

COMBINED SCIENCE

Paper 1 Multiple Choice

0653/12 May/June 2011 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 16.

This document consists of 15 printed pages and 1 blank page.



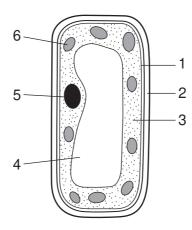
[Turn over

- 1 Where does most of the water enter a plant?
 - A guard cells
 - B mesophyll cells
 - c root hair cells
 - D xylem vessels
- 2 Which list shows substances each of which can diffuse into and out of cells?
 - A amino acids, glucose and oxygen
 - B carbon dioxide, cellulose and glucose
 - C carbon dioxide, oxygen and starch
 - D carbon monoxide, oxygen and protein
- 3 Which breakdown processes occur inside cells, and which occur outside cells?

	large molecules to small molecules for absorption	breakdown of glucose to release energy
Α	inside	inside
в	inside	outside
С	outside	inside
D	outside	outside

0653/12/M/J/11

4 The diagram shows a palisade cell.

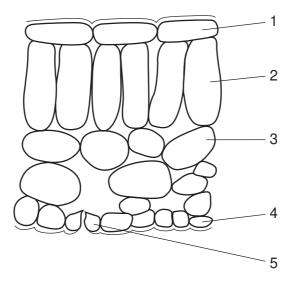


Which parts are found in plant cells and not in animal cells?

	1	2	3	4	5	6
Α	\checkmark	X	\checkmark	\checkmark	X	x
в	\checkmark	X	\checkmark	X	\checkmark	X
С	X	\checkmark	X	\checkmark	X	\checkmark
D	X	\checkmark	X	x	\checkmark	\checkmark

key

- \checkmark = found in plant cells only
- **x** = not found in plant cells only
- **5** The diagram shows the arrangement of cells in a vertical section of a leaf of a green plant. No cell contents are shown.



In which cells is light energy turned into chemical energy?

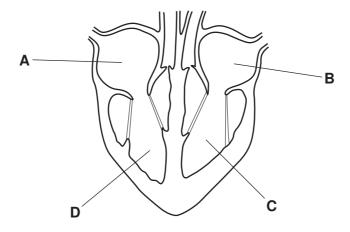
A 1, 2 and 4 **B** 1, 3 and 4 **C** 2, 3 and 5 **D** 2, 4 and 5

0653/12/M/J/11

[Turn over

6 The diagram shows the human heart in section.

Which chamber of the heart pumps blood the greatest distance?



- 7 The statements describe events that occur when glucose is absorbed from the alimentary canal.
 - 1 Blood sugar level falls.
 - 2 Blood sugar level rises.
 - 3 Insulin is released.
 - 4 Liver removes glucose from the blood.

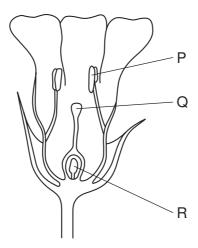
Which is the correct order of events?

- $\textbf{A} \quad 2 \rightarrow 3 \rightarrow 4 \rightarrow 1$
- **B** $2 \rightarrow 4 \rightarrow 3 \rightarrow 1$
- $\textbf{C} \quad 3 \rightarrow 2 \rightarrow 4 \rightarrow 1$
- $\textbf{D} \quad 4 \rightarrow 1 \rightarrow 3 \rightarrow 2$
- 8 Which health problems may result from smoking cigarettes?

	bronchitis	emphysema	lung cancer	
Α	\checkmark	1	\checkmark	key
в	1	x	×	✓ = yes
С	×	\checkmark	\checkmark	x = no
D	×	1	×	

0653/12/M/J/11

9 The diagram shows a section through a flower.



Where are the male gametes made and where are the female gametes made?

	male gametes	female gametes
Α	Р	Q
в	Р	R
С	Q	Р
D	Q	R

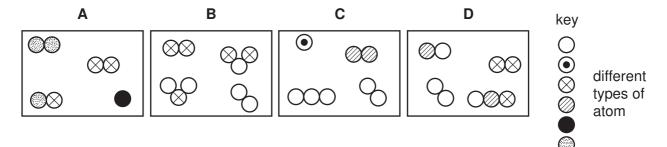
- 10 Which feature **must** all members of the same clone of a plant have in common?
 - **A** They all grow at the same rate.
 - B They all grow from seeds.
 - **C** They all have fruits of the same size.
 - **D** They all have the same alleles.
- 11 Which type or types of variation in organisms can be inherited?

	variation caused by genes	variation caused by the environment	
Α	\checkmark	\checkmark	key
в	\checkmark	×	√ = yes
С	x	\checkmark	x = no
D	x	×	

0653/12/M/J/11

- 12 What does the intra-uterine device (IUD) prevent?
 - A fertilisation of the egg
 - **B** implantation of the zygote
 - C release of eggs from the ovary
 - **D** sperms entering the uterus
- 13 Deforestation in tropical rain forests can lead to
 - A decreased carbon dioxide in the air.
 - B decreased species diversity.
 - **C** increased number of habitats.
 - **D** increased oxygen in the air.
- **14** The diagrams show four different mixtures of gases.

