

Cambridge IGCSE[™] (9–1)

CO-ORDINATED SCIENCES

Paper 1 Multiple Choice (Core)

0973/11 May/June 2022 45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet Soft clean eraser Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- 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 multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

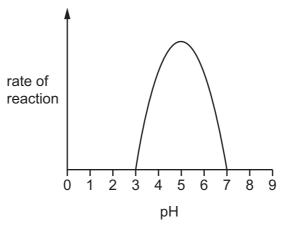
INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has 16 pages. Any blank pages are indicated.

- 1 Which statement about one of the characteristics of living organisms is correct?
 - A Excretion is the removal of excess substances and toxic materials.
 - **B** Movement is the ability to detect and respond to changes in the environment.
 - **C** Nutrition is the maintenance of a constant internal environment.
 - **D** Respiration is the manufacture of nutrients from raw materials.
- 2 Which statement about animal cells and plant cells is correct?
 - A Only animal cells possess cell membranes.
 - **B** Only animal cells possess cell walls.
 - **C** Only plant cells possess cell membranes.
 - **D** Only plant cells possess cell walls.
- 3 Which small molecules are joined together to make a starch molecule?
 - A amino acids
 - B fatty acids
 - C glucose
 - D glycerol
- **4** Fungus can live at the base of human hair where the activity of one of its enzymes can cause dry skin.

The graph shows the action of the fungal enzyme at different pH values.



Different shampoos have different pH values.

Which shampoo causes the greatest amount of dry skin?

A pH3 **B** pH5 **C** pH7 **D** pH9

5 A student places a plant in the dark for 24 hours.

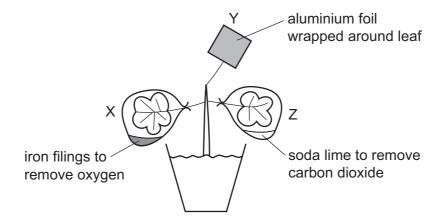
Aluminium foil is then placed around one leaf.

A second leaf is sealed in a bag with soda lime to remove carbon dioxide.

A third leaf is then sealed in a bag with iron filings to remove oxygen.

The plant is then left in the light for a further 24 hours.

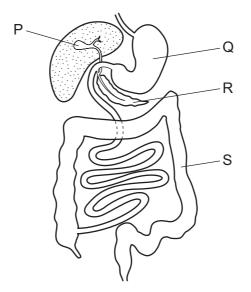
The diagram shows the experiment.



Which leaves would turn blue-black when tested with iodine solution?

	Α	X only	В	X and Y	С	Y and Z	D Zo	nly
--	---	--------	---	---------	---	---------	------	-----

6 The diagram shows part of the digestive system.



Which labelled parts produce digestive enzymes, absorb water and store bile?

	produce digestive enzymes	absorb water	store bile
Α	Р	Q	R
в	Q	R	Р
С	R	S	Р
D	S	Р	R

- 7 Where does evaporation of water occur during transpiration?
 - A from the air spaces through the stomata
 - **B** from the phloem
 - **C** from the surfaces of mesophyll cells
 - **D** from the xylem
- 8 What are the products of aerobic respiration?
 - 1 carbon dioxide
 - 2 glucose
 - 3 water
 - **A** 1 and 2 only **B** 1 and 3 only **C** 1, 2 and 3 **D** 2 and 3 only

www.xtrapapers.com

9 A plant in a pot is placed on its side in a dark cupboard. The shoots grow upwards.

What is this an example of?

- A decomposition
- **B** gravitropism
- **C** photosynthesis
- **D** phototropism
- **10** Which statement about asexual reproduction is correct?
 - A It involves the fusion of gametes from one parent.
 - **B** It involves the fusion of gametes from two parents.
 - **C** It produces offspring which are genetically different.
 - **D** It produces offspring which are genetically identical.
- **11** Purple flower colour is dominant to white flower colour.

Which parents must be crossed to make sure all the offspring have white flowers?

