

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.

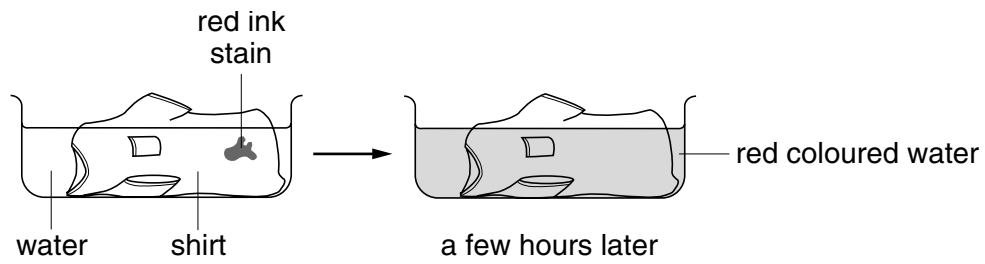
A copy of the Periodic Table is printed on page 20.

This document consists of **19** printed pages and **1** blank page.



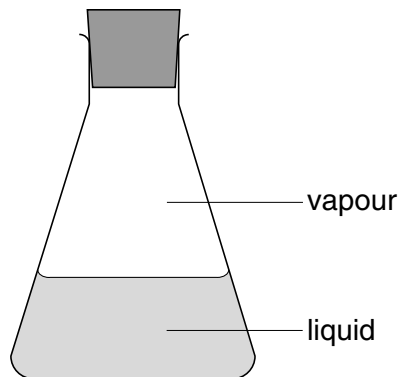
- 1 A shirt is stained with red ink from a pen.

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.



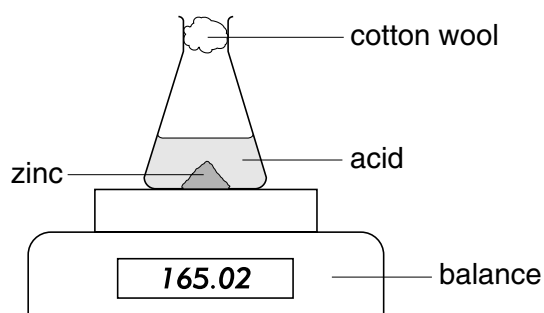
What happens when a molecule in the vapour enters the liquid?

	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?

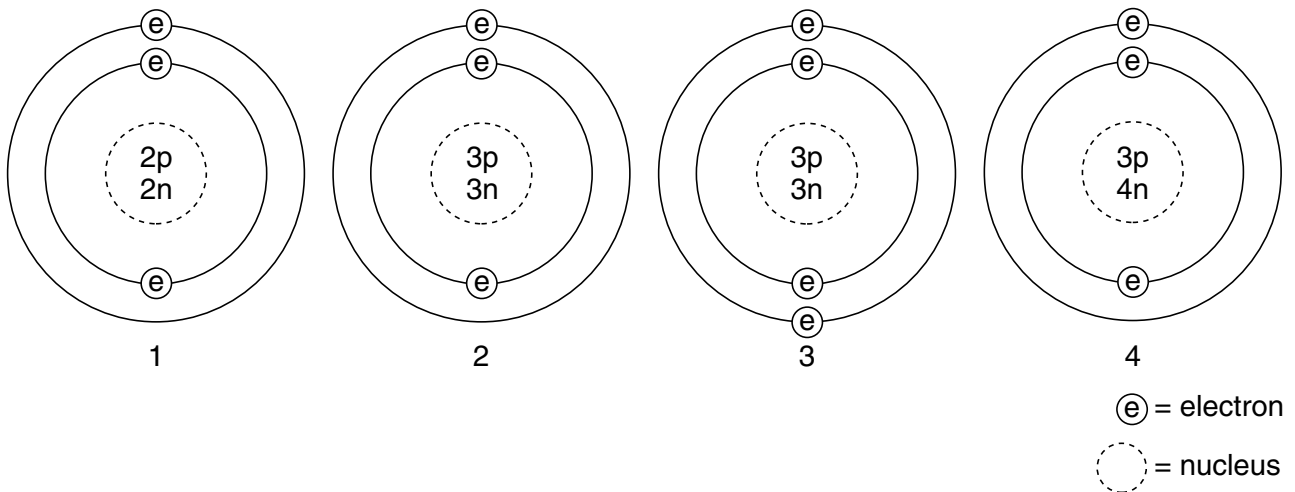
- A Bunsen burner
- B measuring cylinder
- C stop clock
- D thermometer

