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

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.

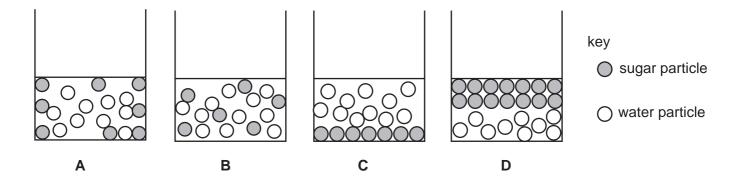
1 Heating a liquid causes it to become a vapour.

What happens to the molecules of the liquid during this process?

	the molecules become bigger	the molecules move further apart
Α	✓	✓
В	✓	×
С	×	✓
D	×	×

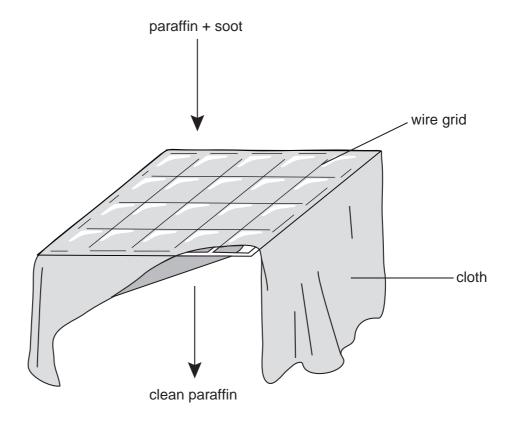
2 Some sugar is dissolved in water.

Which diagram shows how the particles are arranged in the solution?



- **3** Which stages occur in distillation?
 - **A** condensation then evaporation
 - **B** condensation then filtration
 - **C** evaporation then condensation
 - **D** filtration then evaporation

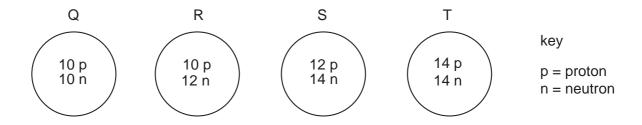
4 Some paraffin is contaminated with soot (carbon). The soot is removed as shown.



Which method is used to remove the soot?

- A cracking
- **B** crystallisation
- **C** diffusion
- **D** filtration

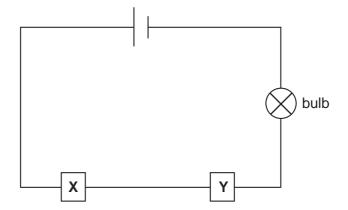
5 The diagrams show the nuclei of four different atoms.



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** ¹₁H
- **B** ${}_{1}^{2}H$
- **C** ³⊢
- **D** ⁴He

- 7 Which change takes place when an atom becomes a positive ion?
 - Α An electron is added.
 - В An electron is removed.
 - C A proton is added.
 - D A proton is removed.
- The diagram shows an electric circuit. 8



For which two substances at X and Y does the bulb light up?

	X	Y
Α	copper	graphite
В	copper	poly(ethene)
С	rubber	graphite
D	rubber	poly(ethene)

One method of producing carbon dioxide is to react calcium carbonate with dilute hydrochloric acid.

What is the balanced chemical equation for the reaction?

$$\mathbf{B} \quad \mathsf{CaCO}_3 \quad + 2\mathsf{HC}l \longrightarrow \mathsf{CaC}l_2 + \mathsf{CO}_2 + \mathsf{H}_2\mathsf{O}$$

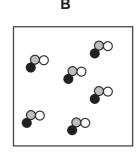
$$\mathbf{C} \quad \mathsf{CaCO}_3 \quad + \mathsf{4HC}l \longrightarrow \mathsf{CaC}l_4 + \mathsf{CO}_2 + \mathsf{H}_2 + \mathsf{H}_2\mathsf{O}$$

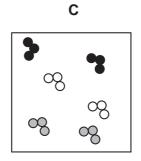
$$\mathbf{D} \quad \mathrm{Ca(HCO_3)_2} \ + \ \mathrm{HC}l \ \longrightarrow \ \mathrm{CaC}l \ + 2\mathrm{CO_2} \ + \ \mathrm{H_2O}$$

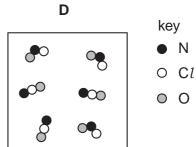
10 A gas has the molecular formula NOC1.

