# CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

mmn. \*tremepapers.com 0620/01 **CHEMISTRY** 

Paper 1 Multiple Choice

May/June 2003

45 minutes

Multiple Choice Answer Sheet Additional Materials:

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.

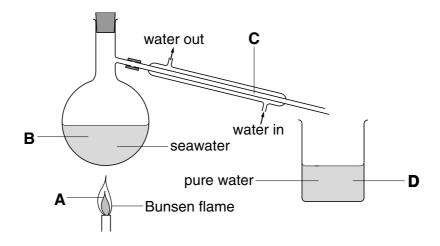
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

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

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

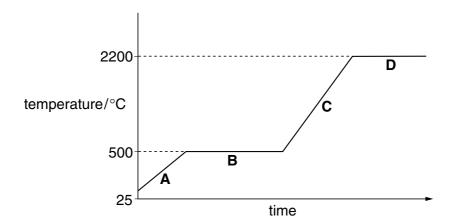
Where do water molecules lose energy?



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
Α	+3	96
В	+3	104
С	-3	96
D	-3	104

5 Which number in the table is -1?

particle	charge	relative mass
electron	Α	В
neutron	С	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 <sub>2</sub>	SrCl <sub>2</sub>
В	SrCl <sub>2</sub>	$SCl_2$
С	SCl <sub>2</sub>	SrCl <sub>2</sub>
D	SCl <sub>2</sub>	$SCl_2$

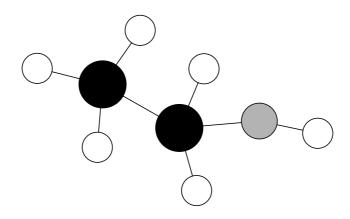
**9** The relative atomic mass of oxygen is 16 and that of hydrogen is 1.

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

Which words correctly complete the gaps?

	gap (i)	gap (ii)
Α	an atom	thirty-two molecules
В	an atom	eight molecules
С	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
Α	1	6	2
В	2	5	1
С	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?

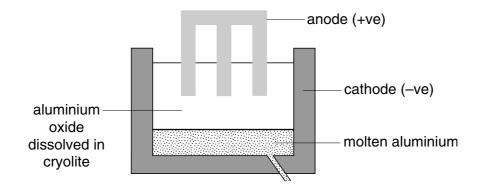
**A** 12 g

**B** 16 g

**C** 96 g

**D** 144 g

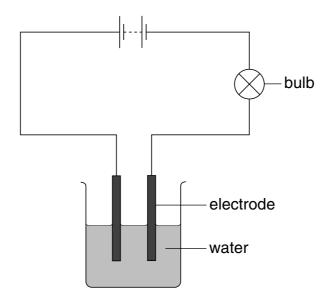
12 The diagram shows how aluminium is manufactured by electrolysis.



What are the anode and cathode made of?

	anode	cathode	
A aluminium		aluminium	
В	aluminium	graphite	
С	graphite	aluminium	
D	graphite	graphite	

13 A student sets up the apparatus shown. The bulb does not light.



After the student adds substance  $\boldsymbol{X}$  to the water, the bulb lights.

### What is X?

A calcium carbonate

**B** carbon

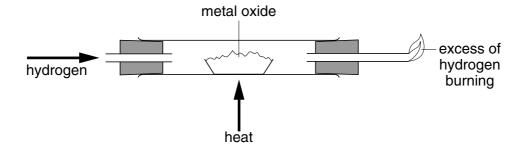
C copper(II) sulphate

**D** ethanol

14 The following elements have radioactive isotopes.

Which element is used as a source of energy because of its radioactivity?