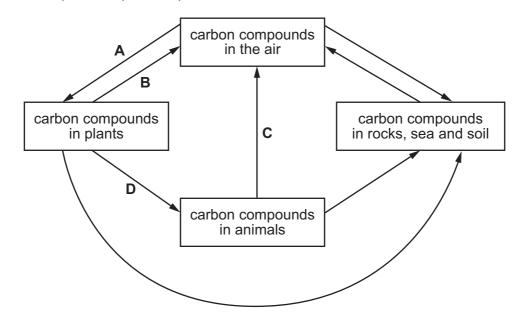
- **A** homozygous dominant × heterozygous
- **B** homozygous dominant × homozygous dominant
- **C** homozygous recessive × heterozygous
- **D** homozygous recessive × homozygous recessive
- 12 Which organisms can be described as producers and herbivores in the food chain shown?

diatoms \rightarrow copepods \rightarrow amphipods

	producers	herbivores
Α	amphipods	copepods
В	amphipods	diatoms
С	diatoms	amphipods
D	diatoms	copepods

13 The diagram shows part of the carbon cycle.

Which arrow represents plant respiration?



14 A mixture contains solid P dissolved in liquid Q.

Which process is used to obtain a pure sample of liquid Q from this mixture?

- A crystallisation
- **B** distillation
- **C** evaporation
- **D** paper chromatography
- **15** Three different processes are listed.
 - 1 heating ice to form water
 - 2 lighting a match
 - 3 removing zinc from sodium chloride solution by filtration

Which processes are physical changes?

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

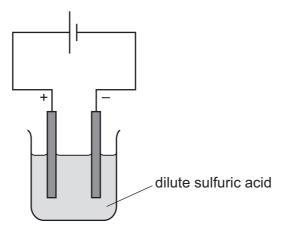
16 Propanol, CH₃CH₂CH₂OH, burns in oxygen to produce carbon dioxide and water.

$$2CH_3CH_2CH_2OH + 9O_2 \rightarrow xCO_2 + yH_2O$$

Which values of *x* and *y* balance the equation?

	x	У
Α	3	4
в	3	8
С	6	4
D	6	8

17 The diagram shows the electrolysis of dilute sulfuric acid using inert electrodes.



Which row shows the products formed at each electrode and describes the bonding in sulfuric acid?

	anode	cathode	type of bonding
Α	oxygen	hydrogen	ionic
в	oxygen	hydrogen	covalent
С	hydrogen	oxygen	ionic
D	hydrogen	oxygen	covalent

18 Hydrogen reacts with iodine to form hydrogen iodide.

The equation for this reaction is shown.

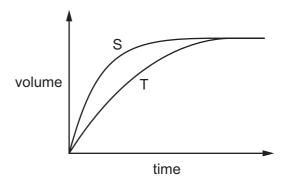
$$H_2 \ + \ I_2 \ \rightarrow \ 2HI$$

During this reaction the temperature increases.

Which statement explains why the temperature increases?

- A One molecule of hydrogen is forming two molecules of hydrogen iodide.
- **B** The reaction is exothermic.
- **C** The reaction is very fast.
- **D** The reaction takes in energy.
- **19** A fixed mass of a solid is reacted with a liquid.

The volume of gas given off from the reaction over time is shown by line S.



Which change to the reaction conditions produces line T on the graph?

- A increasing the amount of catalyst added
- **B** increasing the concentration of the liquid
- **C** increasing the particle size of the solid
- **D** increasing the temperature of the reaction
- 20 Which row shows the flame test colours for lithium and sodium?

	lithium	sodium
Α	lilac	blue-green
В	lilac	yellow
С	red	blue-green
D	red	yellow

21 A gas is used in welding metals together at high temperatures.

The gas is used to provide an inert atmosphere.

What is the gas?

