Centre Number

Candidate Number

Name

WANN, PAPAC AMBRIDGE, COM

CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

PHYSICAL SCIENCE

0652/01

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.

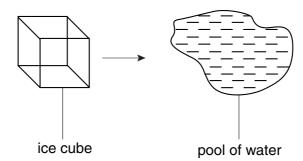
Read the instructions on the Answer Sheet very carefully.

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.

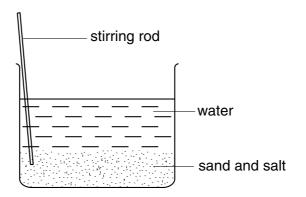
A copy of the Periodic Table is printed on page 20.

1 An ice cube is left on a warm table.



What happens to the molecules of water in the ice cube?

- **A** The molecules condense.
- **B** The molecules dissolve.
- **C** The molecules gain energy.
- **D** The molecules lose energy.
- 2 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

the paragram of the paragram o

3 The table shows what some students wrote about the electrical charges on the patom.

Which student was correct?

student	proton	electron	neutron
Α	+1	0	-1
В	+1	–1	0
С	0	+1	-1
D	–1	+1	0

4 The table shows the nucleon numbers and proton numbers of the atoms of some elements.

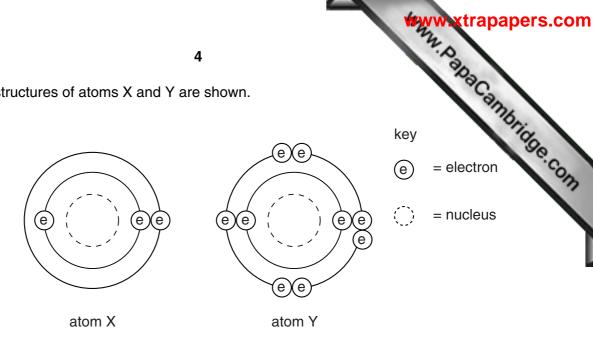
nucleon number	35	37	40	39	40
proton number	17	17	18	19	19

How many are atoms of non-metallic elements?

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

- 5 An ionic compound is likely to
 - A be a gas.
 - **B** be coloured.
 - **C** conduct electricity when molten.
 - **D** react vigorously with water.

The electronic structures of atoms X and Y are shown. 6

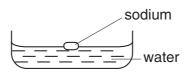


X and Y react to form an ionic compound.

What is the formula of the compound?

- XY Α
- XY_3 В
- С XY_7
- X_7Y D

7 When sodium reacts with water, a solution and a gas are produced.



The solution is tested with litmus paper and the gas is tested with a splint.

What happens to the litmus paper and to the splint?

	litmus paper	splint
A	blue to red	glowing splint relights
В	blue to red	lighted splint 'pops'
С	red to blue	glowing splint relights
D	red to blue	lighted splint 'pops'

8 Which of hydrogen and uranium form oxides when used as a source of energy?

	hydrogen	uranium
Α	✓	✓
В	✓	×
С	×	✓
D	×	×

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

Which change slows down the speed of reaction?

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

10 A spark can cause a mixture of hydrogen and air to explode.

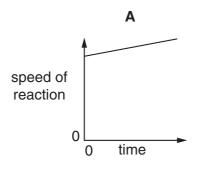
$$2H_2 + O_2 \longrightarrow 2H_2O$$

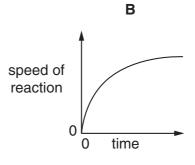
Which two terms apply to this explosion of hydrogen?

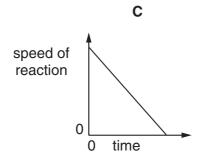
	the reaction is	the hydrogen is
Α	endothermic	oxidised
В	endothermic	reduced
С	exothermic	oxidised
D	exothermic	reduced

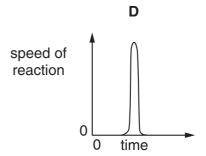
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11 Which graph could represent the explosive combustion of methane?









