

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

CO-ORDINATED SCIENCES

Paper 1 Multiple Choice

0654/12 October/November 2013 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. 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.

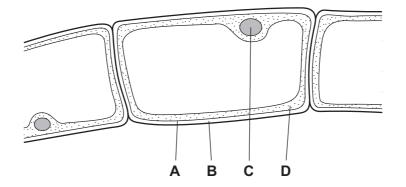
This document consists of 18 printed pages and 2 blank pages.



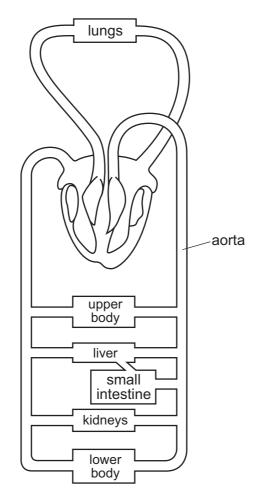
[Turn over



The diagram shows part of an organism that lives in water, magnified by a microscope.Which part shows that the organism **must** be a plant?



2 The diagram shows the blood circulatory system of a human.



How many times must a blood cell pass through the heart on its way from the kidneys to the aorta?

- A once only
- B twice only
- **C** four times
- D more than four times

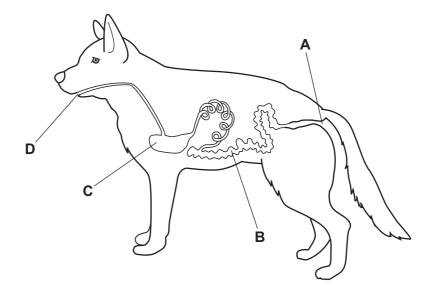
0654/12/O/N/13

- 3 Which statement about blood components is correct?
 - A Platelets make antibodies.
 - **B** Platelets transport oxygen.
 - **C** White blood cells carry out phagocytosis.
 - **D** White blood cells transport carbon dioxide.
- 4 Which row shows a chemical molecule and the basic unit from which it is made?

	chemical molecule	basic unit
Α	glycogen	amino acid
в	glycogen	simple sugar
С	oil	amino acid
D	oil	simple sugar

5 The diagram shows the alimentary canal of a dog.

Where does egestion occur?



- 6 What is the meaning of homeostasis?
 - A breathing faster after exercise
 - B getting rid of carbon dioxide from the lungs
 - **C** keeping conditions in the body constant
 - **D** preventing the body from getting too hot

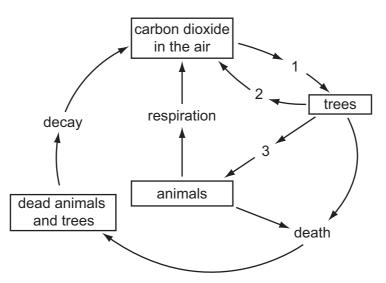
[Turn over

- 7 Which is not a way that liver cells use energy?
 - A cell division
 - **B** heat production
 - C movement
 - **D** protein synthesis
- 8 What does the central nervous system consist of?
 - A brain and peripheral nerves
 - B brain and spinal cord
 - **C** brain only
 - D spinal cord only
- **9** In mice, the allele for black fur is dominant to the allele for white fur. Two heterozygous mice mate.

What colour are the offspring likely to be?

- A all black
- B some black and some white
- C all grey
- D all white
- 10 In a plant, what leads to offspring that are identical to the parent?
 - A asexual reproduction
 - B insect-pollination
 - C seed germination
 - D sexual reproduction
- **11** Pollination is the transfer of pollen
 - A from anther to sepal.
 - **B** from anther to stigma.
 - **C** from sepal to anther.
 - **D** from stigma to anther.

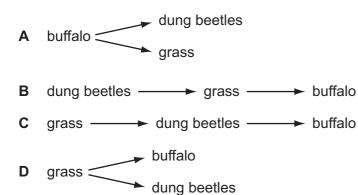
12 The diagram shows part of the carbon cycle in a forest. The numbers represent different processes.



Which of these processes is reduced as a result of deforestation?

- A 1 only
- **B** 1 and 2 only
- C 2 and 3 only
- **D** 1, 2 and 3
- **13** Dung beetles lay their eggs in the faeces of plant-eating mammals like buffalo. Both the adult beetles and their young stages eat the **undigested** food in the faeces.