Which diagram represents a mixture containing only elements?



- 15 Which equation is correctly balanced and shows the correct formulae?
 - $\mathbf{A} \quad \mathbf{H}_2 + \mathbf{C}l_2 \rightarrow \mathbf{H}_2\mathbf{C}l_2$
 - $\textbf{B} \quad H_2 + Cl_2 \rightarrow 2HCl$
 - $\textbf{C} \quad 2\textbf{H} + 2\textbf{C}l_2 \rightarrow \textbf{H}_2\textbf{C}l_2$
 - **D** $2H + Cl_2 \rightarrow 2HCl_2$

0653/12/M/J/11

16 An atom is represented by the symbol ${}^{19}_{9}X$.

	electrons	neutrons	protons
Α	9	9	9
в	9	10	9
С	10	10	9
D	19	9	10

How many electrons, neutrons and protons are in this atom?

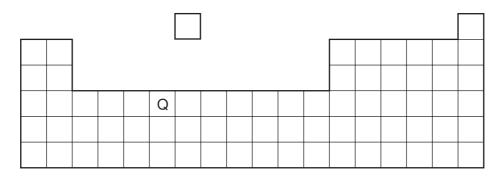
17 Element X reacts with element Y to form compound XY. It also reacts with element Z to form compound XZ.

Compound XY is an electrolyte and compound XZ is a non-electrolyte.

Which row correctly shows whether elements X, Y and Z are metals or non-metals?

	metals	non-metals
Α	х	Y, Z
В	X, Z	Y
С	Y	X, Z
D	Y, Z	Х

18 The position in the Periodic Table of an element Q is shown.



Which description of Q is correct?

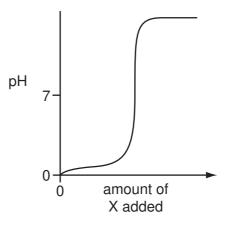
- **A** It is green and has diatomic molecules.
- **B** It is soft and a good electrical conductor.
- **C** It is very dense and has a high melting point.
- D It reacts violently with cold water.

7

0653/12/M/J/11

19 Substance X is added to dilute sulfuric acid until reaction is complete.

The graph shows how the pH changes during the reaction.



Which type of substance is X?

- A base
- B catalyst
- **C** indicator
- D salt
- 20 Metal X reacts vigorously with dilute hydrochloric acid.

Salts of metal X give a red colour in a flame test.

What is X?

- A calcium
- B copper
- C potassium
- D sodium

0653/12/M/J/11

21 A new alloy is resistant to corrosion. It costs about the same as aluminium but it is slightly poisonous.

Its density compared with stainless steel and aluminium is shown.

	aluminium	new alloy	stainless steel
density/g/cm ³	2.7	2.8	7.9

What could this new alloy be used to make?

- A aircraft frames
- B cutlery
- **C** electrical insulators
- D food containers
- 22 Carbon monoxide gas is present in car exhausts.

Why is this gas a pollutant?

- A It causes acid rain.
- B It causes asthma.
- C It damages buildings.
- **D** It is poisonous.
- 23 Many industrial reactions use a catalyst.

What are the advantages of using a catalyst?

	they are not used up in the reaction	they increase speed of the reaction	they increase the amount of product	
Α	\checkmark	\checkmark	×	key
в	\checkmark	x	x	✓ = true
С	×	\checkmark	\checkmark	x = not true
D	x	\checkmark	×	

- 24 Which chemical equation represents a thermal decomposition reaction?
 - $\textbf{A} \quad CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$
 - **B** $HCl + NaOH \rightarrow NaCl + H_2O$
 - **C** $H_2 + Cl_2 \rightarrow 2HCl$
 - **D** MgCO₃ \rightarrow MgO + CO₂

0653/12/M/J/11

It is used in the purification of water.

It is made by electrolysis of one of its salts.

At which electrode is it formed and what is its colour?

	electrode	colour
Α	anode	red
в	anode	yellow-green
С	cathode	red
D	cathode	yellow-green

26 Plastics are used as substitutes for natural materials.

Which statement about the manufacture of plastics is correct?