- A argon
- B carbon dioxide
- **C** fluorine
- D oxygen
- 22 Which row does not link a general physical property to the type of element?

	type of element	general physical property
Α	metal	malleable
в	metal	thermal conductor
С	non-metal	electrical conductor
D	non-metal	low melting point

23 Three metals X, Y and Z are added separately to water and to dilute hydrochloric acid.

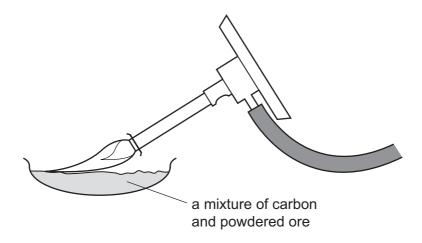
The results are shown.

metal	result with water	result with dilute hydrochloric acid	
x	X	1	key
Y	\checkmark	\checkmark	\checkmark = hydrogen is given off
Z	X	X	x = hydrogen is not given off

What is the order of reactivity of X, Y and Z?

	most reactive		least reactive
Α	х	Z	Y
В	Y	Х	Z
С	Y	Z	х
D	Z	Х	Y

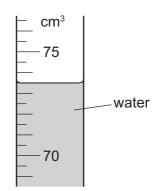
24 The diagram shows a metal being extracted from its powdered ore using carbon.



What happens to the ore in this reaction?

- A It burns.
- B It decomposes.
- **C** It is oxidised.
- D It is reduced.
- 25 Which statement about the treatment of the water supply is correct?
 - A Chlorination is used to improve the taste of the water.
 - B Chlorination is used to kill bacteria.
 - **C** Filtration is used to adjust the pH of the water.
 - **D** Filtration is used to remove soluble impurities.
- 26 Why do farmers add limestone to soil?
 - A It acts as a fertiliser.
 - **B** It adds nitrogen to the soil.
 - **C** It decreases the pH of the soil.
 - **D** It increases the pH of the soil.
- 27 Which method is used to make ethanol?
 - **A** fermentation of sugar by yeast
 - **B** reacting ethane with bromine
 - **C** reacting ethene with bromine
 - **D** reacting methane with steam

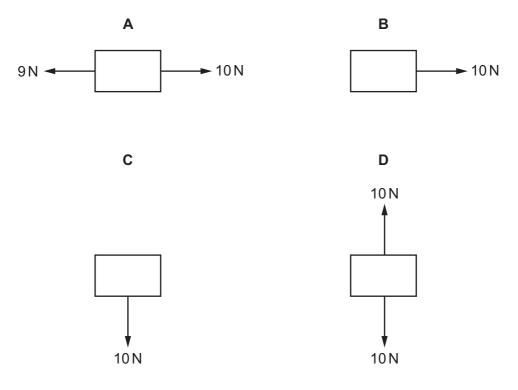
28 The diagram shows the level of water in a measuring cylinder.



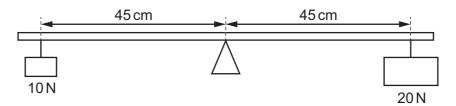
What is the volume of water in the measuring cylinder?

- **A** 73.5 cm³ **B** 74.0 cm³ **C** 76.5 cm³ **D** 77.0 cm³
- **29** The diagrams show the only forces acting on four moving objects.

Which object is travelling at constant speed?



30 A uniform plank is placed on a pivot, with its centre immediately above the pivot. A load of 10 N is suspended on the left, 45 cm from the pivot, and a load of 20 N is suspended on the right, 45 cm from the pivot.



What happens to the plank?

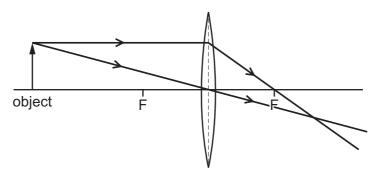
- **A** The left-hand side moves down, the right-hand side moves up and the plank does not return to its horizontal position.
- **B** The left-hand side moves up, the right-hand side moves down and the plank does not return to its horizontal position.
- **C** The plank moves down on one side then returns to its horizontal position.
- **D** The plank remains horizontal without moving.
- **31** A student walks up some steps at constant speed.

Which two quantities provide enough information so that the useful power produced by the student can be calculated?

