

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

Secon

COMBINED SCIENCE 0653/01

Paper 1 Multiple Choice May/June 2007

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**.

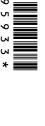
Choose the one you consider correct and record your choice in soft pencil on the separate Answer Sheet.

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.



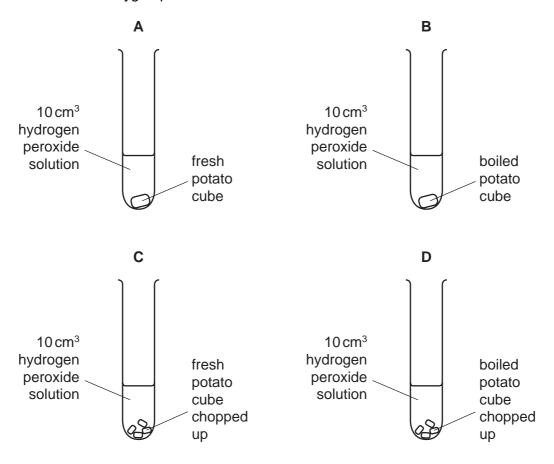
1 The table describes some parts of a plant cell.

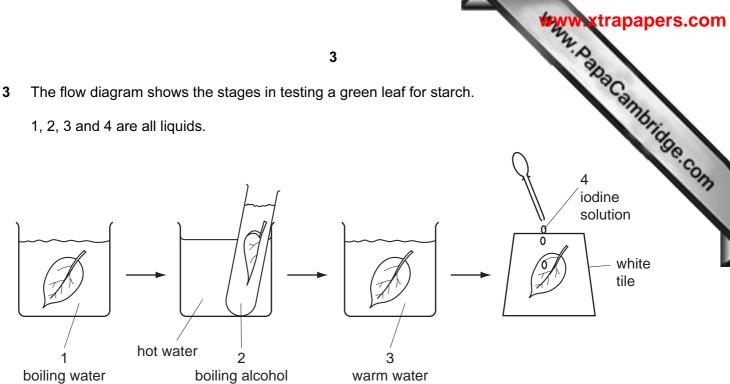
Which part is the cellulose cell wall?

part	feature
Α	allows free passage of water and dissolved substances
В	contains DNA
С	is partially permeable
D	synthesises glucose in sunlight

2 The diagrams show experiments to investigate the activity of the enzyme catalase which is found in potato.

In which test-tube is oxygen produced fastest?

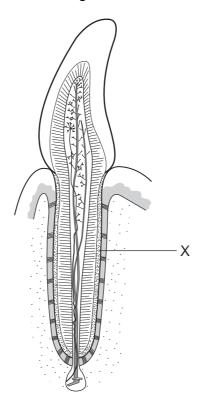




What are the colours of liquids 1, 2, 3 and 4 at the end of each stage for a leaf that contains starch?

	1	2	3	4
Α	colourless	green	colourless	blue/black
В	colourless	colourless	green	brown
С	green	colourless	colourless	blue/black
D	green	green	colourless	brown

4 The diagram shows a vertical section through an incisor in the jaw.

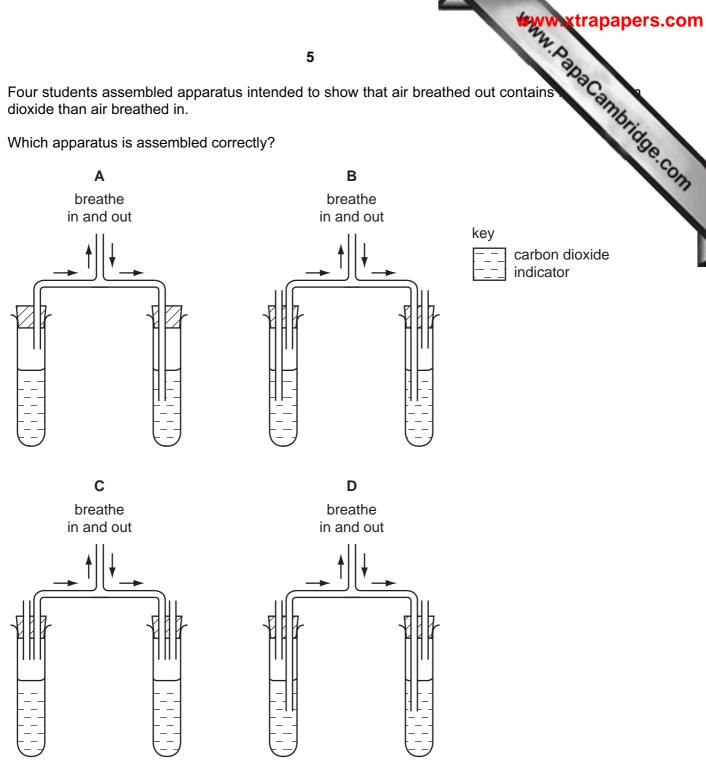


What is the name of the part labelled X?

