

### **Cambridge International Examinations**

Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE 0653/13

Paper 1 Multiple Choice October/November 2014

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, 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.

DO NOT WRITE IN ANY BARCODES.

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.

Electronic calculators may be used.

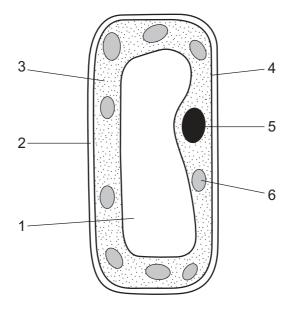




1 A car enters a garage, is filled with fuel and is driven away.

Which characteristic of living organisms is **not** matched by the car in this situation?

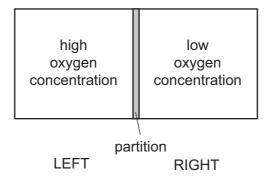
- A excretion
- **B** growth
- **C** movement
- **D** respiration
- 2 The diagram shows a cell from the leaf of a plant.



Which parts are found in animal cells?

- **A** 1, 2 and 3
- **B** 2, 3 and 4
- **C** 3, 4 and 5
- **D** 4, 5 and 6

3 Two samples of air are placed in a sealed container, as shown.

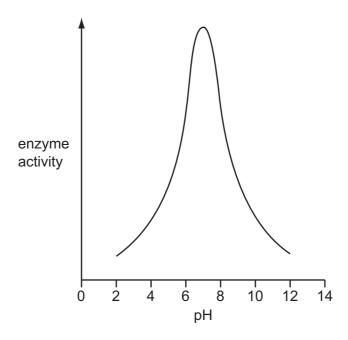


The partition is removed.

What will be the situation in the container one hour later?

- **A** All the oxygen molecules have stopped moving.
- **B** Oxygen molecules are moving in all directions.
- **C** There will be a higher concentration of oxygen on the left than on the right.
- **D** There will be a higher concentration of oxygen on the right than on the left.
- 4 An experiment is carried out to investigate the effect of pH on the activity of an enzyme.

The graph shows the results.



At which pH is this enzyme most active?

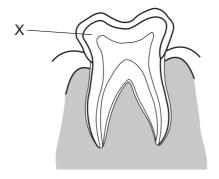
**A** 2

**B** 5

C 7

**D** 12

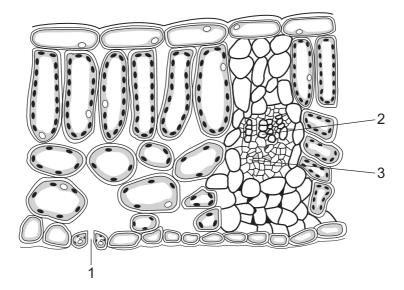
- 5 In leaves, which type of cells surround stomata?
  - A guard cells
  - B palisade cells
  - C phloem
  - **D** xylem
- **6** The diagram shows a section through a tooth.



What is part X?

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

7 The diagram shows a section through a leaf.

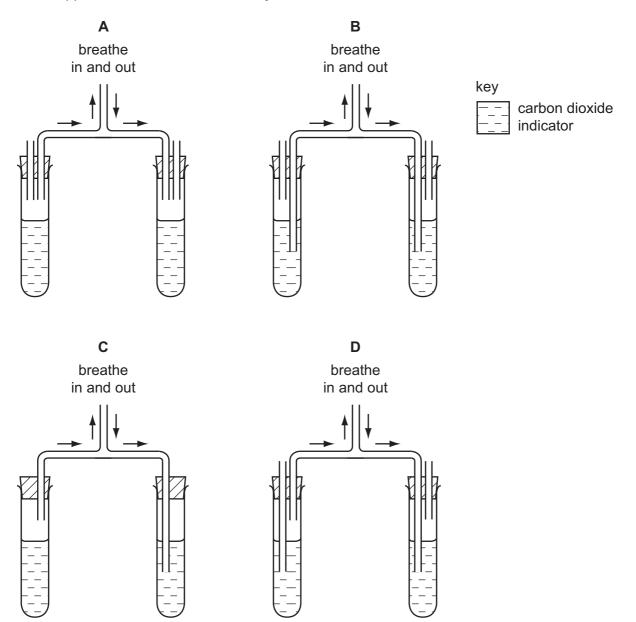


Which part brings water to the leaf and through which part does water leave?

	brings water	water leaves
Α	1	2
В	1	3
С	2	1
D	3	1

**8** Four students assembled apparatus intended to show that air breathed out contains more carbon dioxide than air breathed in.