Which shows this food relationship?



[Turn over

5

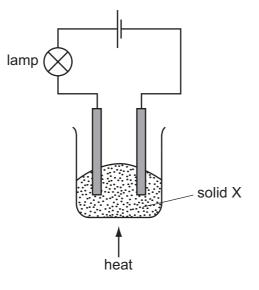
14 Substance Q is used to make a cooking pan.



What are the properties of substance Q?

	melting point	thermal conductivity		
Α	high	high		
В	high	low		
С	low	high		
D	low	low		

15 The experiment shown is used to investigate the properties of solid X.



At first, the lamp does not light.

On heating, solid X melts and the lamp lights.

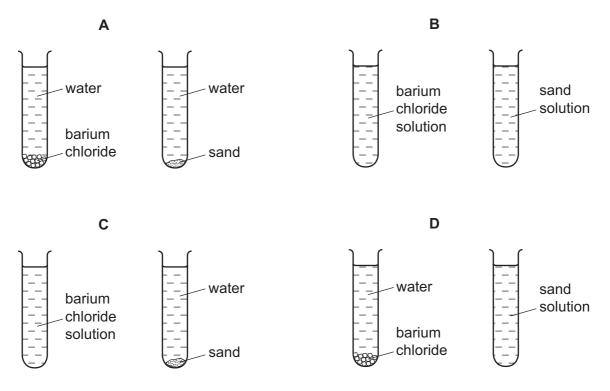
What type of substance is X?

- A a compound of a metal and a non-metal
- **B** a compound of two non-metals
- C a metallic element
- D a non-metallic element

16 Small amounts of barium chloride and sand are shaken with separate samples of water in two test-tubes. The test-tubes are left to stand for 24 hours.

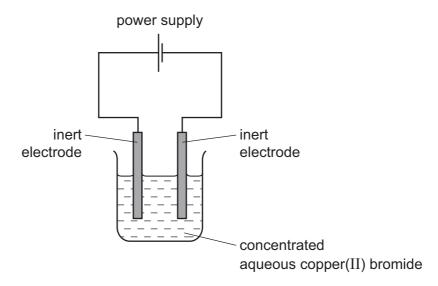
7

Which diagram shows how the test-tubes appear at the end?



17 The diagram shows the circuit for electrolysing concentrated aqueous copper(II) bromide.

Copper(II) bromide is similar to copper(II) chloride.



Which row describes the products at each electrode?

	cathode	anode		
Α	bromine	copper		
В	copper	bromine		
С	copper oxygen			
D	hydrogen	bromine		

18 Hydrogen can occur as an atom, an ion and a molecule.

Which row represents these particles?

	atom	ion	molecule
Α	н	H⁺	H_2
в	н	H_2	H⁺
с	H⁺	н	H_2
D	H_2	H⁺	н

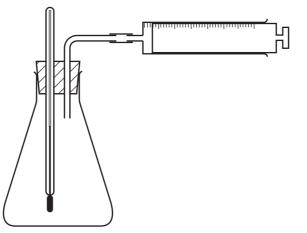
© UCLES 2013

19 The table shows the temperature of some water before and after a solid is dissolved in it.

Which change is the most exothermic?

	temperature before /°C	temperature after /°C
Α	20	18
В	20	40
С	25	18
D	25	42

20 The apparatus below is used to investigate the speed of a chemical reaction.



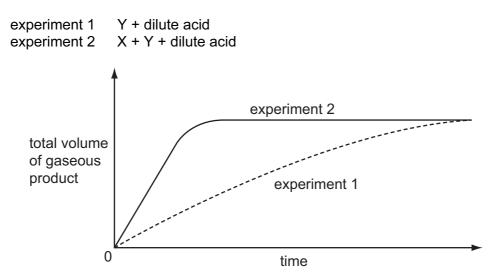
For which reaction is the apparatus suitable?