- A cement
- **B** dentine
- **C** enamel
- **D** pulp

5 Four students assembled apparatus intended to show that air breathed out contains dioxide than air breathed in.

Which apparatus is assembled correctly?

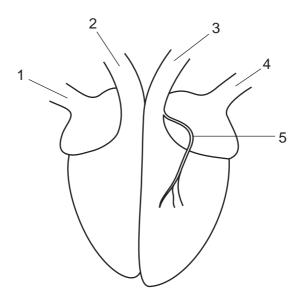


A person accidentally touches a very hot object with their hand. 6

What identifies the receptor, the speed of response and the type of response?

	receptor	speed of response	type of response
Α	skin	rapid	nervous
В	muscle	slow	hormonal
С	eye	rapid	hormonal
D	brain	slow	nervous

7 The diagram shows an external view of the human heart.



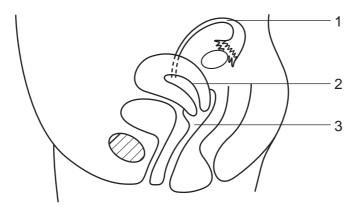
Which vessels contain oxygenated blood?

- **A** 1, 2 and 4
- **B** 1, 3 and 4
- **C** 2, 3 and 5
- **D** 3, 4 and 5
- **8** Water moves through the stomata of leaves during transpiration.

In which direction, and in which form, does it move?

	direction	form
Α	into the leaf	liquid
В	into the leaf	vapour
С	out of the leaf	liquid
D	out of the leaf	vapour

9 The diagram shows a side view of the female reproductive system in a human.



Where do fertilisation and implantation occur?

	fertilisation	implantation
Α	1	2
В	2	1
С	2	3
D	3	2

- 10 Which structure in a flower produces pollen?
 - A sepal
 - **B** stamen
 - C stigma
 - **D** style
- **11** A gardener uses only asexual reproduction to produce clones of a flowering plant. The original plant had red flowers but some cloned plants had blue flowers.

What explains this change in flower colour?

- A height of plant
- **B** insect pollination
- C variation caused by genes
- **D** variation caused by the environment

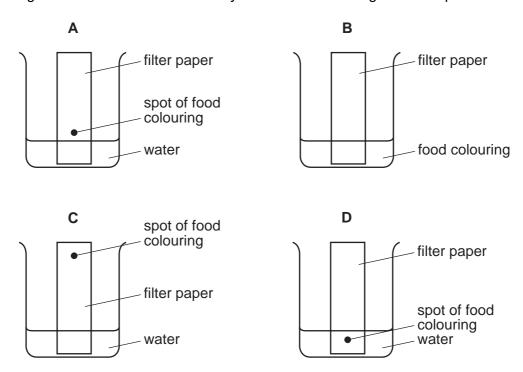
12 The diagram represents a feeding relationship through which energy flows.

P Q grass — cow — lion — decomposer

What is the type of the feeding relationship and the direction in which the energy flows?

	type of relationship	direction of energy flow
Α	food chain	P to Q
В	food chain	Q to P
С	food web	P to Q
D	food web	Q to P

- 13 Which farming practice increases species diversity?
 - A cutting down trees
 - B grazing more cattle
 - C maintaining plant cover
 - **D** using tractors
- 14 Which diagram shows how a mixture of dyes in a food colouring can be separated?



15 Which two elements form covalent bonds when they combine with each other?

- A calcium and oxygen
- B hydrogen and oxygen
- C magnesium and chlorine
- D sodium and chlorine

16 The symbols, nucleon numbers and proton numbers of three elements are shown.

⁷Li

⁹Be

 $^{14}_{7}N$

A student is asked to write the nucleon number and proton number of another element.