Which apparatus is assembled correctly?

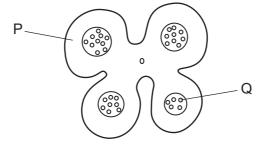


- 9 What are the reactants in aerobic respiration?
  - A carbon dioxide and oxygen
  - B carbon dioxide and water
  - C glucose and oxygen
  - D glucose and water

10 Insulin is a hormone that is secreted into the blood to control blood sugar.

What happens to insulin after it has done its work?

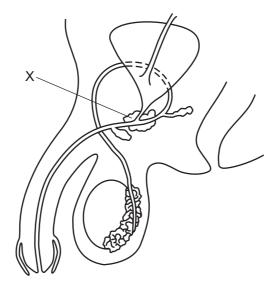
- A It builds up in the blood.
- **B** It is absorbed by the sugar.
- **C** It is destroyed by the pancreas.
- **D** It is removed by the liver.
- **11** The diagram shows a cross-section though part of a stamen of a plant.



## Which row identifies P and Q?

	Р	Q
Α	anther	egg
В	anther	pollen grain
С	stigma	egg
D	stigma	pollen grain

**12** The diagram shows the male reproductive system.



What is the part labelled X?

- A prostate gland
- B sperm duct
- C testis
- **D** urethra

13 The diagram shows a food chain.

tree  $\rightarrow$  caterpillar  $\rightarrow$  bird

Which words describe the caterpillar?

- A carnivore and producer
- B consumer and carnivore
- C consumer and herbivore
- **D** producer and herbivore

**14** Two liquids are separated by fractional distillation.

This is possible because the liquids differ in their

- A boiling points.
- B colour.
- C density.
- **D** solubility in water.

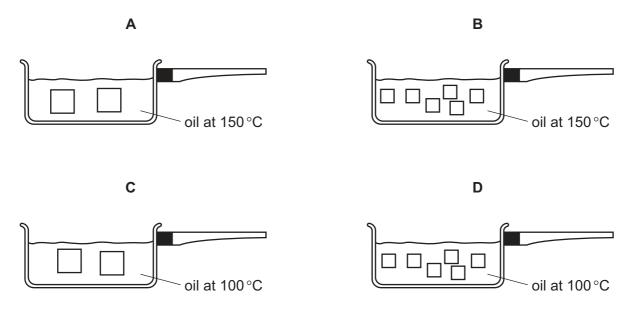
**15** The formulae of two minerals are given below.

name of mineral	formula
andalusite	Al <sub>2</sub> SiO <sub>5</sub>
olivine	Fe <sub>2</sub> Mg <sub>2</sub> SiO <sub>4</sub>

Which statement about the formulae of andalusite and olivine is correct?

- A They contain the same metals.
- **B** They contain the same number of oxygen atoms.
- **C** They contain the same number of silicon atoms.
- **D** They contain the same total number of atoms.
- **16** Which word equation shows a thermal decomposition?
  - A ammonia + nitric acid → ammonium nitrate
  - **B** hydrogen + oxygen → water
  - **C** magnesium carbonate → magnesium oxide + carbon dioxide
  - ${f D}$  potassium chloride + silver nitrate ightarrow potassium nitrate + silver chloride
- 17 A sweet potato is cut into pieces and cooked.

In which pan does the potato cook most quickly?

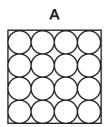


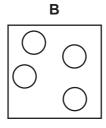
18 Element X forms a basic oxide.

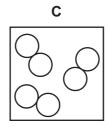
Which row describes element X and its position in the Periodic Table?

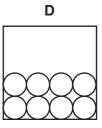
	type of element	position in the Periodic Table
Α	metal	on the left
В	metal	on the right
С	non-metal	on the left
D	non-metal	on the right

19 Which diagram represents gaseous molecules?

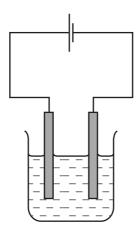








**20** A circuit is set up to pass a current through a solution.



What is added to the circuit to show that a current flows?