12 Which of the following are properties of the oxides of most non-metals?

	property 1	property 2
Α	acidic	covalent
В	acidic	ionic
С	basic	covalent
D	basic	ionic

13 Aqueous ammonia is added to solutions containing the ions of four metals.

aluminium

copper(II)

iron(III)

zinc

Which of these ions give a coloured precipitate?

	aluminium	copper(II)	iron(III)	zinc
Α	✓	Х	×	✓
В	✓	×	✓	×
С	×	✓	×	✓
D	×	✓	✓	×

B 5

C 7

D 9

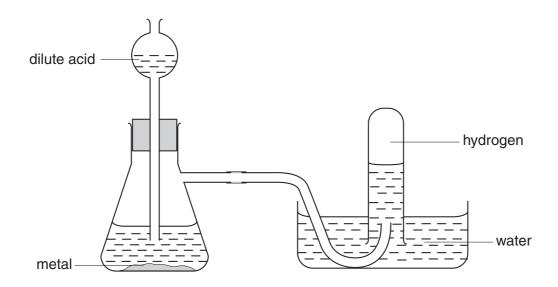
15 An element **X** has the two properties listed.

- 1 It acts as a catalyst.
- 2 It forms colourless ions.

Which of these properties suggest that **X** is a transition element?

	property 1	property 2
Α	✓	✓
В	✓	×
С	X	✓
D	Х	×

16 The diagram shows a method of making hydrogen.



Which acid and metal would be suitable and safe for this method?

	metal	acid
A	copper	hydrochloric acid
В	copper	sulphuric acid
С	sodium	hydrochloric acid
D	zinc	sulphuric acid

17 Rust can be removed from pieces of iron by using hydrochloric acid.

This is possible because rust is

- A an alloy.
- B a metal oxide.
- C a red-brown solid.
- **D** soluble in water.
- 18 In an experiment, incomplete combustion of ethanol occurs.

Which gases may be present in the products?

- A carbon dioxide, carbon monoxide and hydrogen
- B carbon dioxide, carbon monoxide and water
- C carbon dioxide, hydrogen and water
- **D** carbon monoxide, hydrogen and water
- 19 Methanol and ethanol are both liquids.

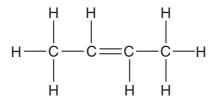
They both burn with a blue flame to produce carbon dioxide and water.

Both contain the functional group —O—H.

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

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

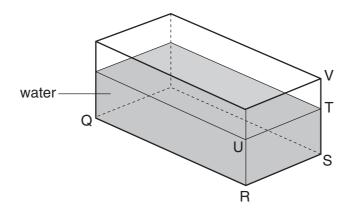
20 Compound X has the structure shown.



Which reactions does X show?

	addition of hydrogen	addition polymerisation
Α	✓	✓
В	✓	Х
С	X	✓
D	×	×

21 A glass tank contains some water.



The length QR and the width RS of the tank are known.

What other distance needs to be measured in order to be able to calculate the volume of the water?

- A ST
- **B** SV
- **C** TU
- **D** TV

22 A tunnel has a length of 50 km. A car takes 20 min to travel between the two ends of

10

What is the average speed of the car?

- **A** 2.5 km/h
- **B** 16.6 km/h
- C 150 km/h
- **D** 1000 km/h
- 23 Which statement is correct?
 - A Mass is a force, measured in kilograms.
 - **B** Mass is a force, measured in newtons.
 - **C** Weight is a force, measured in kilograms.
 - **D** Weight is a force, measured in newtons.
- 24 Three children, X, Y and Z, are using a see-saw to compare their weights.





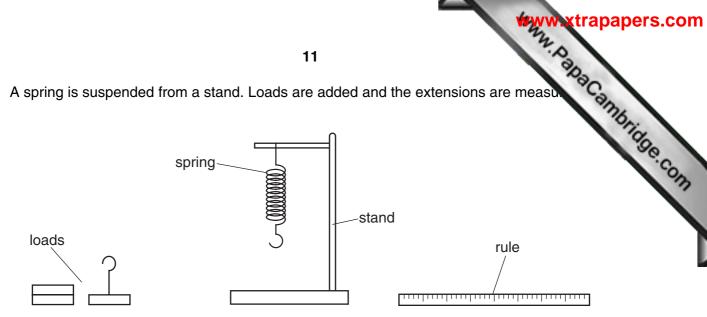


Which line in the table shows the correct order of the children's weights?

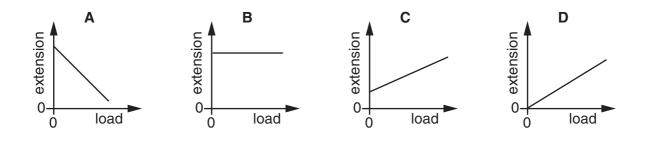
	heaviest	\longleftrightarrow	lightest
Α	Х	Υ	Z
В	X	Z	Υ
С	Y	Χ	Z
D	Y	Z	X



25 A spring is suspended from a stand. Loads are added and the extensions are measure



Which graph shows the result of plotting extension against load?