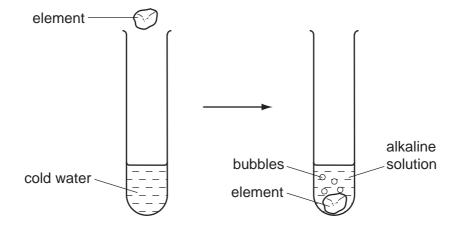
Using the Periodic Table, which two numbers are correct?

	nucleon number	proton number
Α	18	11
В	18	12
С	23	11
D	47	23

- 17 Why are noble gases unreactive?
 - **A** They have a complete outer shell of electrons.
 - **B** They have an even number of electrons.
 - **C** They have an even number of shells of electrons.
 - **D** They have two electrons in the first shell.
- 18 Which elements exist as diatomic molecules?

	bromine	calcium	chlorine	magnesium	
Α	✓	X	x	✓	key
В	✓	x	✓	×	√ correct
С	×	✓	✓	×	x not correct
D	x	✓	x	✓	

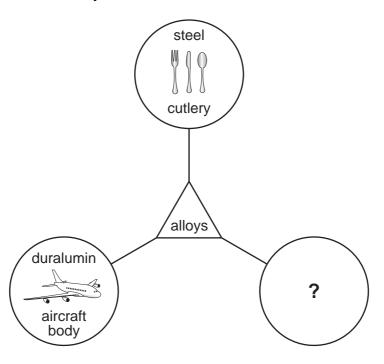
- **19** Which method is used to obtain iron from iron(III) oxide?
 - A combustion
 - **B** electrolysis
 - **C** reduction
 - **D** thermal decomposition
- 20 The diagrams show an experiment.



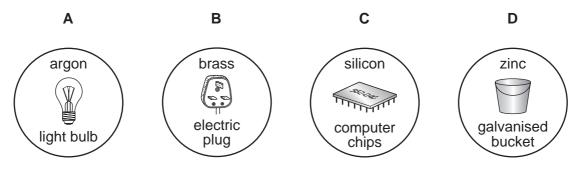
What could the element be?

- **A** calcium
- **B** carbon
- C copper
- **D** sulphur

21 The diagram shows uses of alloys.



Which picture could be used to complete the diagram?



22 Which equation shows the thermal decomposition of a compound?

A
$$CaCO_3 \rightarrow CaO + CO_2$$

$$\textbf{B} \quad 2H_2 + O_2 \rightarrow 2H_2O$$

$$\textbf{C} \quad \text{NaOH + HNO}_3 \rightarrow \text{NaNO}_3 + 2\text{H}_2\text{O}$$

$$\textbf{D} \quad 3H_2 + N_2 \rightarrow 2NH_3$$

23 Marble and chalk are two forms of calcium carbonate.

WANN, PAPAC CAMBRIDGE, COM The diagram shows equal masses of lumps of marble and powdered chalk placed hydrochloric acid.



The marble takes longer than the chalk to dissolve in the acid.

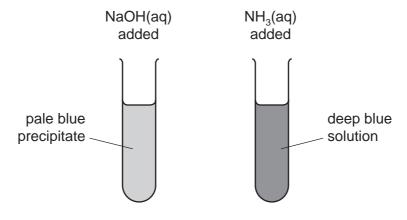
Why is this?

- Marble is more reactive than chalk.
- В Marble is more soluble than chalk.
- C The marble has the smaller surface area.
- The marble is more basic.
- 24 The diagrams show the results of adding an excess of

NaOH(aq),

 $NH_3(aq)$,

to a solution of salt S.



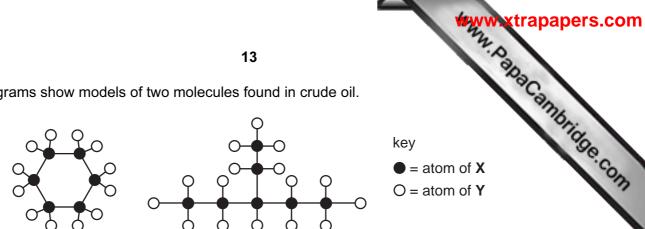
Which metal ion is present in salt S?

- A Cu²⁺
- Fe²⁺
- Fe³⁺
- Zn²⁺

25 Which substance is reduced during the following reaction?

C Α В D lead(II) oxide hydrogen lead water

26 The diagrams show models of two molecules found in crude oil.



Which element could X be?

- carbon
- В hydrogen
- C nitrogen
- D oxygen
- 27 The reaction shown occurs naturally.

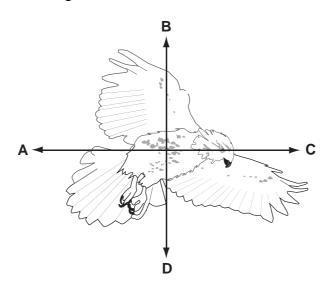
$$C_6H_{12}O_6 + 6O_2$$
 \rightarrow $6CO_2 + 6H_2O$ \rightarrow Q

Which descriptions of P and Q are correct?