Which diagram could show molecules of the pure gas NOC1?

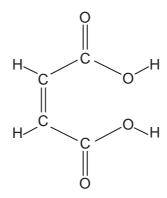
Α 0 0







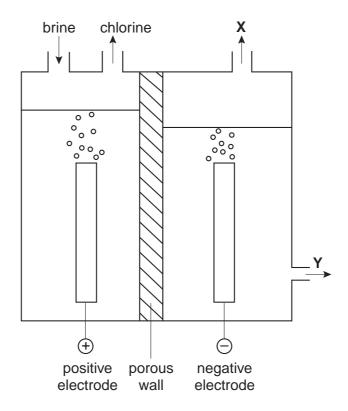
11 Butenedioic acid has the structure shown.



What is the molecular formula of butenedioic acid?

- CHO Α

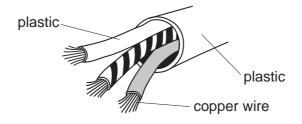
12 The diagram represents the electrolysis of brine (aqueous sodium chloride).



What are products **X** and **Y**?

	Х	Υ
Α	hydrogen	aqueous sodium hydroxide
В	hydrogen	hydrochloric acid
С	oxygen	aqueous sodium hydroxide
D	oxygen	hydrochloric acid

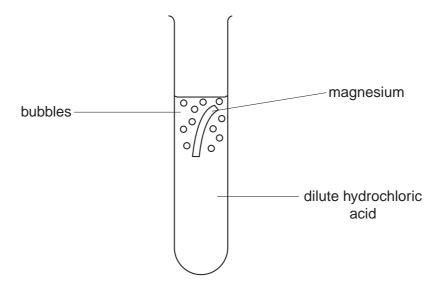
13 Copper wires in an electricity cable are covered in plastic.



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.



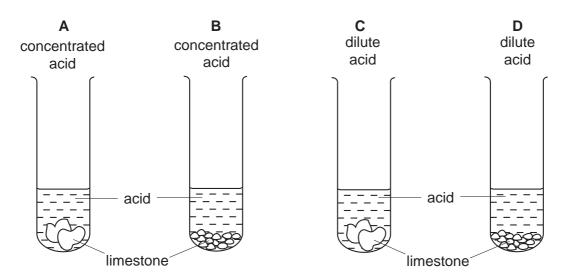
Why does the test-tube become warm?

- 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
Α	high	high
В	high	low
С	low	high
D	low	low

18 Which metals can be obtained by heating their oxides with carbon?

	copper	iron	magnesium
Α	Х	✓	✓
В	✓	✓	×
С	X	×	✓
D	✓	×	×

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
Α	1	3
В	2	6
С	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
Α	good	positive
В	good	negative
С	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?

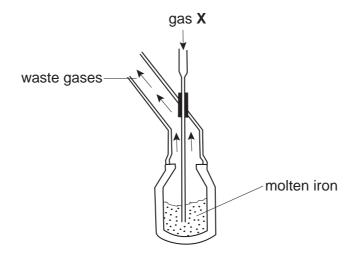
	corrosion	extraction
Α	oxidation	oxidation
В	oxidation	reduction
С	reduction	oxidation
D	reduction	reduction

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, KC*l* 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.



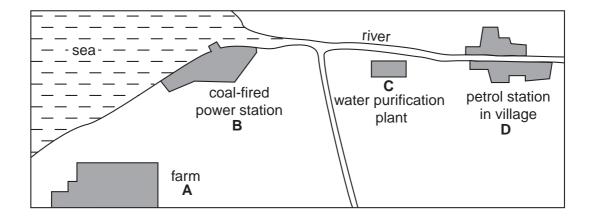
What could gas X be?