- 26 What is the source of the energy converted by a hydro-electric power station?
 - Α hot rocks
 - В falling water
 - C oil
 - D waves
- A labourer on a building site lifts heavy concrete blocks onto a lorry. Lighter blocks are now lifted the same distance in the same time.

What happens to the work done in lifting each block and the power exerted by the labourer?

	work done in lifting each block	power exerted by labourer
Α	decreases	decreases
В	decreases	remains the same
С	increases	increases
D	remains the same	increases

28 A person holds a glass beaker in one hand and fills it quickly with hot water. It is seconds before his hand starts to feel the heat.

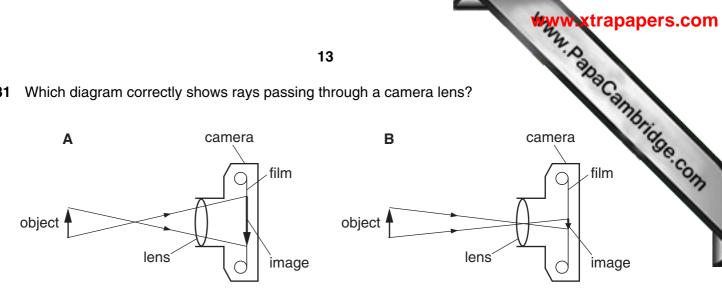
Why is there this delay?

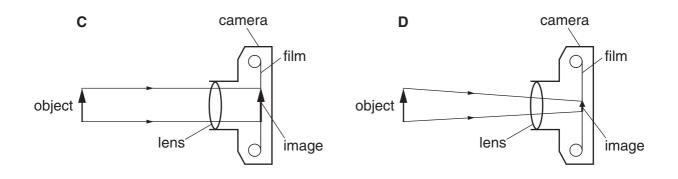
- **A** Glass is a poor conductor of heat.
- **B** Glass is a good conductor of heat.
- **C** Water is a poor conductor of heat.
- **D** Water is a good conductor of heat.
- 29 What causes refraction when light travels from air into glass?
 - A The amplitude of the light waves changes.
 - **B** The colour of the light changes.
 - **C** The frequency of the light waves changes.
 - **D** The speed of the light changes.
- **30** A woman tunes her radio to a station broadcasting on 200 m.

What does the 200 m tell her about the radio wave?

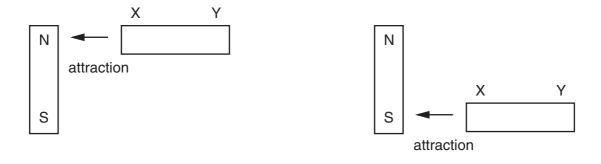
- A its amplitude
- B its frequency
- C its speed
- **D** its wavelength

31 Which diagram correctly shows rays passing through a camera lens?





32 A metal rod XY is placed near a magnet. End X is attracted when it is placed near to the north pole of the magnet, and also when it is placed near to the south pole.



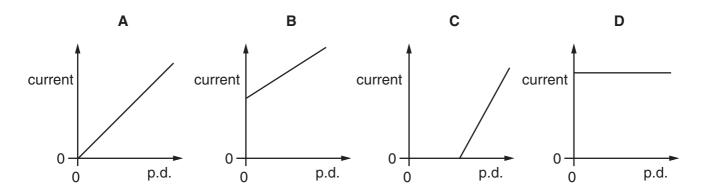
How does end Y behave when it is placed, in turn, near to the two poles of the magnet?

	Y near north pole	Y near south pole
Α	attraction	attraction
В	attraction	repulsion
С	repulsion	attraction
D	repulsion	repulsion

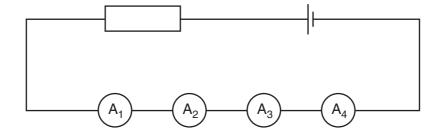
When the potential difference (p.d.) across a piece of resistance wire is changed 33 through the wire also changes.

The temperature of the wire is kept the same.

Which graph shows how the p.d. and current are related?



Two faulty ammeters and two perfect ammeters are connected in series in the circuit shown.



The readings on the ammeters are

A₁ 2.9 A

A₂ 3.1 A

A₃ 3.1 A

A₄ 3.3 A

Which two ammeters are faulty?