	P is a hydrocarbon	Q is an acidic oxide
Α	yes	yes
В	yes	no
С	no	yes
D	no	no

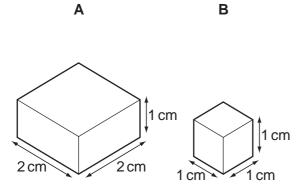
28 The diagram shows a bird in flight.

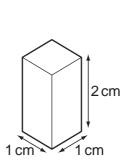
In which direction does the weight of the bird act?



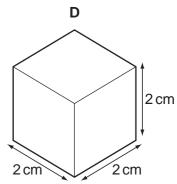
- 29 Which of the following is a unit of density?
 - **A** cm³/g
- \mathbf{B} g/cm²
- **C** g/cm³
- \mathbf{D} kg/m²
- 30 Each of the solids shown in the diagram has the same mass.

Which solid has the greatest density?



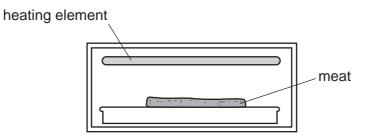


C



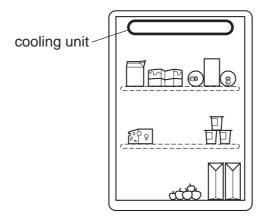
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31 Meat can be cooked by placing it below, but not touching, a heating element.



Which process transfers thermal energy from the heating element to the meat?

- **A** conduction
- **B** convection
- **C** insulation
- **D** radiation
- **32** The diagram shows a refrigerator. The cooling unit is placed at the top. The cooling unit cools the air near it.

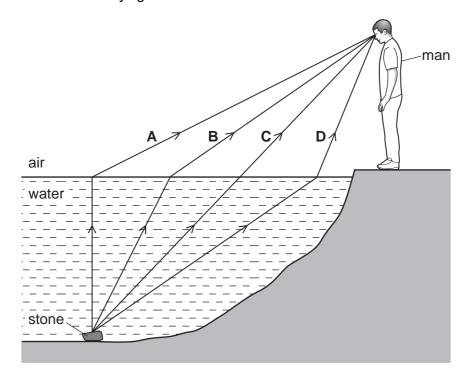


What happens to the density of this air as it cools and how does it move?

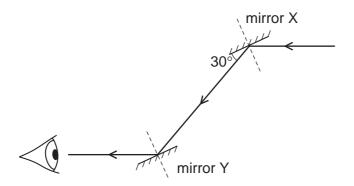
	density of the air	movement of the air
Α	decreases	moves down
В	decreases	stays where it is
С	increases	moves down
D	increases	stays where it is

33 A man sees a stone at the bottom of a pool of water.

Which path could be taken by light from the stone to the man?



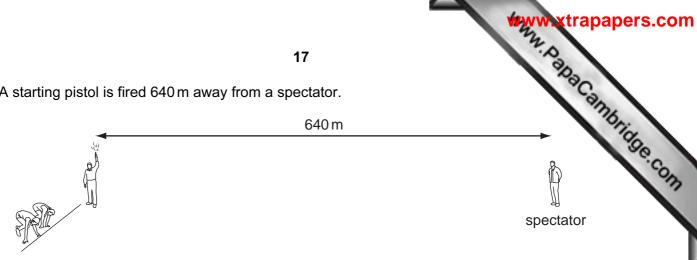
34 A ray of light is reflected by two parallel plane mirrors X and Y.



Which statement is correct?

- **A** The angle of incidence at mirror X is 30°.
- **B** The angle of incidence at mirror Y is 60°.
- ${f C}$ The angle of reflection at mirror X is 120°.
- **D** The angle of reflection at mirror Y is 0° .

35 A starting pistol is fired 640 m away from a spectator.

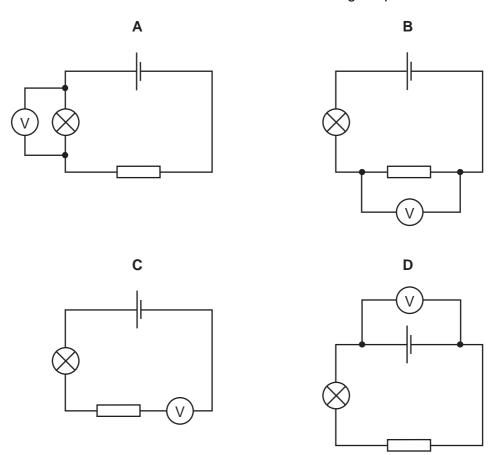


The spectator hears the sound of the starting pistol two seconds after seeing the flash.