- **A** the weight of the student and the time taken
- **B** the weight of the student and the total height of the steps
- **C** the work done by the student and the time taken
- **D** the work done by the student and the total height of the steps
- 32 Which energy resource does not use a turbine and generator to produce electricity?
 - A geothermal
 - B nuclear fission
 - C solar cells
 - **D** wind
- 33 What happens to the temperature of a substance as it is melting and as it is boiling?

	melting	boiling
Α	decreases	increases
в	decreases	no change
С	increases	increases
D	no change	no change

34 The diagram shows light from an object passing through a converging lens to form an image.



Which description of the image is correct?

- A diminished and inverted
- **B** diminished and upright
- **C** enlarged and inverted
- **D** enlarged and upright
- 35 Which statement about sound is correct?
 - A An echo is produced by refraction of sound waves.
 - **B** The amplitude of a sound wave affects the pitch of a sound.
 - **C** The approximate range of audible frequencies for a human is 20 Hz–20 kHz.
 - **D** Sound waves travel more quickly in a vacuum than in air.
- **36** A plastic rod is rubbed with a cloth and the rod becomes positively charged.

Why does this happen?

- A Electrons move from the cloth to the rod.
- **B** Electrons move from the rod to the cloth.
- **C** Protons move from the cloth to the rod.
- **D** Protons move from the rod to the cloth.

37 Which row shows how lamps are connected in a lighting circuit in a house and gives an advantage of connecting them in this way?

	how lamps are connected	advantage of connecting them in this way
Α	in parallel	they can be switched separately
В	in parallel	they share the voltage
С	in series	they can be switched separately
D	in series	they share the voltage

38 A 240 V mains lamp operating normally has a working resistance of 480Ω .

Which rating of fuse is most suitable to use with this lamp?

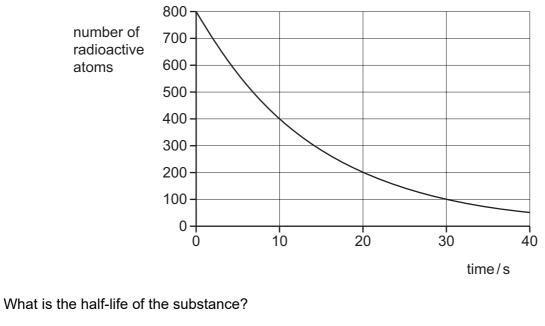
A 0.4A **B** 1A **C** 2A **D** 4A

39 An atom of beryllium is represented by ${}_{4}^{9}$ Be.

How many neutrons are in the nucleus of this type of beryllium atom?

A 4 **B** 5 **C** 9 **D** 13

40 A pure sample of a radioactive substance decays. The graph shows how the number of these radioactive atoms in the sample changes with time.



A 10s **B** 20s **C** 30s **D** 40s

BLANK PAGE

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.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

