

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.

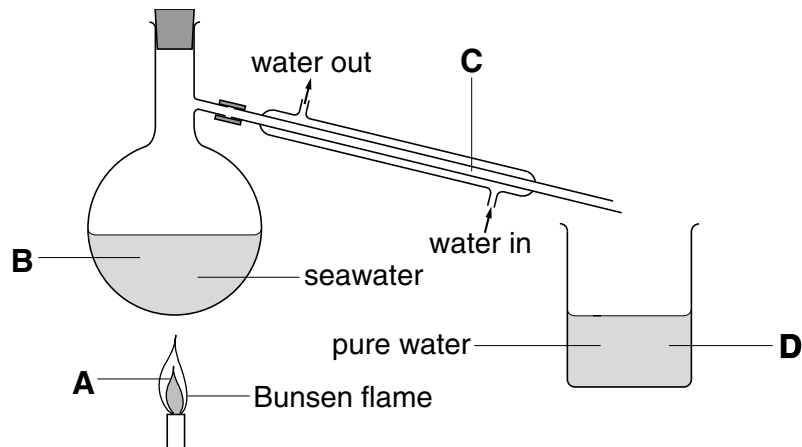
Any rough working should be done in this booklet.

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

2

- 1 The diagram shows how to obtain pure water from seawater.

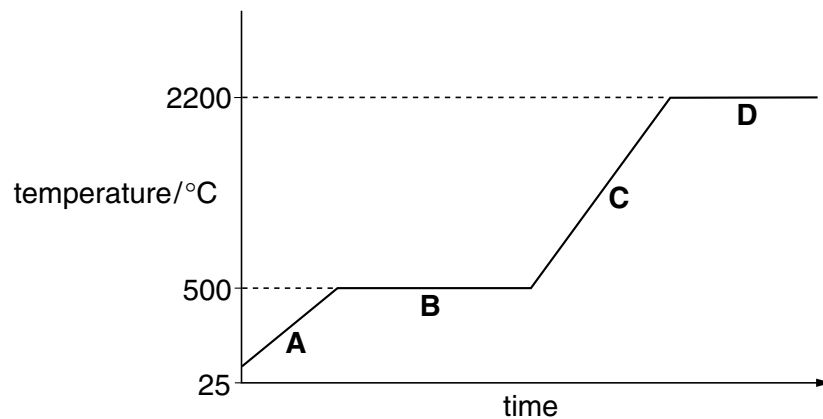
Where do water molecules lose energy?



- 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

3

- 4 What could be the melting point and boiling point of water containing a dissolved impurity?

	melting point / °C	boiling point / °C
<b>A</b>	+3	96
<b>B</b>	+3	104
<b>C</b>	-3	96
<b>D</b>	-3	104

- 5 Which number in the table is -1?

particle	charge	relative mass
electron	<b>A</b>	<b>B</b>
neutron	<b>C</b>	1
proton	<b>D</b>	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  $\text{SrCl}_2$ .

Sulphur, S, is a non-metal that forms a covalent chloride  $\text{SCl}_2$ .

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
<b>A</b>	$\text{SrCl}_2$	$\text{SrCl}_2$
<b>B</b>	$\text{SrCl}_2$	$\text{SCl}_2$
<b>C</b>	$\text{SCl}_2$	$\text{SrCl}_2$
<b>D</b>	$\text{SCl}_2$	$\text{SCl}_2$

4

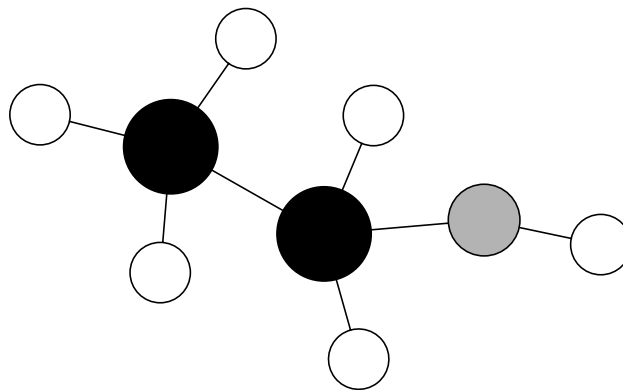
- 9 The relative atomic mass of oxygen is 16 and that of hydrogen is 1.

This means that ... (i) ... of oxygen has the same mass as ... (ii) ... of hydrogen.