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

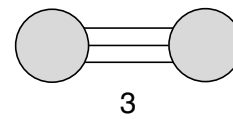
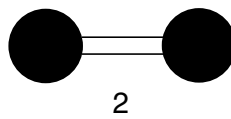
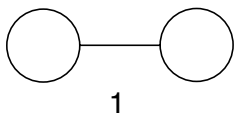
7 Which of the following can be used as a lubricant?

	graphite	a liquid fraction from petroleum
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

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

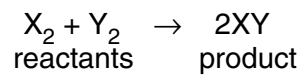
9 The diagrams show the bonding in three covalent molecules.



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

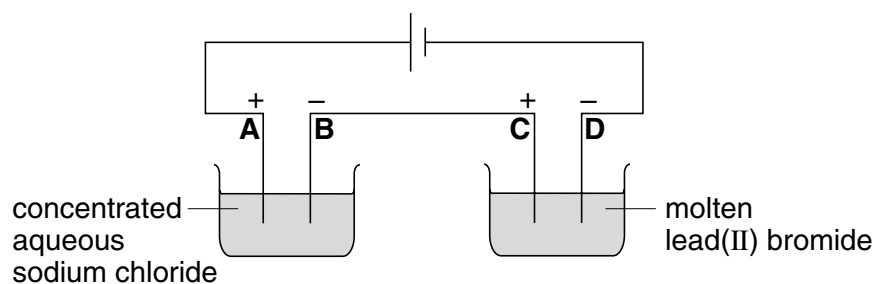
11 Carbon and chlorine form a chloride.

What is the formula of this chloride?

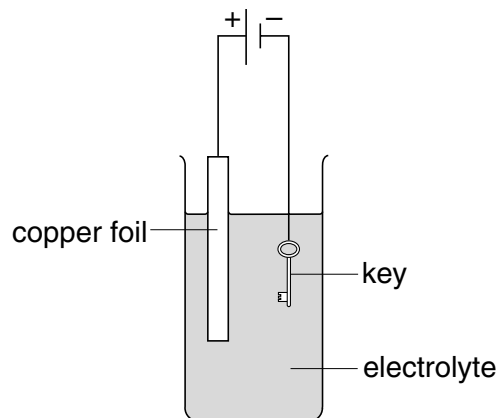
- A CCl_2
- B CCl_4
- C $CaCl_2$
- D $CaCl_4$

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.

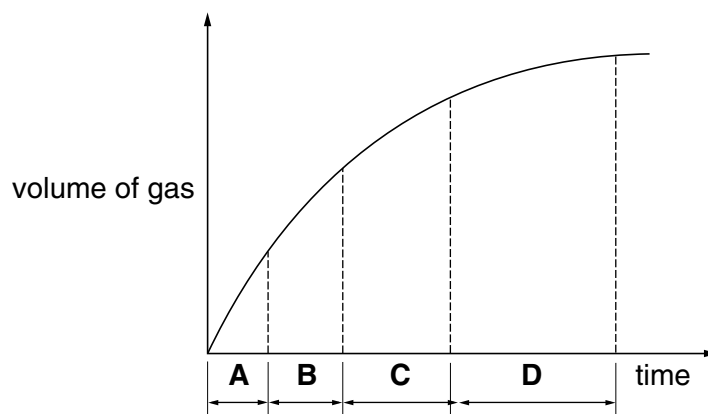


Which aqueous solution is most suitable for the electrolyte?

- 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?