- **A** gas E + gas F \rightarrow liquid G only
- $\textbf{B} \quad \text{solid H} + \text{ solution I} \rightarrow \text{ solution J only}$
- $\textbf{C} \quad \text{solid K} \ \textbf{+} \ \textbf{solution L} \ \rightarrow \ \textbf{solution M} \ \textbf{+} \ \textbf{gas N}$
- $\textbf{D} \quad \text{solution P} \ \textbf{+} \ \text{solution Q} \ \rightarrow \ \textbf{solid} \ \textbf{R} \ \textbf{+} \ \textbf{solution Q}$

[Turn over

21 Substance X does not react with dilute acid. Substance Y reacts with dilute acid, forming a gas.

The graph shows the results of two experiments.



What do these results show?

	X is a catalyst	X is quickly used up	
Α	\checkmark	\checkmark	key
в	\checkmark	x	✓ = true
С	x	\checkmark	x = false
D	x	x	

22 The elements in a Group of the Periodic Table are solid at 20 °C.

The reactivity of the elements increases down the group.

Which statements about this group of elements and their oxides are correct?

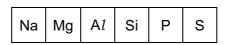
	the elements are in	their oxides are
Α	Group I	acidic
в	Group I	basic
с	Group VII	acidic
D	Group VII	basic

23 A label from a packet of indigestion tablets is shown.

Each tablet contains:	
magnesium carbonate	120 mg
magnesium hydroxide	15 mg
magnesium oxide	62 mg
magnesium sulfate	47 mg

Which substance does not neutralise stomach acid?

- A magnesium carbonate
- B magnesium hydroxide
- **C** magnesium oxide
- **D** magnesium sulfate
- 24 The elements from sodium to sulfur are in the same period of the Periodic Table.



Which trend does not occur across the Periodic Table from sodium to sulfur?

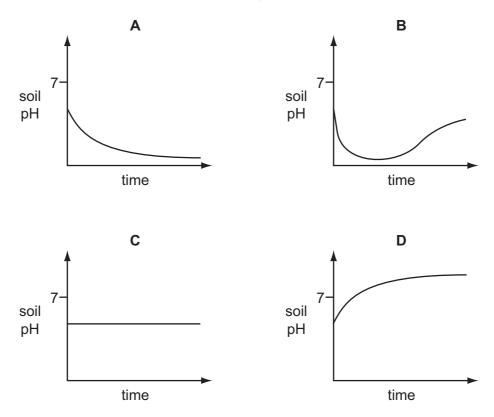
- A The chlorides of the elements change from covalent to ionic.
- **B** The elements change from good to poor electrical conductors.
- **C** The oxides of the elements change from basic to acidic.
- **D** The solid elements change from malleable to brittle.
- **25** Which type of reaction and which temperature change take place when an acid reacts with an alkali?

	type of reaction	temperature change
Α	endothermic	decrease
в	endothermic	increase
С	exothermic	decrease
D	exothermic	increase

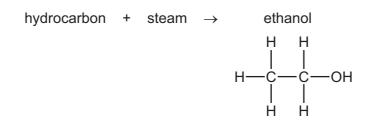
[Turn over

www.xtrapapers.com

26 Which graph shows how the pH of the soil changes when lime is added?



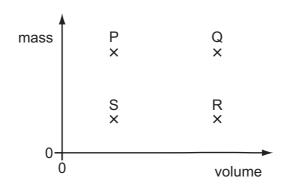
27 Ethanol can be made by reacting steam with a hydrocarbon.



What is the name of the hydrocarbon?

- A ethane
- B ethene
- C methane
- D propene

28 The diagram shows a graph with values of mass against volume for four different objects P, Q, R and S.



Which two objects have the same density?

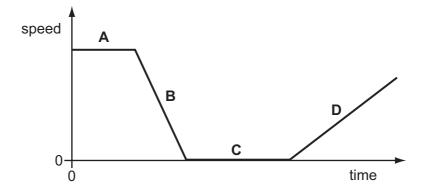


29 An aeroplane flies at a constant speed and height for several hours.

Which type of energy must change during this part of the flight?

- A the gravitational energy of the aeroplane
- **B** the kinetic energy of the aeroplane
- **C** the store of chemical energy in the fuel tank of the aeroplane
- **D** the thermal energy of the aeroplane
- **30** The graph shows the motion of a train during part of a journey.

At which labelled point on the graph could the train be waiting at a station?