Which words correctly complete the gaps?

	gap (i)	gap (ii)
<b>A</b>	an atom	thirty-two molecules
<b>B</b>	an atom	eight molecules
<b>C</b>	a molecule	sixteen atoms
<b>D</b>	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
<b>A</b>	1	6	2
<b>B</b>	2	5	1
<b>C</b>	2	6	1
<b>D</b>	6	2	1

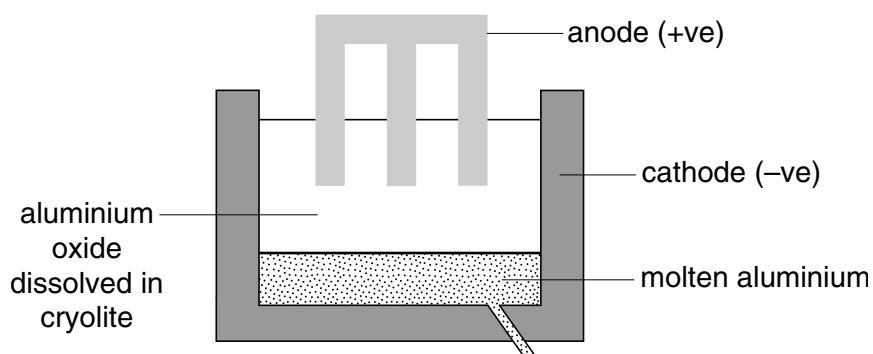
- 11 Water is formed when 48 g of oxygen combine with 6 g of hydrogen.

What mass of oxygen combines with 2 g of hydrogen?

- A** 12 g                      **B** 16 g                      **C** 96 g                      **D** 144 g

5

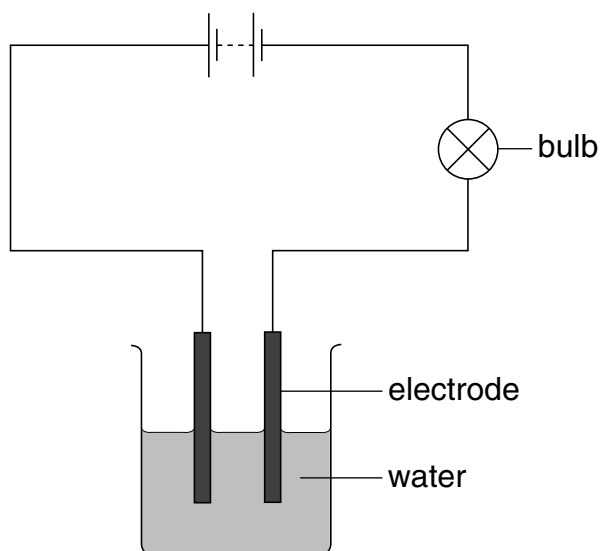
12 The diagram shows how aluminium is manufactured by electrolysis.



What are the anode and cathode made of?

	anode	cathode
<b>A</b>	aluminium	aluminium
<b>B</b>	aluminium	graphite
<b>C</b>	graphite	aluminium
<b>D</b>	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**?

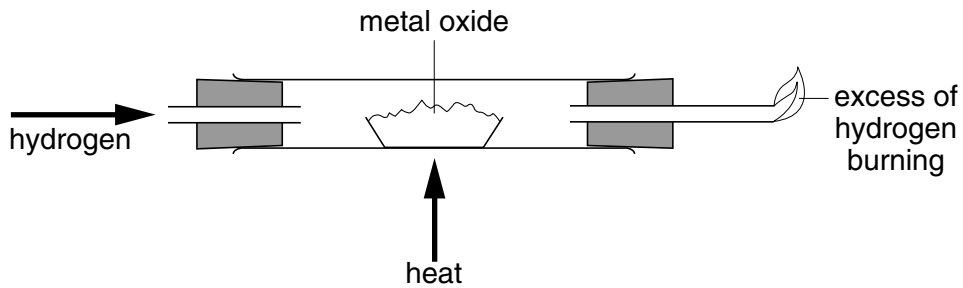
- A** calcium carbonate
- B** carbon
- C** copper(II) sulphate
- D** ethanol