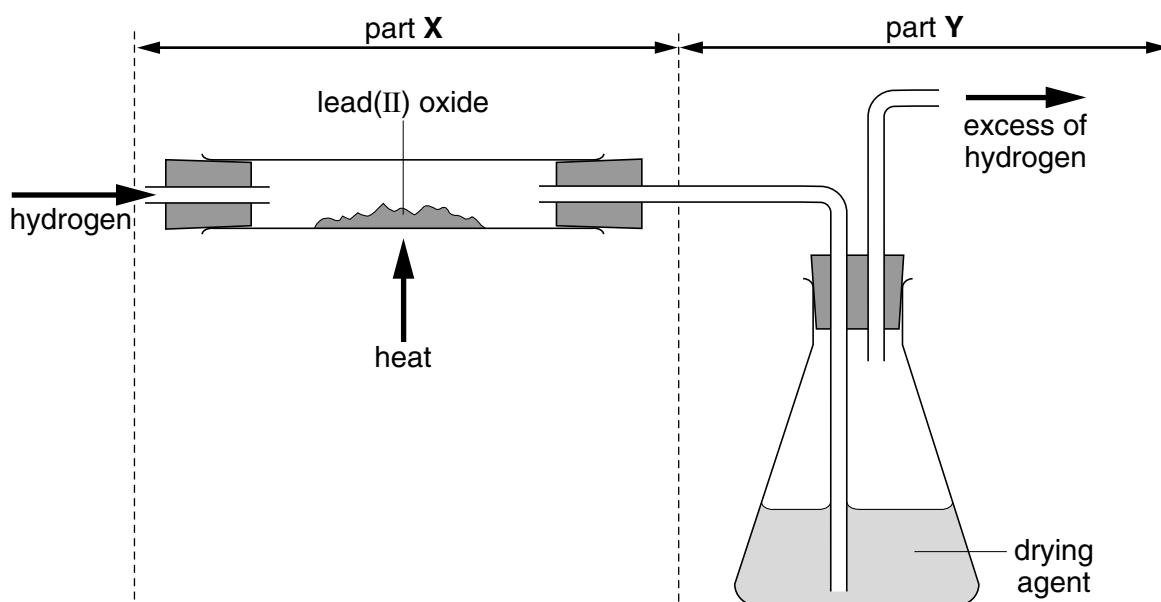


15 Potassium nitrate is a salt and dissolves in water in an endothermic process.

What happens to the temperature and pH of the water as the salt dissolves?

	temperature increases	pH falls
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

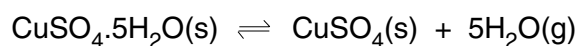
16 Lead(II) oxide is reduced in the apparatus shown.



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

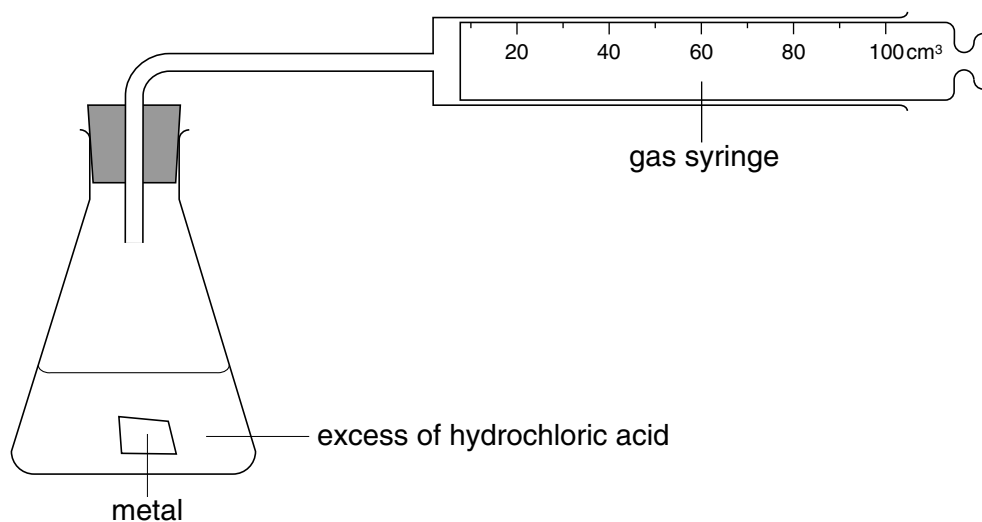
17 The equation shows what happens when hydrated copper(II) sulphate is heated.