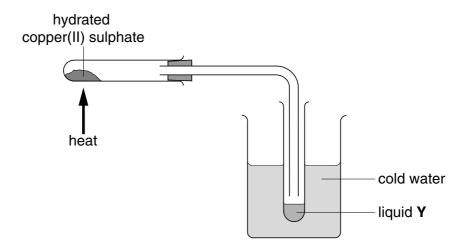
- A carbon
- **B** hydrogen
- **C** iodine
- **D** uranium
- 15 When hydrogen is passed over a heated metal oxide, the metal and steam are formed.



What happens to the hydrogen and to the metal oxide?

	hydrogen	metal oxide
Α	oxidised	oxidised
В	oxidised	reduced
С	reduced	oxidised
D	reduced	reduced

16 When hydrated copper(II) sulphate is heated in the apparatus shown, solid  ${\bf X}$  and liquid  ${\bf Y}$  are produced.



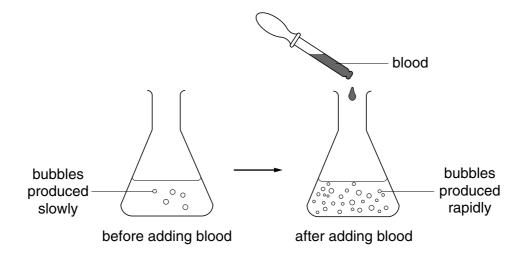
Which changes are noticed when liquid Y is added to cold solid X?

	colour change	heat change
Α	blue to white	heat given out
В	blue to white	heat taken in
С	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.

hydrogen peroxide  $\rightarrow$  water + oxygen

The diagrams show the effect of adding blood to the solution.

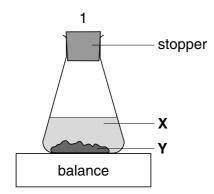


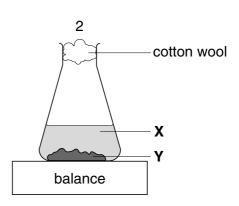
What could be the reason for the observed change?

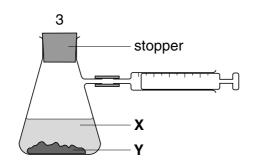
- A Blood contains an enzyme.
- **B** Blood contains water.
- **C** The hydrogen peroxide becomes more concentrated.
- **D** The hydrogen peroxide is neutralised by blood.

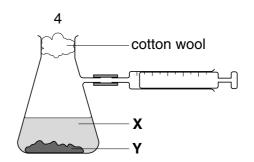
18 A liquid X reacts with solid Y to form a gas.

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
Α	a lighted splint	oxygen
В	a glowing splint	hydrogen
С	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 <b>X</b>	structure of gas <b>X</b>
Α	2	single atoms
В	2	diatomic molecules
С	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  $\dots$  (i)  $\dots$  This can be used to  $\dots$  (ii)  $\dots$  the properties of elements.

Which words correctly complete the gaps?

	gap (i)	gap (ii)
A Periodic Table		measure
B Periodic Table pro		predict
c reactivity series meas		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
Р	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
Α	Р	Q	R
В	Р	R	Q
С	Q	R	Р
D	R	Q	Р

**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
Α	good conductor of electricity	good conductor of heat
В	good conductor of electricity	strong
С	good conductor of heat	low density
D	strong	low density

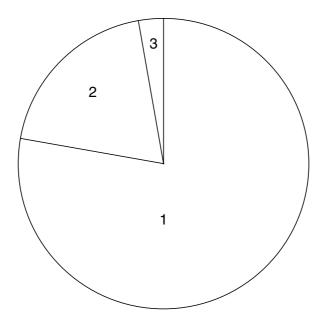
- 28 Which raw materials are used in the manufacture of iron?
  - A bauxite and lime
  - **B** bauxite and limestone
  - C haematite and lime
  - **D** haematite and limestone
- 29 In a car industry, approximately 45 000 litres of water are required to produce a single car.

This water does not need to be very pure.