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

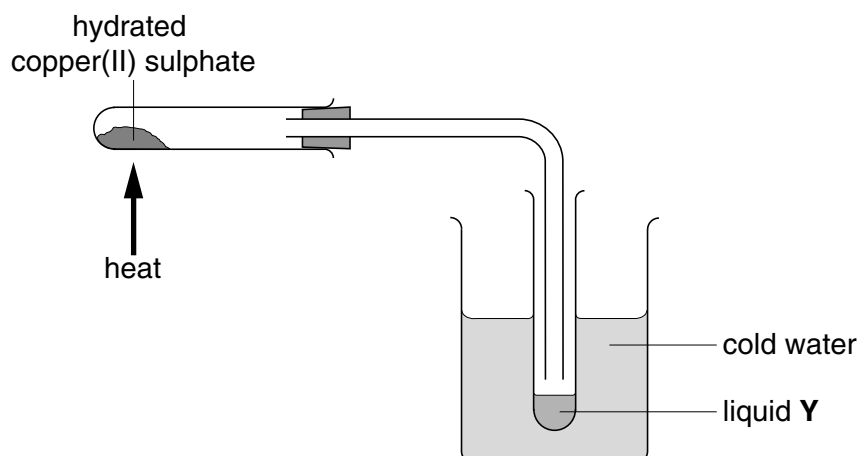
15 When hydrogen is passed over a heated metal oxide, the metal and steam are formed.



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.

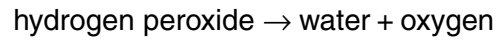


Which changes are noticed when liquid Y is added to cold solid X?

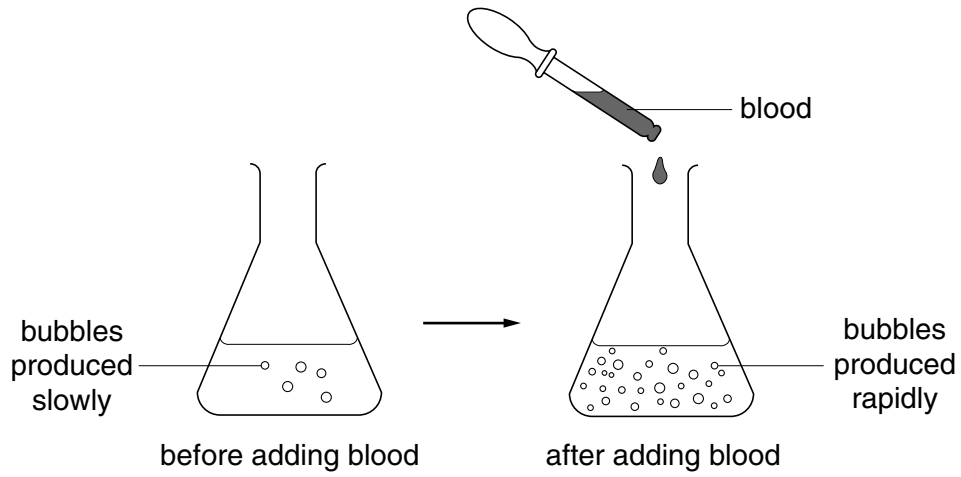
	colour change	heat change
<b>A</b>	blue to white	heat given out
<b>B</b>	blue to white	heat taken in
<b>C</b>	white to blue	heat given out
<b>D</b>	white to blue	heat taken in

8

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?

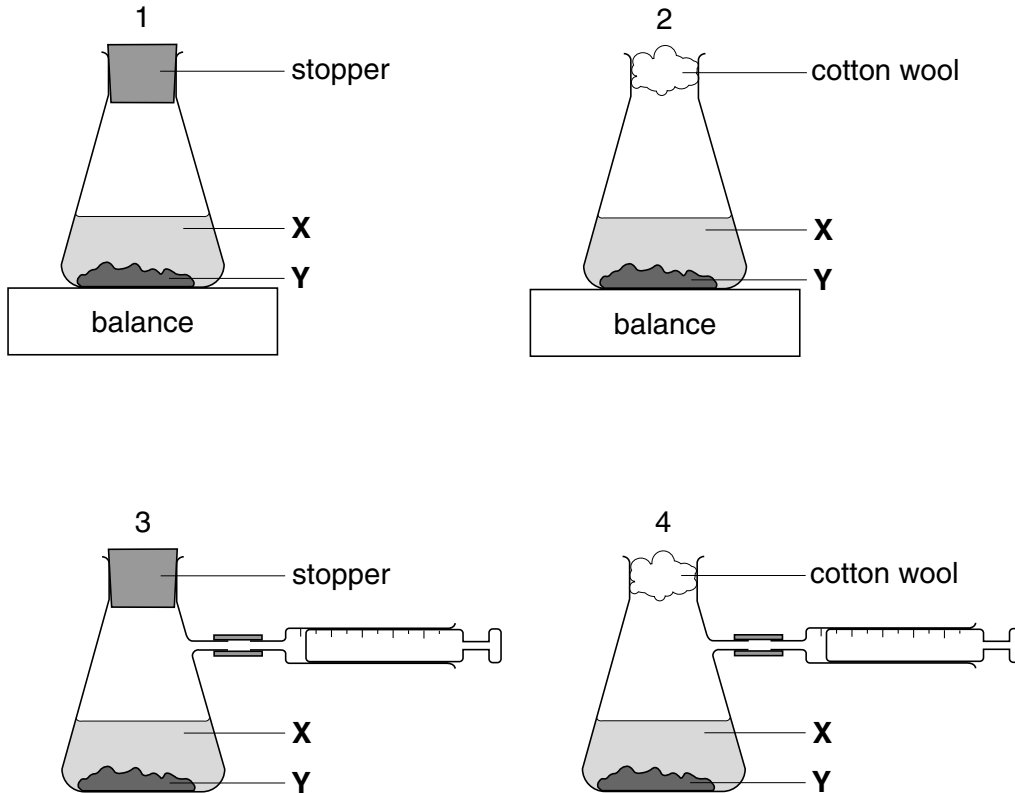
- A Blood contains an enzyme.
- B Blood contains water.
- C The hydrogen peroxide becomes more concentrated.
- D The hydrogen peroxide is neutralised by blood.