- A Plastics are made by breaking long-chain molecules into shorter chain ones.
- **B** Plastics are made by joining polymers together.
- **C** Plastics are made by fractional distillation of crude oil (petroleum).
- **D** Plastics are made by joining short-chain molecules together.
- 27 Kerosene is a hydrocarbon fuel obtained from crude oil.

Which statement is correct?

- A Kerosene burns to form carbon dioxide and water.
- **B** Kerosene contains the elements carbon, hydrogen and oxygen.
- **C** Kerosene is used as a fuel for cars.
- **D** The combustion of kerosene is an endothermic reaction.
- 28 Which is the unit for force and which is the unit for weight?

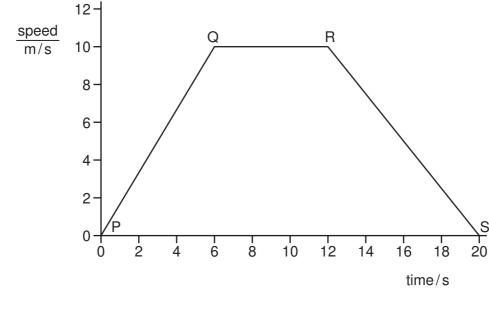
	force	weight
Α	kg	kg
В	kg	Ν
С	Ν	kg
D	Ν	Ν

0653/12/M/J/11

29 A car takes 30 minutes to travel a distance of 60 km.

What is the average speed of the car?

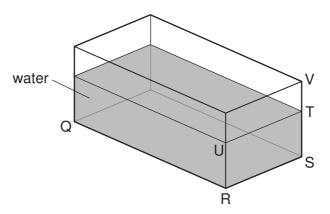
- A 2.0 km/hour
- B 30 km/hour
- C 120 km/hour
- **D** 1800 km / hour
- 30 The graph shows how the speed of a car changes with time.



Between which points on the graph is the acceleration zero?

A PQ only B QR only C RS only D PQ and RS

31 A glass tank contains some water.



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

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

A ST	B SV	΄ C TU	D	ΤV

© UCLES 2011

0653/12/M/J/11

[Turn over

32 Which row shows the input energy and the output energy for a microphone?

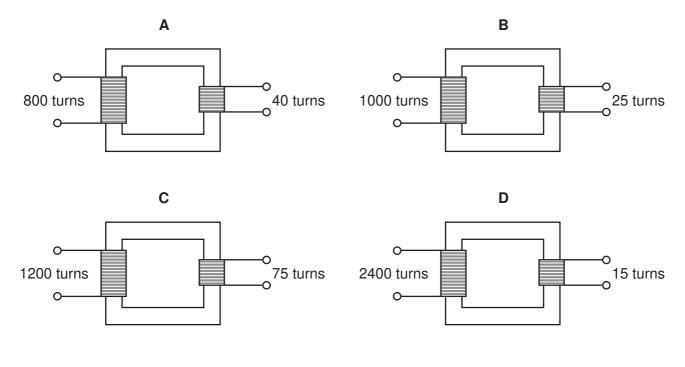
	input energy	output energy
Α	electrical	potential
В	electrical	sound
С	sound	electrical
D	sound	potential

33 A man warms himself by a fire.



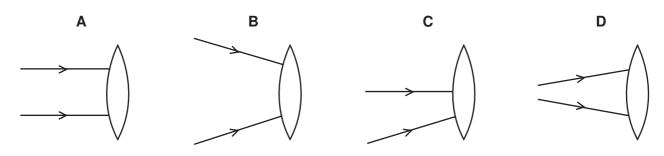
Which method of heat transfer supplies the most heat energy to him?

- A conduction through the air
- B convection by moving air
- **C** evaporation by moving water vapour
- D infra-red radiation
- 34 Which transformer would change a 240 V a.c. input into a 15 V a.c. output?

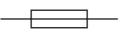


0653/12/M/J/11

35 In which diagram will the two light rays shown both pass through the principal focus (focal point) of the lens after passing through the lens?

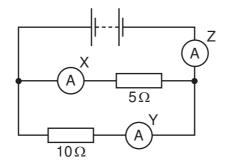


36 A circuit diagram contains the following symbol.



What does this symbol represent?

- A a fixed resistor
- B a fuse
- C a relay
- D a variable resistor
- 37 The diagram shows a circuit with three ammeters, X, Y and Z.

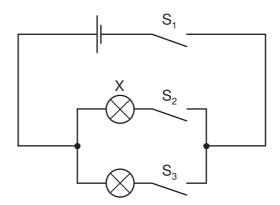


The ammeter readings are 1A, 2A and 3A.

Which ammeter has which reading?

	Х	Y	Z
Α	1 A	2A	3A
в	3A	2A	1 A
С	2A	3 A	1A
D	2A	1 A	3A

38 The diagram shows an electric circuit.



Which switches will have to be closed so that **only** bulb X will light?