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

The Periodic Table of Elements

			a'	E		0				ç			uc		~	E			ç										
	>	2	Ť	heliu 4	10	ž	neon 20	18	Ā	argc 40	36	Ā	krypt 84	54	×	xenc 131	86	Å	rado										
					6	ш	fluorine 19	17	Cl	chlorine 35.5	35	Ъ	bromine 80	53	Ι	iodine 127	85	At	astatine	1									
5	>				8	0	oxygen 16	16	ა	sulfur 32	34	Se	selenium 79	52	Te	tellurium 128	84	Ро	polonium	116	L<	livermorium -							
>	>				7	z	nitrogen 14	15	٩	phosphorus 31	33	As	arsenic 75	51	Sb	antimony 122	83	Ē	bismuth	607									
≥	2				9	ပ	carbon 12	14	Si	silicon 28	32	Ge	germanium 73	50	Sn	tin 119	82	Pb	lead	114	Fl	flerovium 							
≡	≡				5	ш	boron 11	13	Ρl	aluminium 27	31	Ga	gallium 70	49	In	indium 115	81	11	thallium	404									
											30	Zn	zinc 65	48	Cd	cadmium 112	80	Hg	mercury	112	C	copemicium -							
											29	Cu	copper 64	47	Ag	silver 108	79	Au	gold	111	Rg	roentgenium -							
Group											28	ïZ	nickel 59	46	Ъd	palladium 106	78	Ę	platinum 405	110	Ds	darmstadtium -							
Gro											27	ပိ	cobalt 59	45	Rh	rhodium 103	77	Ir	iridium 100	109	Mt	meitnerium -							
			т	hydrogen 1							26	Ге	iron 56	44	Ru	ruthenium 101	76	SO	osmium	108	Hs	hassium _							
					1						25	Mn	manganese 55	43	Lc	technetium -	75	Re	rhenium 1 oc	107	Bh	bohrium –							
								loc	ISS				24	ŗ	chromium 52	42	Mo	molybdenum 96	74	8	tungsten	106	Sg	seaborgium -					
					Key	atomic number	atomic numb∈	atomic numb€	atomic numbe	atomic symbo	atomic numbe mic sym	atomic numbe mic sym	atomic numbe mic sym	name relative atomic mass				23	>	vanadium 51	41	qN	niobium 93	73	Та	tantalum	105	Db	dubnium –
					Ø	ato	rela				22	F	titanium 48	40	Zr	zirconium 91	72	Ŧ	hafnium 170	104	Rf	rutherfordium -							
											21	Sc	scandium 45	39	≻	yttrium 89	57-71	lanthanoids		89-103	actinoids								
=	=				4	Be	beryllium 9	12	Mg	magnesium 24	20	Ca	calcium 40	38	ي ا	strontium 88	56	Ba	barium	88	Ra	radium -							
-	-				е	:	lithium 7	11	Na	sodium 23	19	¥	potassium 39	37	Rb	rubidium 85	55	Cs	caesium	87	Fr	francium 							

La Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm lanthauum centum prasedomium neodynium neodynium promethium auropium gadoinium terbium dysposium homium eebium tutulium 139 140 141 144 – 150 157 159 165 165 165 165 167 169 89 90 91 92 93 94 95 96 97 98 99 100 101 169 AC Th Pa U Np Pu Am Cm BK Cf Es Fm Md actinium prateritium uranium neptunium auroium buttonium einethium fermium mendelwium - 232 231 238 – 1 – 1 – 1 – 1 – 1 – 1 – 1 – 1 – 1 –	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
certurnpresectormiumpromethiumsamariumeuropiumgadoiniumterturnterturnhomiumterturn140141-150152157159163165167169909192939495969798991001011501711890785969798991001011511531651631651631651631691521598495969798991001011501531561631651631651631631511301407070165163100101152131238232231238	La		ŗ	Νd	Pm	Sm	Eu	Gd	Tb	D	Ч	ц	Tm	Υb	Lu
90 91 92 93 94 95 96 97 98 99 100 101 Th Pa U Np Pu Am Cm Bk Cf Es Fm Md thorium protactinium uranium plutonium curium berkelium cariformium einsteinium femium medelevium 232 231 238 _ _ _ _ _ _ _ _ _	lanthanun 139		praseodymium 141	neodymium 144	promethium -	samarium 150	europium 152	gadolinium 157	terbium 159	dysprosium 163	holmium 165	erbium 167	thulium 169	ytterbium 173	lutetium 175
Th Pa U Np Pu Am Cm Bk Cf Es Fm Md thorium protactinium uranium plutonium americium curium berkelium calfonium femium mendelevium 232 231 238 - - - - - - -	89		91	92	93	94	95	96	97	98	66	100	101	102	103
thorium protactinium uranium neptunium plutonium americium curium berkelium californium einsteinium fermium mendelevium 232 231 238	Ac		Ра		Np	Pu	Am	Cm	Ŗ	ç	Es	Еm	Md	No	Ļ
231 238	actinium		protactinium	uranium	neptunium	plutonium	americium	curium	berkelium	califomium	einsteinium	fermium	mendelevium	nobelium	lawrencium
	I	232	231	238	I	I	I	I	I	I	I	I	I	I	I

The volume of one mole of any gas is $24\,dm^3$ at room temperature and pressure (r.t.p.).