9

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
<b>A</b>	a lighted splint	oxygen
<b>B</b>	a glowing splint	hydrogen
<b>C</b>	damp litmus paper	chlorine
<b>D</b>	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 <b>X</b>	structure of gas <b>X</b>
<b>A</b>	2	single atoms
<b>B</b>	2	diatomic molecules
<b>C</b>	8	single atoms
<b>D</b>	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) ... properties of elements.

Which words correctly complete the gaps?

	gap (i)	gap (ii)
<b>A</b>	Periodic Table	measure
<b>B</b>	Periodic Table	predict
<b>C</b>	reactivity series	measure
<b>D</b>	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
<b>A</b>	P	Q	R
<b>B</b>	P	R	Q
<b>C</b>	Q	R	P
<b>D</b>	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
<b>A</b>	good conductor of electricity	good conductor of heat
<b>B</b>	good conductor of electricity	strong
<b>C</b>	good conductor of heat	low density
<b>D</b>	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 45 000 litres of water are required to produce a single car.

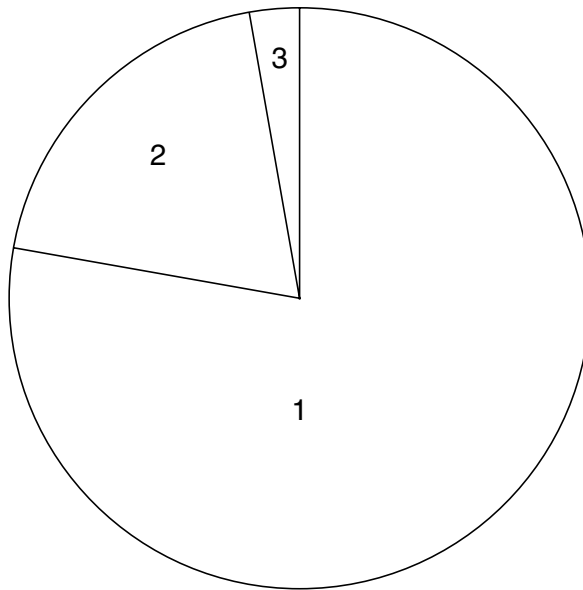
This water does not need to be very pure.

Which purification methods would be suitable and economic to use?

	chlorinated	distilled
<b>A</b>	✓	✓
<b>B</b>	✓	✗
<b>C</b>	✗	✓
<b>D</b>	✗	✗

13

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
<b>A</b>	✓	✓	✓
<b>B</b>	✓	✓	✗
<b>C</b>	✗	✓	✓
<b>D</b>	✗	✗	✓

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
<b>A</b>	ammonia	blue
<b>B</b>	ammonia	red
<b>C</b>	chlorine	red
<b>D</b>	chlorine	white

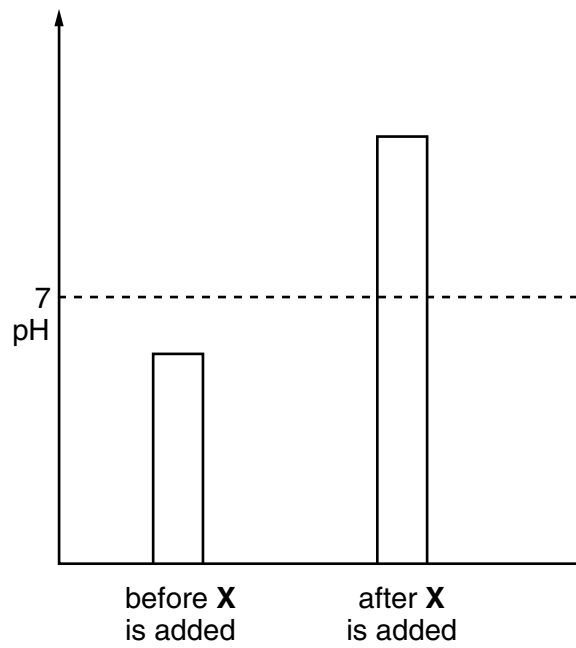
34 A newspaper article claims that carbon dioxide is formed as follows.