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.

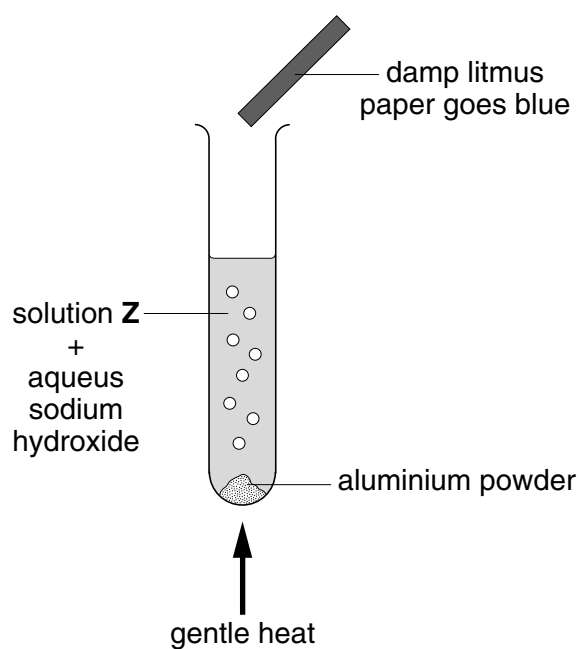
18 The diagram shows an experiment.



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

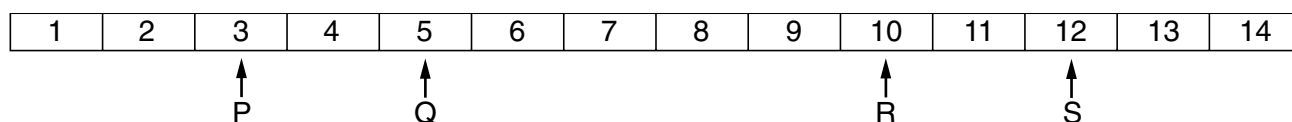
20 The diagram shows the result of testing an aqueous solution **Z**.



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

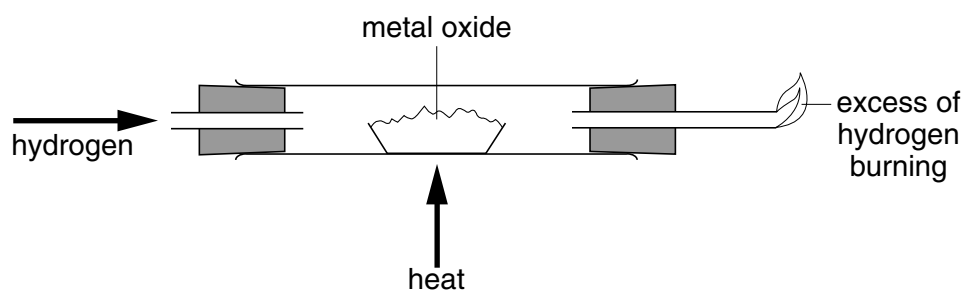
25 Element X

- 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.

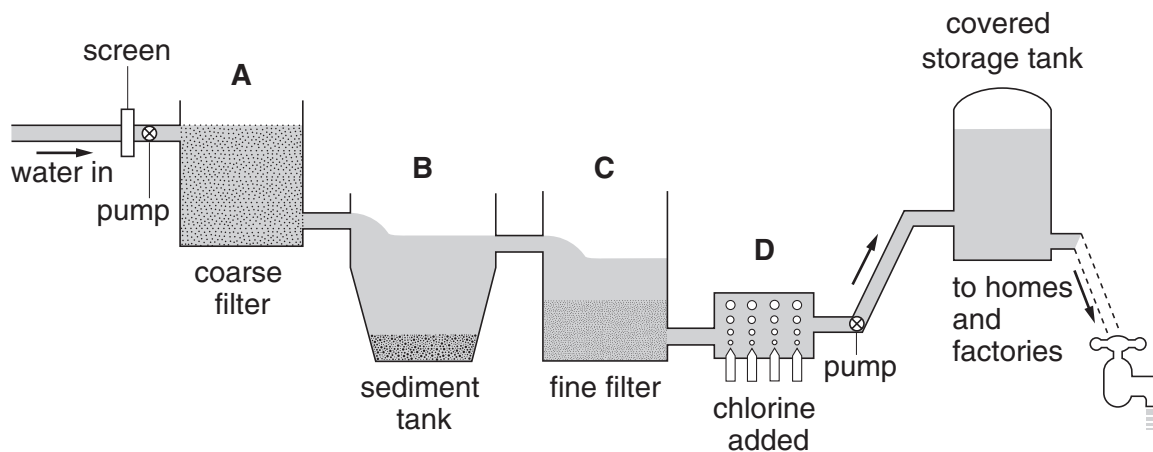
most reactive potassium
 X
 sodium
 zinc
 Y
 iron
 copper
 least reactive **Z**