- 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 KNO₃, Na₂HPO₄
 - B K₂SO₄, KNO₃
 - **C** NaCl, $Ca_3(PO_4)_2$
 - **D** NH₄C*l*, Na₂HPO₄

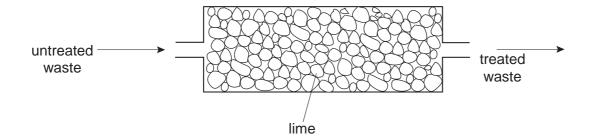
34 Two uses of oxygen are

- 1 burning acetylene in welding,
- 2 helping the breathing of hospital patients.

Which of these uses form carbon dioxide?

	use 1	use 2
Α	✓	✓
В	✓	×
С	X	✓
D	X	×

35 Lime is used to treat an industrial waste.



Which pH change occurs in the treatment?

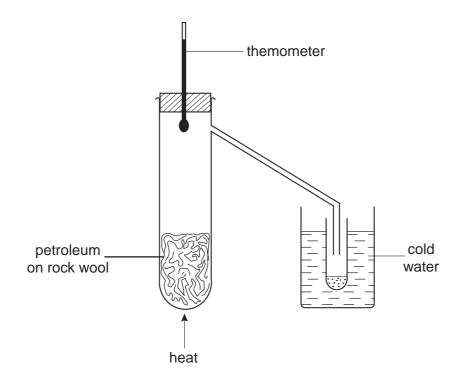
$$\begin{array}{cccc} & \underline{\text{untreated waste}} & \longrightarrow & \underline{\text{treated waste}} \\ \mathbf{A} & \text{acidic} & \longrightarrow & \text{neutral} \\ \mathbf{B} & \text{alkaline} & \longrightarrow & \text{acidic} \\ \mathbf{C} & \text{alkaline} & \longrightarrow & \text{neutral} \\ \mathbf{D} & \text{neutral} & \longrightarrow & \text{acidic} \\ \end{array}$$

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
Α	✓	✓
В	✓	×
С	X	✓
D	×	×

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
Α	✓	✓
В	✓	×
С	Х	✓
D	X	×

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

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Rubidium	Strontium	Yttrium	Zirconium	Niobium	Molybdenum	Technetium	Ruthenium	Rhodium	Palladium		Cadmium	Indium		Antimony	Tellurium	lodine	Xenon
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Caesium 55	Barium 56	Lanthanum 57 *	Hafnium 72	Tantalum 73	Tungsten 74	Rhenium 75	Osmium 76	Iridium 77	Platinum 78	Gold 79	Mercury 80	Thallium 81	Lead 82	Bismuth 83	Polonium 84	Astatine 85	Radon 86
	226	227															
<u>τ</u>	Ra	Ac															
Francium	Radium	Actinium															
87	88	+ 68															
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† 90-103	†90-103 Actinoid series	series		Cerium	Praseodymium	Z ;	Promethium	Samarium	Europium	Gadolinium	Terbium	Dysprosium	Holmium	Erbium	Thulium	Ytterbium	Lutetium

169 Tm	Thulium 69	Mendelevium 101
167 Er	Erbium 68	Fm Fermium
165 Ho	19	Einsteinium
162 DV	Dysprosium 66	Californium
651 QL	Terbium 65	Bk Berkelium 97
157 Gd	Gadolinium 64	Curium 96
152 Eu	Europium 63	Am Americium
150 Sm	Samarium 62	Pu Plutonium
Шd	Promethium 61	Neptunium
P N	- 6	L Uranium
141 Pr	Praseodymium 59	Pa Protactinium 91
140 Ce	Cerium 58	232 Tb Thorium

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Nobelium Nobelium

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

Key

b = proton (atomic) number

a = relative atomic mass X = atomic symbol