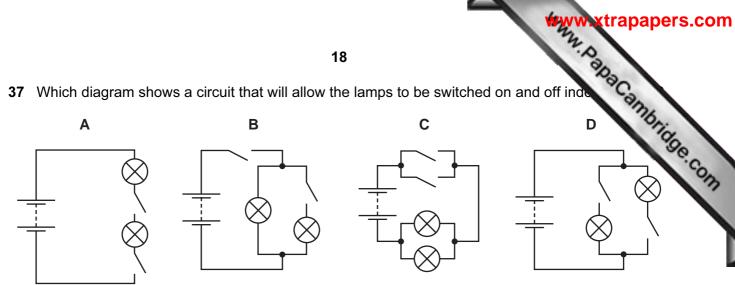
What is the speed of sound in air?

- 160 m/s
- В $320\,\text{m/s}$
- С $640\,\mathrm{m/s}$
- D 1280 m/s

36 Which circuit shows the correct use of a voltmeter in measuring the p.d. across the resistor?



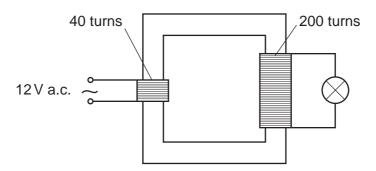
37 Which diagram shows a circuit that will allow the lamps to be switched on and off inde



38 A cable in a house is carrying too much current.

What is the greatest danger?

- appliances not working
- В electric shock
- C fire
- D low power
- **39** The diagram shows a lamp connected to a transformer.



What is the potential difference across the lamp?

- **A** 2.4 V
- 12 V
- 60 V
- 240 V
- **40** What are the most penetrating and the least penetrating types of radiation?

	most penetrating	least penetrating
Α	alpha-particles	beta-particles
В	beta-particles	alpha-particles
С	gamma-rays	alpha-particles
D	gamma-rays	beta-particles

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The Periodic Table of the Elements DATA SHEET

								Gre	Group								
_	=											=	\ <u>\</u>	Λ	IN	IIA	0
							1 Hydrogen										4 He Helium
7 Cithium	Beryllium 4	4 . €										11 Boron	12 C Carbon 6	14 N Nitrogen 7	16 Oxygen	19 F luorine	20 Ne on 10
Na Sodium	Magnesium 12	ma ma										27 A1 Aluminium 13	28 Si Silicon	31 P Phosphorus 15	32 S Sulphur 16	35.5 C1 Chlorine	40 Ar Argon
39 K Potassium	Ca Calcium	45 Sc Scandium Scandium	48 T Titanium	51 V Vanadium 23	Cr Chromium 24	Mn Manganese 25	56 Fe Iron	59 Cob Cobalt	59 Nickel	64 Copper 29	Zn Zinc	70 Ga Gallium 31	73 Ge Germanium 32	75 AS Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
Rb Rubidium 37	St Strontium 38	89 × 4	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium	106 Pd Palladium	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin	Sb Antimony 51	128 Te Tellurium	127 I lodine 53	131 Xe Xeron Xeron 54
Caesium 55	137 Ba n Barium 56	139 La Lanthanum 57		181 Ta Tananum	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium	195 Pt Platinum 78	197 Au Gold	201 Hg Mercury	204 T 1 Thallium	207 Pb Lead		Po Polonium 84	At Astatine 85	Radon 86
Francium 87	226 Ra m Radium	227 1 AC m Actinium †															
*58-71 190-10	*58-71 Lanthanoid serie 190-103 Actinoid series	*58-71 Lanthanoid series 190-103 Actinoid series	1	140 Ce Cerium 58	Pr Praseodymium 59	Neodymium 60	Pm Promethium 61	Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thullum 69	Yb Ytterbium 70	175 Lu Lutetium
Key	× ¤	 a = relative atomic mass X = atomic symbol b = proton (atomic) number 		232 Th	Pa Protactinium	238 U Uranium	Neptunium	Pu Plutonium			BK Berkelium	Californium	ES Einsteinium	Fm Fermium	Md Mendelevium		Lr Lawrencium

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

Fm Fermium

Einsteinium

Californium

BkBerkelium
97

Curium 96

Am Americium 95

PuPlutonium
94

Neptunium 93

06