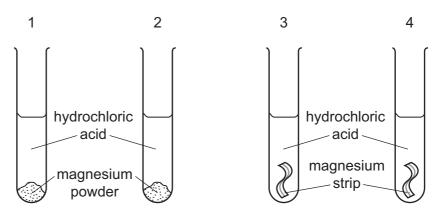
- A an anode
- **B** a battery
- C a cathode
- **D** a lamp

21 The initial and final temperatures of two chemical reactions are shown.

reaction	initial temperature /°C	final temperature
1	19	23
2	20	16

Which statement is correct?

- A Both reactions are endothermic.
- **B** Both reactions are exothermic.
- **C** Reaction 1 is endothermic and reaction 2 is exothermic.
- **D** Reaction 1 is exothermic and reaction 2 is endothermic.
- **22** Magnesium is added to four separate test-tubes containing hydrochloric acid as shown. The mass of magnesium and volume of hydrochloric acid are the same in each test-tube.



test-tube	1	2	3	4
magnesium	powder	powder	strip	strip
hydrochloric acid	dilute	concentrated	concentrated	dilute
temperature	30 °C	50°C	50°C	30°C

Which experiment is the fastest and which experiment is the slowest?

	fastest	slowest
Α	1	2
В	1	4
С	2	3
D	2	4

23 Gasoline is a hydrocarbon fuel obtained from crude oil.

Which statement is correct?

- A Gasoline burns to form carbon dioxide and water.
- **B** Gasoline contains the elements carbon, hydrogen and oxygen.
- **C** Gasoline is used as a fuel for diesel engines.
- **D** The combustion of gasoline is an endothermic reaction.
- **24** The noble gases make up Group 0 of the Periodic Table.

Which statement is correct?

- A Argon exists as non-bonded atoms.
- **B** Krypton is very poisonous.
- **C** Neon burns in pure oxygen with a red flame.
- **D** The chemical formula for helium is He<sub>2</sub>.
- **25** P, Q, R and S are four different elements.

P is a metal that floats on water.

Q is a non-metal and its oxide is coloured.

R is a dense metal.

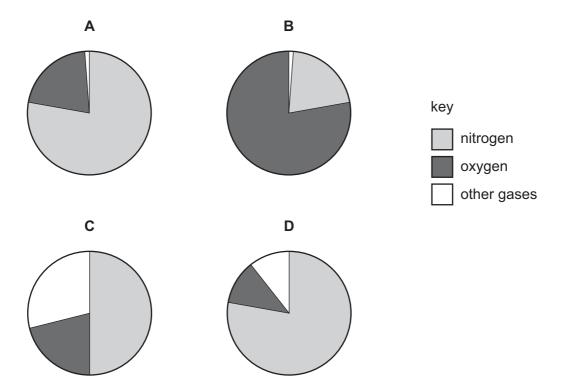
S has a green colour and its boiling point is -35 °C.

Which row describes the elements?

	transition element	non-transition element
Α	P, R	Q, S
В	P, R, S	Q
С	Q, R	P, S
D	R	P, Q S

- **26** Which statement about alloys is correct?
  - A They are made from metals because metals are poor electrical conductors.
  - **B** They are mixtures of compounds that contain metals.
  - **C** They have all the same properties as the metals from which they are made.
  - **D** They have different properties to the metals from which they are made.

27 Which pie chart shows the composition of clean air?

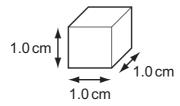


28 A vehicle takes 30 minutes to travel a distance of 60 km.

What is the average speed of the vehicle?

- A 2.0 km/hour
- B 30 km/hour
- C 120 km/hour
- **D** 1800 km/hour

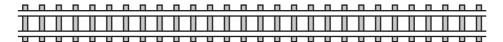
29 A cube of aluminium has sides of length 1.0 cm.



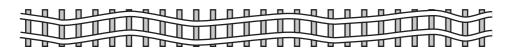
Compared with this cube, which statement about a cube of aluminium with sides of 2.0 cm is correct?