Which purification methods would be suitable and economic to use?

	chlorinated	distilled
Α	✓	✓
В	✓	×
С	Х	✓
D	Х	×

**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
Α	nitrogen	other gases	oxygen
В	nitrogen	oxygen	other gases
С	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
Α	✓	✓	<b>√</b>
В	✓	✓	X
С	×	✓	✓
D	Х	×	✓

**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?

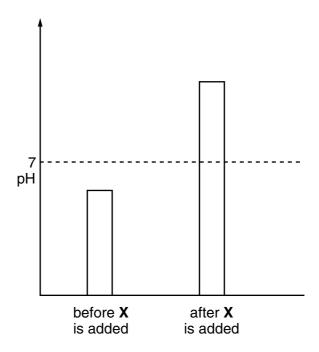
	gas	colour
Α	ammonia	blue
В	ammonia	red
С	chlorine	red
D	chlorine	white

- **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

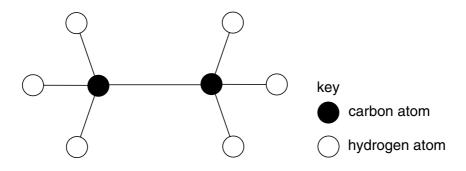
35 The diagram shows how the pH of an industrial waste changes when substance X is added to it.



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?

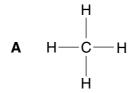
	boiling points	sizes of molecules
Α	high	large
В	high	small
С	low	large
D	low	small

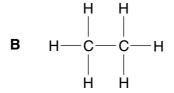
38 Which hydrocarbons in the table are members of the same homologous series?

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
Α	absent	30
В	absent	70
С	present	30
D	present	70

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DATA SHEET F

Caesium   Sodum   11   Sodum   39   Sodum   11   Sodum   13   Sodum   133   Caesium   133   Caesium   Sodum   1433   Caesium   Sodum   Sodum   Caesium   Sodum   Sod	Be Beryllium A 24 Mg Magnesium 120 Ca aloum 38 Rontlum 38 Radum 56 Radum 88		Tranium 22 P1 91 P1	51  V Vanadium 23 Niobium 41 181 Tan Tantalum 73	52 Cr Chromium 24 Molybdenum 42 Molybdenum 42 Tungsten 74	55 Mn Manganesse 25 Technetium 43 186 Re Rhenium 75	1 Hydrogen 1 101 Ruthenium 190 Osmium 76 Peric	65 Cobalt 103 Rh Rhodium 45 Iridium 77 Iridium 150	1	Blemen   64   Cu   Copper   108   Ag   Silver   47   Au   Gold   75   Gold   157	65 Sadmium 48 Mercury 80 Mercury 80 Mercury 159	11 Boron 5 Boron 13 Aluminium 13 Gallium 149 C24 T1 T16 T16 T16 T16 T16 T16 T16 T16 T16	Carbon  6 Carbon  6 Carbon  14 73 Carbon  16 73 Carbon  16 73 Carbon  17 73 Carbon  18 73 Carbon  18 73 Carbon  18 73 Carbon  18 73 Carbon  19 73 Carbon  19 73 Carbon  10 73 Carbon  11 74 75 Carbon  11 75 Carbon  12 75 Carbon  14 75 Carbon  15 75 Carbon  16 75 Carbon  17 75 Carbon  17 75 Carbon  18 75 Carbon  18 75 Carbon  19 75 Carbon  19 75 Carbon  19 75 Carbon  10 75 Carbon	14 Nitrogen 7 Nitrogen 7 31 B Bismuth 83 Bismuth 83 Nitrogen 167 Bismuth 83 Nitrogen 167 Nitroge		VIII  19  Fluorine 9 80.  C1 Chlorine 17 Brownine 85 Iodine 53 Iodine 85 Astatine 85	175	
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**Lr** Lawrencium 103

Nobelium 102

Fm Fermium 100

**ES**Einsteinium
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Californium

**BK**Berkelium
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Curium 96

**Am**Americium
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