- 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

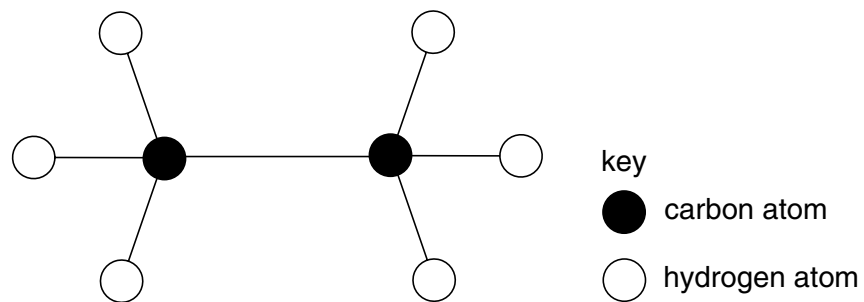
35 The diagram shows how the pH of an industrial waste changes when substance X is



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
<b>A</b>	high	large
<b>B</b>	high	small
<b>C</b>	low	large
<b>D</b>	low	small

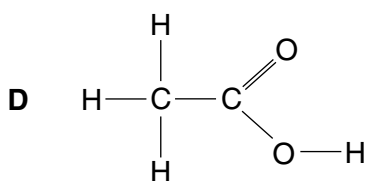
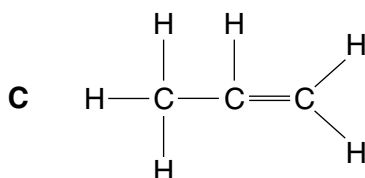
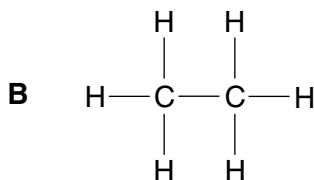
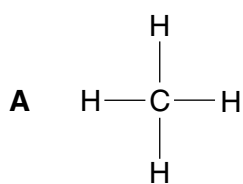
38 Which hydrocarbons in the table are members of the same homologous series?

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
<b>A</b>	absent	30
<b>B</b>	absent	70
<b>C</b>	present	30
<b>D</b>	present	70