- **A** S_1 , S_2 and S_3
- **B** S_1 and S_2 only
- $\boldsymbol{C} \quad S_1 \text{ and } S_3 \text{ only} \\$
- \mathbf{D} S₂ and S₃ only
- 39 Which type of radiation has the greatest ionising effect, and which is the most penetrating?

	greatest ionising effect	most penetrating
Α	alpha-particles	alpha-particles
в	alpha-particles	gamma-rays
С	gamma-rays	alpha-particles
D	gamma-rays	gamma-rays

40 A student copies a diagram of the electromagnetic spectrum but makes a mistake.

waves waves light waves rays	radio waves	micro- waves	infra-red waves	visible light	X-rays	ultraviolet waves	gamma rays
------------------------------	----------------	-----------------	--------------------	------------------	--------	----------------------	---------------

```
large wavelength
```

small wavelength

Which two names should be interchanged so that the order is correct?

- A infra-red waves and ultraviolet waves
- B radio waves and infra-red waves
- C radio waves and visible light
- D X-rays and ultraviolet waves

0653/12/M/J/11

BLANK PAGE

0653/12/M/J/11

	4	0	Helium 4	0	02	NP 1	Neon	2	Ar	Argon 18	84	Кr	Krypton 36	131	Xe	Xenon 54		Rn	Radon 86		175	Lu	71		Ļ	Lawrencium 103
	1174	>			19	Ľ	Fluorine	2 2 2 2 2	CI	Chlorine 17	80	Ŗ	Bromine 35	127	I	lodine 53		At	Astatine 85		173	٩۲	70		No	Nobelium 102
	111	>			16	0	Oxygen		ŝ	Sulfur 16	62	Se	Selenium 34	128	Те	Tellurium 52		Ро	Polonium 84		169	Tm	1 nuinu		Md	Mendelevium 101
		>			14	z	Nitrogen		.	Phosphorus 15	75	As	Arsenic 33	122	Sb	Antimony 51	209	Bi	Bismuth 83		167	Ш	Eroium 68		E	Fermium 100
	10	2			12	с С	Carbon		Si	Silicon 14	73	Ge	Germanium 32	119	Sn	50 Tin	207	Pb	Lead 82		165	Р	ноітит 67		Es	Einsteinium 99
	=	≡			:	8	Boron		AI	Aluminium 13	70	Ga	Gallium 31	115	In	Indium 49	204	Τl	Thallium 81		162	D	bysprosium 66		ັວ	Californium 98
												Zn	Zinc 30	112	BC	Cadmium 48	201	Hg	Mercury 80		159	qT	65		BĶ	Berkelium 97
											64	Cu	Copper 29	108	Ag		197	Au	Gold 79		157	Gd	ы 64			Curium 96
Ine Periodic Table of the Elements Group	dno										59	ÏZ	Nickel 28	106	Pd	Palladium 46	195	Ł	Platinum 78		152	Eu	Europium 63		Am	Americium 95
	5										26	ပိ	Cobalt 27	103	Rh	Rhodium 45	192	Ir	Iridium 77		150	Sm	Samarium 62			Plutonium 94
			Hydrogen	-							56	Fe	lron 26	101	Ru	Ruthenium 44	190	0s	Osmium 76				Promernium 61		ЧN	Neptunium 93
											55	Mn	Manganese 25		ЪС	Technetium 43	186	Re	Rhenium 75		144		Neodymum 60	238		Uranium 92
											52	່ວ	Chromium 24	96	Mo	Molybdenum 42	184	8	Tungsten 74		141	Pr	59 59		Ра	Protactinium 91
											51	>	Vanadium 23	93	qN	Niobium 41	181	Та	Tantalum 73		140	မီ	Cenum 58	232	Ч	Thorium 90
											48	F	Titanium 22	91	Zr	Zirconium 40	178	Ŧ	Hafnium 72					nic mass	lodi	nic) number
											45	Sc	Scandium 21	68	~	Yttrium 39	139	La	Lanthanum 57 *	227 Actinium 89	cariac	eries		a = relative atomic mass	X = atomic symbol	b = proton (atomic) number
	:	=			6	Be	Beryllium	4	Ma	Magnesium 12	40	ca	Calcium 20	88	S	Strontium 38	137		Barium 56	226 Rad 88	*58-71 I anthanoid cariac	190-103 Actinoid series			××	q
	.	_			7		Lithium	23	Na	Sodium	39	¥	Potassium 19	85	Rb	Rubidium 7	133	Cs	Caesium 55	Francium	71	-103	L		Key	q

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

© UCLES 2011

0653/12/M/J/11