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?



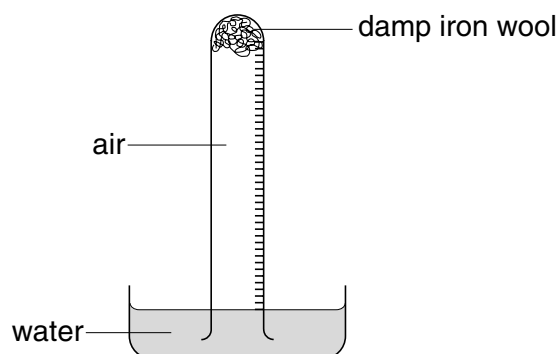
30 Which two fuels each produce both carbon dioxide and water when separately burned in air?

- A** charcoal and hydrogen
- B** charcoal and petrol
- C** natural gas and hydrogen
- D** natural gas and petrol

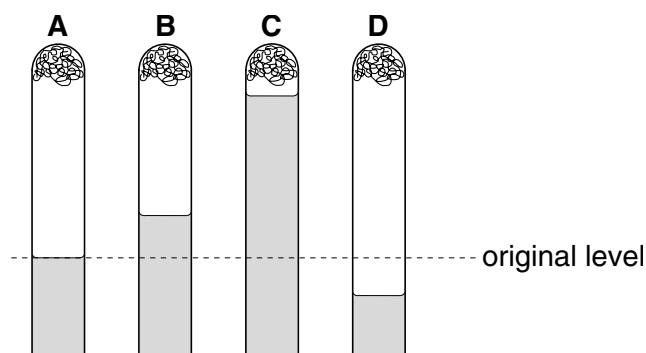
31 Which compound in polluted air can damage stonework and kill trees?

- 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?

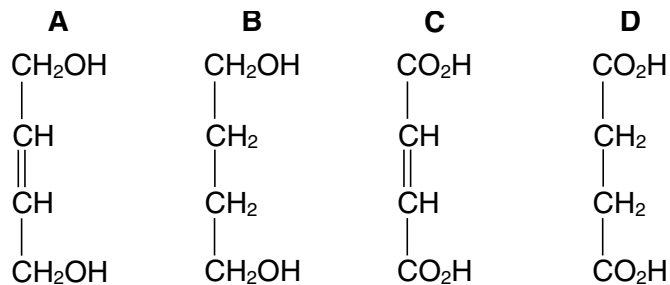
	1	2
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

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

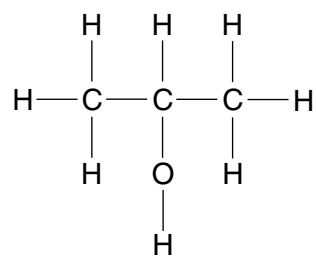
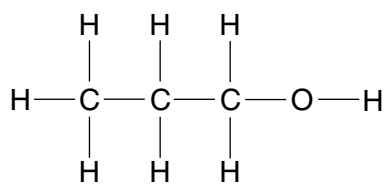
36 Which compound is unsaturated and forms a neutral solution in water?



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.