**DATA SHEET**  
**The Periodic Table of the Elements**

		Group										
I	II	III	IV	V	VI	VII	O					
7 <b>Li</b> Lithium	9 <b>Be</b> Beryllium	1 <b>H</b> Hydrogen	12 <b>C</b> Carbon	14 <b>N</b> Nitrogen	16 <b>O</b> Oxygen	17 <b>F</b> Fluorine	4 <b>He</b> Helium	11 <b>B</b> Boron	13 <b>Al</b> Aluminium	15 <b>P</b> Phosphorus	17 <b>Cl</b> Chlorine	20 <b>Ne</b> Neon
23 <b>Na</b> Sodium	24 <b>Mg</b> Magnesium	5 <b>B</b> Boron	14 <b>Si</b> Silicon	7 <b>N</b> Nitrogen	8 <b>O</b> Oxygen	9 <b>F</b> Fluorine	10 <b>Ne</b> Neon	5 <b>B</b> Boron	13 <b>Al</b> Aluminium	15 <b>P</b> Phosphorus	17 <b>Cl</b> Chlorine	18 <b>Ar</b> Argon
39 <b>K</b> Potassium	40 <b>Ca</b> Calcium	6 <b>C</b> Carbon	14 <b>Si</b> Silicon	7 <b>N</b> Nitrogen	8 <b>O</b> Oxygen	9 <b>F</b> Fluorine	10 <b>Ne</b> Neon	11 <b>B</b> Boron	13 <b>Al</b> Aluminium	15 <b>P</b> Phosphorus	17 <b>Cl</b> Chlorine	18 <b>Ar</b> Argon
85 <b>Rb</b> Rubidium	88 <b>Sr</b> Strontium	27 <b>Zn</b> Zinc	30 <b>Ga</b> Gallium	31 <b>Ge</b> Germanium	32 <b>As</b> Arsenic	33 <b>Se</b> Selenium	34 <b>Br</b> Bromine	35 <b>Kr</b> Krypton	36 <b>Xe</b> Xenon	37 <b>Rb</b> Rubidium	38 <b>Sr</b> Strontium	39 <b>Y</b> Yttrium
133 <b>Cs</b> Caesium	137 <b>Ba</b> Barium	48 <b>Ti</b> Titanium	51 <b>V</b> Vanadium	52 <b>Cr</b> Chromium	53 <b>Mn</b> Manganese	54 <b>Fe</b> Iron	55 <b>Mn</b> Manganese	56 <b>Fe</b> Iron	57 <b>Co</b> Cobalt	58 <b>Ni</b> Nickel	59 <b>Co</b> Cobalt	60 <b>Ni</b> Nickel
226 <b>Ra</b> Radium	227 <b>Ac</b> Actinium	72 <b>Hf</b> Hafnium	73 <b>Ta</b> Tantalum	74 <b>W</b> Tungsten	75 <b>Re</b> Rhenium	76 <b>Os</b> Osmium	77 <b>Ir</b> Iridium	78 <b>Pt</b> Platinum	79 <b>Au</b> Gold	80 <b>Hg</b> Mercury	81 <b>Tl</b> Thallium	82 <b>Pb</b> Lead
3-71 Lanthanoid series	0-103 Actinoid series	89 <b>La</b> Lanthanum	91 <b>Zr</b> Zirconium	92 <b>Nb</b> Niobium	93 <b>Mo</b> Molybdenum	94 <b>Tc</b> Technetium	95 <b>Ru</b> Ruthenium	96 <b>Rh</b> Rhodium	97 <b>Pd</b> Palladium	98 <b>Ag</b> Silver	99 <b>Cd</b> Cadmium	100 <b>In</b> Indium
		101 <b>Ru</b> Ruthenium	102 <b>Rh</b> Rhodium	103 <b>Pd</b> Palladium	104 <b>Ag</b> Silver	105 <b>Cd</b> Cadmium	106 <b>In</b> Indium	107 <b>Tl</b> Thallium	108 <b>Pb</b> Lead	109 <b>Bi</b> Bismuth	110 <b>Po</b> Polonium	111 <b>At</b> Astatine
		112 <b>Cu</b> Copper	113 <b>Zn</b> Zinc	114 <b>Ga</b> Gallium	115 <b>Ge</b> Germanium	116 <b>As</b> Arsenic	117 <b>Se</b> Selenium	118 <b>Br</b> Bromine	119 <b>Kr</b> Krypton	120 <b>Xe</b> Xenon	121 <b>Rn</b> Radon	122 <b>Fr</b> Francium
		122 <b>Fr</b> Francium	123 <b>Ra</b> Radium	124 <b>Ac</b> Actinium	125 <b>Th</b> Thorium	126 <b>Pa</b> Protactinium	127 <b>U</b> Uranium	128 <b>Np</b> Neptunium	129 <b>Pu</b> Plutonium	130 <b>Am</b> Americium	131 <b>Cm</b> Curium	132 <b>Bk</b> Berkelium
		132 <b>Bk</b> Berkelium	133 <b>Cf</b> Californium	134 <b>Es</b> Einsteinium	135 <b>Fm</b> Fermium	136 <b>Md</b> Mendelevium	137 <b>No</b> Nobelium	138 <b>Lr</b> Lawrencium	139 <b>Lu</b> Lutetium	140 <b>Ce</b> Cerium	141 <b>Pr</b> Praseodymium	142 <b>Nd</b> Neodymium
