium 3	9 Be Beryllium 4											11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	18 F Fluorine 9	20 Ne Neon 10	
23 Na Sodium 11	24 Mg Magnesium 12											27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 16	35.5 Cl Chlorine 17	40 Ar Argon 18	
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	58 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36	
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87 Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89																

0620/01 01/10/03

20

*58-71 Lanthanoid series
†90-103 Actinoid series

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232 Th Thorium 90	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103

316

Key

a	a = relative atomic mass
X	X = atomic symbol
b	b = proton (atomic) number

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).