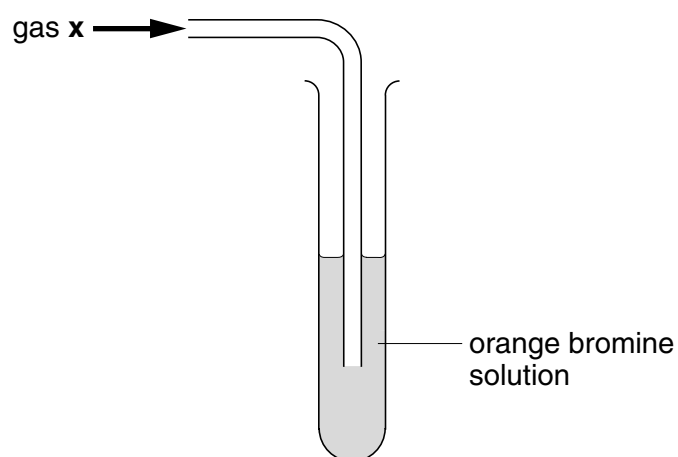
The two compounds have similar chemical properties.

Why is this?

Their molecules have the same

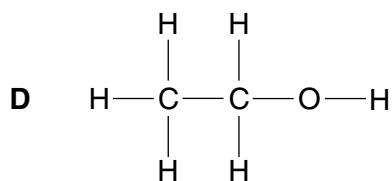
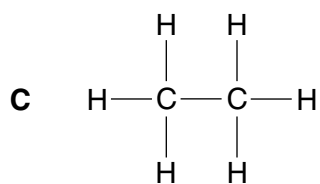
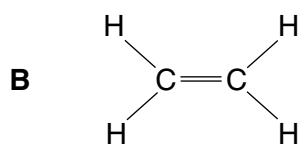
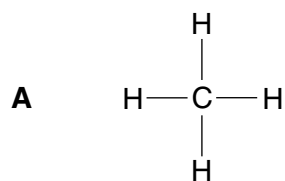
- A functional group.
- B number of carbon atoms.
- C number of oxygen atoms.
- D relative molecular mass.

39 The apparatus shows an experiment used to test gas X.

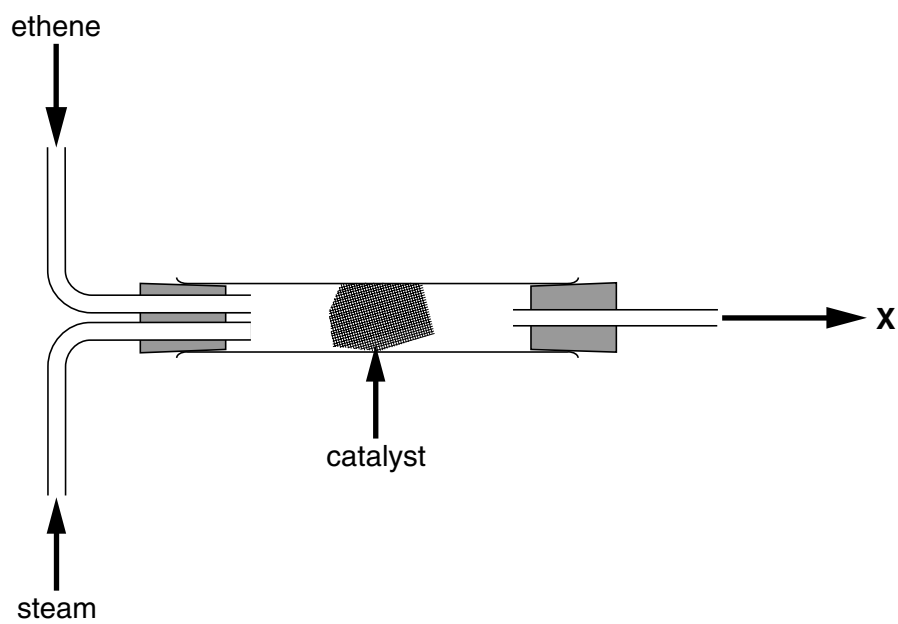


The bromine solution quickly becomes colourless.