		141 <b>Pr</b> Praseodymium	142 <b>Nd</b> Neodymium	143 <b>Pm</b> Promethium	144 <b>Nd</b> Neodymium	145 <b>Pu</b> Plutonium	146 <b>Am</b> Americium	147 <b>Cm</b> Curium	148 <b>Bk</b> Berkelium	149 <b>Cf</b> Californium	150 <b>Es</b> Einsteinium	151 <b>Fm</b> Fermium
		142 <b>Nd</b> Neodymium	143 <b>Pm</b> Promethium	144 <b>Nd</b> Neodymium	145 <b>Pu</b> Plutonium	146 <b>Am</b> Americium	147 <b>Cm</b> Curium	148 <b>Bk</b> Berkelium	149 <b>Cf</b> Californium	150 <b>Es</b> Einsteinium	151 <b>Fm</b> Fermium	152 <b>Md</b> Mendelevium
		143 <b>Pm</b> Promethium	144 <b>Nd</b> Neodymium	145 <b>Pu</b> Plutonium	146 <b>Am</b> Americium	147 <b>Cm</b> Curium	148 <b>Bk</b> Berkelium	149 <b>Cf</b> Californium	150 <b>Es</b> Einsteinium	151 <b>Fm</b> Fermium	152 <b>Md</b> Mendelevium	153 <b>No</b> Nobelium
		144 <b>Nd</b> Neodymium	145 <b>Pu</b> Plutonium	146 <b>Am</b> Americium	147 <b>Cm</b> Curium	148 <b>Bk</b> Berkelium	149 <b>Cf</b> Californium	150 <b>Es</b> Einsteinium	151 <b>Fm</b> Fermium	152 <b>Md</b> Mendelevium	153 <b>No</b> Nobelium	154 <b>Lr</b> Lawrencium
		145 <b>Pu</b> Plutonium	146 <b>Am</b> Americium	147 <b>Cm</b> Curium	148 <b>Bk</b> Berkelium	149 <b>Cf</b> Californium	150 <b>Es</b> Einsteinium	151 <b>Fm</b> Fermium	152 <b>Md</b> Mendelevium	153 <b>No</b> Nobelium	154 <b>Lr</b> Lawrencium	155 <b>Lu</b> Lutetium
		146 <b>Am</b> Americium	147 <b>Cm</b> Curium	148 <b>Bk</b> Berkelium	149 <b>Cf</b> Californium	150 <b>Es</b> Einsteinium	151 <b>Fm</b> Fermium	152 <b>Md</b> Mendelevium	153 <b>No</b> Nobelium	154 <b>Lr</b> Lawrencium	155 <b>Lu</b> Lutetium	156 <b>Yb</b> Ytterbium
		147 <b>Cm</b> Curium	148 <b>Bk</b> Berkelium	149 <b>Cf</b> Californium	150 <b>Es</b> Einsteinium	151 <b>Fm</b> Fermium	152 <b>Md</b> Mendelevium	153 <b>No</b> Nobelium	154 <b>Lr</b> Lawrencium	155 <b>Lu</b> Lutetium	156 <b>Yb</b> Ytterbium	157 <b>Lu</b> Lutetium
		148 <b>Bk</b> Berkelium	149 <b>Cf</b> Californium	150 <b>Es</b> Einsteinium	151 <b>Fm</b> Fermium	152 <b>Md</b> Mendelevium	153 <b>No</b> Nobelium	154 <b>Lr</b> Lawrencium	155 <b>Lu</b> Lutetium	156 <b>Yb</b> Ytterbium	157 <b>Lu</b> Lutetium	158 <b>Yb</b> Ytterbium
		149 <b>Cf</b> Californium	150 <b>Es</b> Einsteinium	151 <b>Fm</b> Fermium	152 <b>Md</b> Mendelevium	153 <b>No</b> Nobelium	154 <b>Lr</b> Lawrencium	155 <b>Lu</b> Lutetium	156 <b>Yb</b> Ytterbium	157 <b>Lu</b> Lutetium	158 <b>Yb</b> Ytterbium	159 <b>Lu</b> Lutetium
		150 <b>Es</b> Einsteinium	151 <b>Fm</b> Fermium	152 <b>Md</b> Mendelevium	153 <b>No</b> Nobelium	154 <b>Lr</b> Lawrencium	155 <b>Lu</b> Lutetium	156 <b>Yb</b> Ytterbium	157 <b>Lu</b> Lutetium	158 <b>Yb</b> Ytterbium	159 <b>Lu</b> Lutetium	160 <b>Yb</b> Ytterbium
		151 <b>Fm</b> Fermium	152 <b>Md</b> Mendelevium	153 <b>No</b> Nobelium	154 <b>Lr</b> Lawrencium	155 <b>Lu</b> Lutetium	156 <b>Yb</b> Ytterbium	157 <b>Lu</b> Lutetium	158 <b>Yb</b> Ytterbium	159 <b>Lu</b> Lutetium	160 <b>Yb</b> Ytterbium	161 <b>Lu</b> Lutetium