- A It has the same density.
- B It has the same mass.
- C It has twice the density.
- **D** It has twice the mass.

- 30 Which energy resource can be used to obtain electricity without any moving parts?
  - A hydroelectric
  - B solar cells
  - C tides
  - **D** wave
- 31 Which statement describes evaporation?
  - A The most energetic molecules of a liquid escape from the surface into the air.
  - **B** The most energetic molecules of a liquid return to the liquid from the air.
  - **C** The least energetic molecules of a liquid escape from the surface into the air.
  - **D** The least energetic molecules of a liquid return to the liquid from the air.
- **32** A badly designed railway line changes shape when the temperature of the air around it changes by a large amount.



railway line before the temperature change



railway line after the temperature change

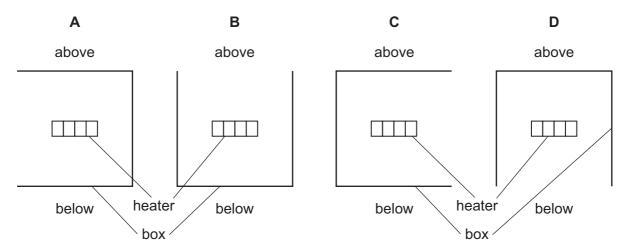
How has the temperature changed, and what change to the railway line has this caused?

	temperature change	change to railway line
Α	decreased	contracted
В	decreased	expanded
С	increased	contracted
D	increased	expanded

**33** An electric heater is placed inside a metal box which has one side open. The diagram shows four possible positions of the box.

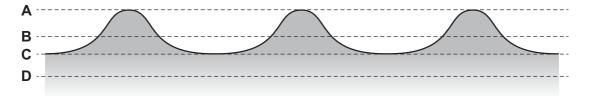
The heater is switched on for several minutes.

In which position does the box become the hottest?



**34** The diagram shows a section through waves on water.

Which dotted line shows the position of the water surface before the wave reaches it?



**35** A plane mirror is on a wall.

Which description of the image formed by the mirror is correct?

- A upright and smaller than the object
- **B** upright and the same size as the object
- C inverted and smaller than the object
- **D** inverted and the same size as the object

**36** Electromagnetic waves are used to scan passengers' luggage before they board an aeroplane.

Electromagnetic waves are also used in a television remote controller.

Which type of electromagnetic wave is used for each of these purposes?

	scanning luggage	television remote controller
Α	radio waves	infra-red waves
В	radio waves	ultraviolet waves
С	X-rays	infra-red waves
D	X-rays	ultraviolet waves

**37** A woman hammers a post into the ground.

A boy starts a stop-watch when he sees the hammer hit the post. He stops the stop-watch when he hears the sound of the hammer hitting the post.

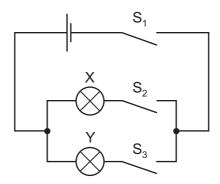
The stop-watch reading is 0.60 seconds.

The speed of sound in air is 330 m/s.

What is the distance between the boy and the post?

- **A** 99 m
- **B** 198 m
- **C** 275 m
- **D** 550 m

38 The diagram shows an electric circuit.

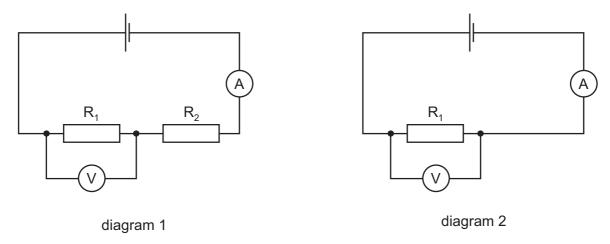


Which switches should be closed so that lamp X is lit but lamp Y is not lit?

- $\mathbf{A}$  S<sub>1</sub>, S<sub>2</sub> and S<sub>3</sub>
- **B**  $S_1$  and  $S_2$  only
- C S<sub>1</sub> and S<sub>3</sub> only
- **D**  $S_2$  and  $S_3$  only

- 39 Why is a fuse used in an electric circuit in a house?
  - A to increase the resistance of the circuit
  - **B** to keep the power used at a constant value
  - C to prevent a short circuit from occurring
  - D to stop the cables overheating
- **40** Diagram 1 shows two identical resistors R<sub>1</sub> and R<sub>2</sub> connected in series in a circuit.