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	
		1 H Hydrogen 1							2 He Helium 4	
3	4	7 Li Lithium	9 Be Beryllium		5 B Boron	6 C Carbon	7 N Nitrogen	8 O Oxygen	9 F Fluorine	10 Ne Neon
11	12	23 Na Sodium	24 Mg Magnesium		13 Al Aluminium	14 Si Silicon	15 P Phosphorus	16 S Sulphur	17 Cl Chlorine	18 Ar Argon
19	20	39 K Potassium	40 Ca Calcium		31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton
37	38	85 Rb Rubidium	88 Sr Strontium		49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon
55	56	133 Cs Caesium	137 Ba Barium		81 Tl Thallium	82 Pb Lead	83 Bi Bismuth	84 Po Polonium	85 At Astatine	86 Rn Radon
87	88	226 Fr Francium	227 Ra Radium		89 Ac Actinium					
					59 Sc Scandium	60 Ti Titanium	61 V Vanadium	62 Cr Chromium	63 Mn Manganese	64 Fe Iron
					71 Y Yttrium	72 Zr Zirconium	73 Nb Niobium	74 Mo Molybdenum	75 Tc Technetium	76 Ru Ruthenium
					89 La Lanthanum	90 Ce Cerium	91 Pr Praseodymium	92 Nd Neodymium	93 Pm Promethium	94 Sm Samarium
					101 Re Rhenium	102 Os Osmium	103 Ir Iridium	104 Pt Platinum	105 Au Gold	106 Hg Mercury
					107 Cu Copper	108 Zn Zinc	109 Ga Gallium	110 Ge Germanium	111 As Arsenic	112 Se Selenium
					121 Ag Silver	122 Cd Cadmium	123 In Indium	124 Sn Tin	125 Sb Antimony	126 Te Tellurium
					131 Pd Palladium	132 Rh Rhodium	133 Pt Platinum	134 Au Gold	135 Hg Mercury	136 Tl Thallium
					141 W Tungsten	142 Re Rhenium	143 Os Osmium	144 Ir Iridium	145 Pt Platinum	146 Au Gold
					151 Ta Tantalum	152 Hf Hafnium	153 Ta Tantalum	154 W Tungsten	155 Re Rhenium	156 Os Osmium
					161 La Lanthanum	162 Ce Cerium	163 Pr Praseodymium	164 Nd Neodymium	165 Pm Promethium	166 Sm Samarium
					171 Ba Barium	172 La Lanthanum	173 Ce Cerium	174 Pr Praseodymium	175 Nd Neodymium	176 Pm Promethium
					181 Ra Radium	182 Ac Actinium	183 Th Thorium	184 Pa Protactinium	185 U Uranium	186 Np Neptunium
					191 Fr Francium	192 Ra Radium	193 Th Thorium	194 Pa Protactinium	195 U Uranium	196 Np Neptunium
					201 Fr Francium	202 Ra Radium	203 Th Thorium	204 Pa Protactinium	205 U Uranium	206 Np Neptunium
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					241 Fr Francium	242 Ra Radium	243 Th Thorium	244 Pa Protactinium	245 U Uranium	246 Np Neptunium
					251 Fr Francium	252 Ra Radium	253 Th Thorium	254 Pa Protactinium	255 U Uranium	256 Np Neptunium
					261 Fr Francium	262 Ra Radium	263 Th Thorium	264 Pa Protactinium	265 U Uranium	266 Np Neptunium
					271 Fr Francium	272 Ra Radium	273 Th Thorium	274 Pa Protactinium	275 U Uranium	276 Np Neptunium
					281 Fr Francium	282 Ra Radium	283 Th Thorium	284 Pa Protactinium	285 U Uranium	286 Np Neptunium
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					301 Fr Francium	302 Ra Radium	303 Th Thorium	304 Pa Protactinium	305 U Uranium	306 Np Neptunium
					311 Fr Francium	312 Ra Radium	313 Th Thorium	314 Pa Protactinium	315 U Uranium	316 Np Neptunium
					321 Fr Francium	322 Ra Radium	323 Th Thorium	324 Pa Protactinium	325 U Uranium	326 Np Neptunium
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					481 Fr Francium	482 Ra Radium	483 Th Thorium	484 Pa Protactinium	485 U Uranium	486 Np Neptunium
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