		152 <b>Md</b> Mendelevium	153 <b>No</b> Nobelium	154 <b>Lr</b> Lawrencium	155 <b>Lu</b> Lutetium	156 <b>Yb</b> Ytterbium	157 <b>Lu</b> Lutetium	158 <b>Yb</b> Ytterbium	159 <b>Lu</b> Lutetium	160 <b>Yb</b> Ytterbium	161 <b>Lu</b> Lutetium	162 <b>Yb</b> Ytterbium
		153 <b>No</b> Nobelium	154 <b>Lr</b> Lawrencium	155 <b>Lu</b> Lutetium	156 <b>Yb</b> Ytterbium	157 <b>Lu</b> Lutetium	158 <b>Yb</b> Ytterbium	159 <b>Lu</b> Lutetium	160 <b>Yb</b> Ytterbium	161 <b>Lu</b> Lutetium	162 <b>Yb</b> Ytterbium	163 <b>Lu</b> Lutetium
		154 <b>Lr</b> Lawrencium	155 <b>Lu</b> Lutetium	156 <b>Yb</b> Ytterbium	157 <b>Lu</b> Lutetium	158 <b>Yb</b> Ytterbium	159 <b>Lu</b> Lutetium	160 <b>Yb</b> Ytterbium	161 <b>Lu</b> Lutetium	162 <b>Yb</b> Ytterbium	163 <b>Lu</b> Lutetium	164 <b>Yb</b> Ytterbium
		155 <b>Lu</b> Lutetium	156 <b>Yb</b> Ytterbium	157 <b>Lu</b> Lutetium	158 <b>Yb</b> Ytterbium	159 <b>Lu</b> Lutetium	160 <b>Yb</b> Ytterbium	161 <b>Lu</b> Lutetium	162 <b>Yb</b> Ytterbium	163 <b>Lu</b> Lutetium	164 <b>Yb</b> Ytterbium	165 <b>Lu</b> Lutetium
		156 <b>Yb</b> Ytterbium	157 <b>Lu</b> Lutetium	158 <b>Yb</b> Ytterbium	159 <b>Lu</b> Lutetium	160 <b>Yb</b> Ytterbium	161 <b>Lu</b> Lutetium	162 <b>Yb</b> Ytterbium	163 <b>Lu</b> Lutetium	164 <b>Yb</b> Ytterbium	165 <b>Lu</b> Lutetium	166 <b>Yb</b> Ytterbium
		157 <b>Lu</b> Lutetium	158 <b>Yb</b> Ytterbium	159 <b>Lu</b> Lutetium	160 <b>Yb</b> Ytterbium	161 <b>Lu</b> Lutetium	162 <b>Yb</b> Ytterbium	163 <b>Lu</b> Lutetium	164 <b>Yb</b> Ytterbium	165 <b>Lu</b> Lutetium	166 <b>Yb</b> Ytterbium	167 <b>Lu</b> Lutetium
		158 <b>Yb</b> Ytterbium	159 <b>Lu</b> Lutetium	160 <b>Yb</b> Ytterbium	161 <b>Lu</b> Lutetium	162 <b>Yb</b> Ytterbium	163 <b>Lu</b> Lutetium	164 <b>Yb</b> Ytterbium	165 <b>Lu</b> Lutetium	166 <b>Yb</b> Ytterbium	167 <b>Lu</b> Lutetium	168 <b>Yb</b> Ytterbium
		159 <b>Lu</b> Lutetium	160 <b>Yb</b> Ytterbium	161 <b>Lu</b> Lutetium	162 <b>Yb</b> Ytterbium	163 <b>Lu</b> Lutetium	164 <b>Yb</b> Ytterbium	165 <b>Lu</b> Lutetium	166 <b>Yb</b> Ytterbium	167 <b>Lu</b> Lutetium	168 <b>Yb</b> Ytterbium	169 <b>Lu</b> Lutetium
		160 <b>Yb</b> Ytterbium	161 <b>Lu</b> Lutetium	162 <b>Yb</b> Ytterbium	163 <b>Lu</b> Lutetium	164 <b>Yb</b> Ytterbium	165 <b>Lu</b> Lutetium	166 <b>Yb</b> Ytterbium	167 <b>Lu</b> Lutetium	168 <b>Yb</b> Ytterbium	169 <b>Lu</b> Lutetium	170 <b>Yb</b> Ytterbium
		161 <b>Lu</b> Lutetium	162 <b>Yb</b> Ytterbium	163 <b>Lu</b> Lutetium	164 <b>Yb</b> Ytterbium	165 <b>Lu</b> Lutetium	166 <b>Yb</b> Ytterbium	167 <b>Lu</b> Lutetium	168 <b>Yb</b> Ytterbium	169 <b>Lu</b> Lutetium	170 <b>Yb</b> Ytterbium	171 <b>Lu</b> Lutetium

a = relative atomic mass  
**X** = atomic symbol  
 b = proton (atomic) number

The volume of one mole of any gas is 24 dm<sup>3</sup> at room temperature and pressure (r.t.p.).