31 A sample of liquid is allowed to cool for 20 minutes. Its temperature is recorded every two minutes.

The results are shown in the table.

time/minutes	0	2	4	6	8	10	12	14	16	18	20
temperature/°C	90.8	80.9	74.1	67.4	61.9	57.0	53.0	50.2	48.5	47.3	46.1

How should the sample be described at the end of the 20 minutes?

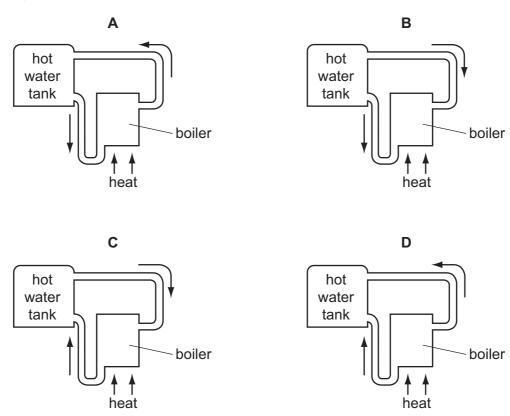
- **A** all liquid
- **B** all solid
- **C** in the process of boiling
- **D** in the process of solidifying
- 32 Liquid in a beaker evaporates quickly.

Which row shows what happens to the mass and to the temperature of the liquid in the beaker?

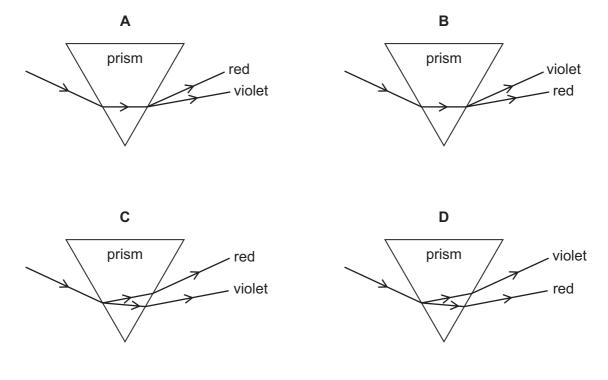
	mass	temperature
Α	decreases	decreases
в	decreases	increases
С	increases	decreases
D	increases	increases

33 The diagrams show part of a water-heating system which is working by convection.

Which diagram shows the flow of water in the system?



34 Which diagram shows the dispersion of white light as it passes through a glass prism?

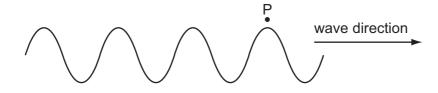


[Turn over

0654/12/O/N/13

© UCLES 2013

35 A student counts how many waves pass point P in 30 seconds.



Using only this information, what can the student calculate?

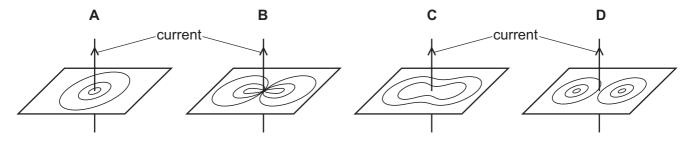
- **A** the amplitude of the wave
- B the frequency of the wave
- **C** the speed of the wave
- **D** the wavelength of the wave
- **36** What is the approximate value of the frequency of the highest-pitched sound that can be heard by a young person?

A 20 Hz **B** 200 Hz **C** 2000 Hz **D** 20 000 Hz

37 Which row shows how the speed and the wavelength of microwaves compare with those of γ (gamma)-rays?

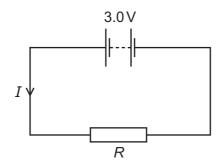
	speed	wavelength
Α	less than γ -rays	greater than γ -rays
в	less than γ -rays	less than γ -rays
С	the same as γ -rays	greater than γ -rays
D	the same as γ -rays	less than γ -rays

38 Which diagram shows the magnetic field pattern around a straight wire carrying a current?



© UCLES 2013

39 The circuit shows a current *I* in a resistor of resistance *R*.



Which row gives possible values of I and of R?