In diagram 2, R<sub>2</sub> has been removed.



What has happened to the reading on the ammeter and what has happened to the reading on the voltmeter in diagram 2?

	ammeter	voltmeter
Α	decreases	decreases
В	decreases	increases
С	increases	decreases
D	increases	increases

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DATA SHEET
The Periodic Table of the Elements

	0	<sup>₽</sup> He	Helium 2	20	Ne	Neon 10	40	Ā	Argon 18	84	첫	Krypton 36	131	Xe	Xenon 54		Rn	Radon 86				175	3	Lutetium 71		בֿ	Lawrencium 103
	IIA			19	ш	Fluorine 9	35.5	Cl	Chlorine 17	80	ğ	Bromine 35	127	н	lodine 53		Ą	Astatine 85				173	Υp	Ytterbium 70		9 N	Nobelium 102
	IN			16	0	Oxygen 8	32	S	Sulfur 16	79	Se	Selenium 34	128	<u>e</u>	Tellurium 52		Ро	Polonium 84				169	ш			Md	Mendelevium 101
	>			41	z	Nitrogen 7	31	۵	Phosphorus 15	75			122	Sb	Antimony 51	209	ā	Bismuth 83				167	ш	Erbium 68		Fm	Fermium 100
	<u>\</u>			12	ပ	Carbon 6	28	Si	Silicon 14	73		Germanium 32		Sn		207	Pb	Lead 82				165	운	Holmium 67		Es	Einsteinium 99
	III			11	Ω	Boron 5	27	ΝI	Aluminium 13	70	Ga	Gallium 31	115	In	Indium 49	204	11	Thallium 81				162	۵	Dysprosium 66		ర	Californium 98
										65	Zn	Zinc 30	112	င္ပ	Cadmium 48	201	Hg	Mercury 80				159	Д	Terbium 65		æ	Berkelium 97
										64	Cn	Copper 29	108	Ag		197	Ρn	Gold 79				157	gq	Gadolinium 64		Cm	
Group										29	Z	Nickel 28	106	Pd	Palladium 46	195	ጟ	Platinum 78				152	Ē	Europium 63		Am	Americium 95
ភ្ជ				1						59	ပိ	Cobalt 27	103	몺	Rhodium 45	192	ä	Iridium 77				150	Sm	Samarium 62		Pu	Plutonium 94
		- <b>I</b>	Hydrogen 1							56	Ьe	Iron 26	101	Ru	Ruthenium 44	190	SO.	Osmium 76						Promethium 61		N	Neptunium 93
										55	Mn	Manganese 25			Technetium 43	186	Re	Rhenium 75				144	P	Neodymium 60	238	_	Uranium 92
										52	ပ်	Chromium 24	96	Mo	Molybdenum 42	184	≥	Tungsten 74				141	P	Praseodymium 59		Ра	Protactinium 91
										51	>	Vanadium 23	93	Q N	Niobium 41	181	Та	Tantalum 73				140	ဝီ	Cerium 58	232	드	Thorium 90
										48	F	Titanium 22	91	Z	Zirconium 40	178	Ξ	Hafnium 72							nic mass	loqi	nic) number
										45	လွ	Scandium 21	88	>	Yttrium 39	139	Гa	Lanthanum 57 *	227	Ac	Actinium 89	l cariae	orioe	501103	a = relative atomic mass	X = atomic symbol	b = proton (atomic) number
	=			6	Be	Beryllium 4	24	Mg	Magnesium 12	40	Ca	Calcium 20	88	s	Strontium 38	137	Ва	Barium 56	226	Ra	Radium 88	*58_71 Lanthanoid series	30-7 1 Earninailoid series	י מוסוווסע	a a	×	φ 
	_			7	=	Lithium 3	23	Na	Sodium 11	39	¥	Potassium 19	85	Rb	Rubidium 37	133	Cs	Caesium 55	ı	Ē	Francium 87	*58-71	100-103	001-00-		Key	٥

The volume of one mole of any gas is 24 dm<sup>3</sup> at room temperature and pressure (r.t.p.).

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