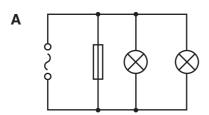
- A_1 and A_2

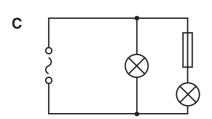
- $\textbf{B} \quad \textbf{A}_1 \text{ and } \textbf{A}_4 \qquad \qquad \textbf{C} \quad \textbf{A}_2 \text{ and } \textbf{A}_3 \qquad \qquad \textbf{D} \quad \textbf{A}_3 \text{ and } \textbf{A}_4$
- Which electrical component would not normally be found in a battery-operated torch (flashlight)?

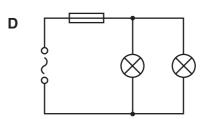


36 A student makes four circuits.

In which circuit are both lamps protected by the fuse?

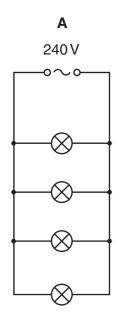


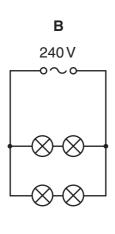


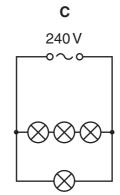


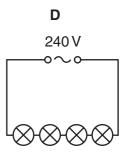
37 Four lamps are labelled '60 W 240 V'.

In which circuit are the lamps connected so that they all work at normal brightness?

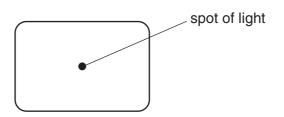






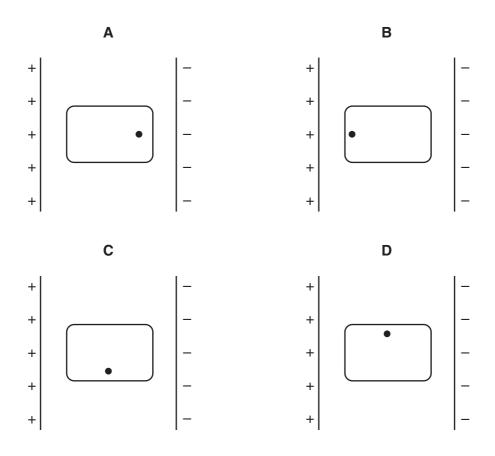


38 The diagram below shows the screen of a cathode-ray oscilloscope tube.



The tube is placed between a pair of charged plates.

Which diagram shows the new position of the spot?



- 39 Which type of radiation can be stopped by a sheet of paper?
 - **A** α -particles
 - **B** β -particles
 - \mathbf{C} γ -rays
 - **D** X-rays

ample was teste

40 The half-life of a radioactive substance is 5 hours. A sample is tested and found to of the substance.

How much of the substance was present in the sample 20 hours before the sample was tested

- **A** 0.03 g
- **B** 0.12 g
- **C** 1.92 g
- **D** 7.68 g

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Lu Lutetium

Yb Ytterbium

T

Erbium

Nd Mendelevium

FB

The Periodic Table of the Elements DATA SHEET

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								Grc	Group								
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							Hydrogen 1										Helium 2
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=	Be											Δ	ပ	z	0	ш	Ne
Lithium	Beryllium											Boron					Neon
8	4											2	9	7		9 46	10
S N	Ma											ΔI	₃ is	5 Q	S	S Z	Ā
Sodium	Magnesium											Aluminium	Silicon	Phosphorus		Chlorine	Argon
	12											13	14	15		17	18
39	40	45	48	51	52	55	56	59	59	64	92	02	73	75	62	80	84
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otassium	Calcinm	Scandium	Titanium	Vanadium	Chromium	Manganese	Iron	Cobalt	Nickel	Copper			Germanium	Arsenic	Selenium	Bromine	Krypton
	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
82	88	68	91	86	96		101	103	106	108	112	115	119	122	128	127	131
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3ubidium	Strontium	Yttrium	Zirconium	Niobium	Molybdenum	Technetium	Ruthenium	Rhodium	Palladium	Silver	Cadmium	Indium		Antimony	Tellurium		Xenon
	88	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
133	137	139	178	181	184	186	190	192	195	197	201	204	207	209		ı	ļ
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Saesium	Barium	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
ù	a G	ν Δ															
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				140	141	144		150	152	157	159	162	165	167	169	173	175

ES Einsteinium **H**olmium Californium **Dy**Dysprosium **T**erbium **Gd** Gadolinium Curium **Am** Americium **Europium Sa**marium **Pm** Promethium **N**eptunium **Neodymium Pa** Protactinium Praseodymium 232 **7** Thorium Cerium 58 06

b = proton (atomic) number

a = relative atomic mass X = atomic symbol

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3-71 Lanthanoid series 0-103 Actinoid series The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).