	I/A	R/Ω
Α	1.5	1.5
В	1.5	2.0
С	6.0	2.0
D	4.0	12.0

40 A proton has charge *q* and mass *m*. A neutron has no charge and mass *m*.

Which row shows the charge and mass of an α -particle?

	charge	mass
Α	2 <i>q</i>	2 <i>m</i>
в	2q	4 <i>m</i>
С	4 <i>q</i>	2 <i>m</i>
D	4 <i>q</i>	4 <i>m</i>

BLANK PAGE

BLANK PAGE

		0	4 He		0	Ne	uo	40	Ar	Argon	4	Kr	Krypton	131	Xe	Xenon		Rn	Radon			175	Lu			Lr wrencium											
		0		2	10	z	10 Ne	4	<	18 18	80	×	36 Kry	÷	×	54 Xer			86				Lutetium	71	-		103										
		١١			19	ш	Fluorine 9	35.5	CI	Chlorine 17	80	B	Bromine 35	127	н	lodine 53		At	Astatine 85			173	Ytterbium	70	-	Nobelium	102										
		N			16	0	Oxygen 8	32	S	Sulfur 16	62	Se	Selenium 34	128	Te	Tellurium 52		Ро	Polonium 84			169	T Thulium	69		Mendelevium	101										
		>			14	z	Nitrogen 7	31	٩	Phosphorus 15	75	As	Arsenic 33	122	Sb	Antimony 51	209	B	Bismuth 83			167	Erbium m	68	L	Fermium Fermium	100										
		2													12	ပ	6 6	28	Si	Silicon 14	73	e B	Germanium 32	119	Sn	Tin 50	207	Pb	Lead 82			165	Holmium	67	L	Einsteinium	66
		≡			11	B	Boron 5	27	A1	Aluminium 13	70		Gallium 31		In	Indium 49	204	11	Thallium 81			162	Dy	66	č	Californium	98	pressure									
ents											65	Zn	Zinc 30	112	Cd	Cadmium 48	201	Hg	Mercury 80			159	Terbium Terbium	65	ā	Berkelium		ature and									
DATA SHEET The Periodic Table of the Elements											64	Cu	Copper 29	108	Ag	Silver 47	197	Au	Gold 79			157	Gadolinium Gadolinium	64	Ċ	orrim B		The volume of one mole of any gas is 24 ${ m dm}^3$ at room temperature and pressure (r.t.p.)									
	Group										59	ïZ	Nickel 28	106	Pd	Palladium 46	195	Ŧ	Platinum 78			152	Eu	. 63		Amancium	95	n³ at roor									
DAT/ iodic Ta	Gr				-						59	ပိ	Cobalt 27	103	Rh	Rhodium 45	192	ŗ	Iridium 77			150	Samarium	62	Ċ	Plutonium	94	as is 24 dı									
The Peri			T T	1							56	Fe	lron 26	101	Ru	Ruthenium 44	190	0s	Osmium 76				Pamethium	61		Neptunium	93	of any ga									
											55	Mn	Manganese 25		ЦС	Technetium 43	186	Re	Rhenium 75			144		. 09	238	Uranium	92	one mole									
											52	ບັ	Chromium 24	96	Mo	Molybdenum 42	184	3	Tungsten 74			141	Praseodvmium	59	c.	Protactinium	91	olume of o									
											51	>	Vanadium 23	93	٩N	Niobium 41	181	Ta	Tantalum 73			140	Certium	58	232	Thorium	90	The v									
											48	F	Titanium 22	91	Zr	Zirconium 40	178	Ħ	Hafnium 72			7			nic mass	DOI	nic) number										
											45	Sc	Scandium 21	68		Yttrium 39	139	La	Lanthanum 57 *	227	AC Actinium 89	series	eries		a = relative atomic mass	X = atomic symbol	p = proton (atomic) number										
		=			6	Be	Beryllium 4	24	Mg	Magnesium 12	40	Ca	Calcium 20	88	Sr	Strontium 38	137	Ba	Barium 56	226	Radium 88	*58-71 Lanthanoid series	90-103 Actinoid series			×											
		_			7	5	Lithium 3	23	Na	Sodium 11	39	¥	Potassium 19	85	Rb	Rubidium 37	133	Cs	Caesium 55	L	Francium 87	*58-711	190-103	L	2	key	٩										

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.

0654/12/O/N/13

www.xtrapapers.com

PAPA CAMBRIDGE

20