



# Cambridge IGCSE™

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## CO-ORDINATED SCIENCES

0654/13

Paper 1 Multiple Choice (Core)

May/June 2025

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)

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### 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.
- Take the weight of 1.0 kg to be 9.8 N (acceleration of free fall =  $9.8 \text{ m/s}^2$ ).

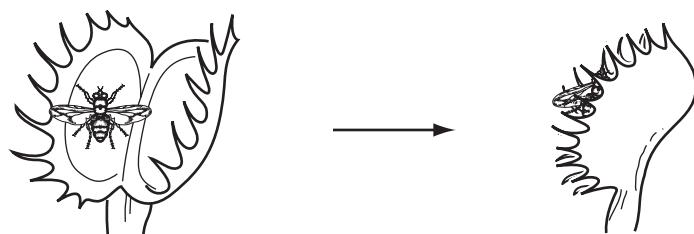
### INFORMATION

- 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.

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This document has **16** pages.

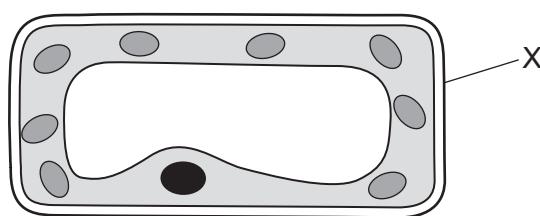
1 The Venus fly trap is a plant that catches insects.



Which characteristic of living organisms is shown in the diagram?

- A excretion
- B growth
- C reproduction
- D sensitivity

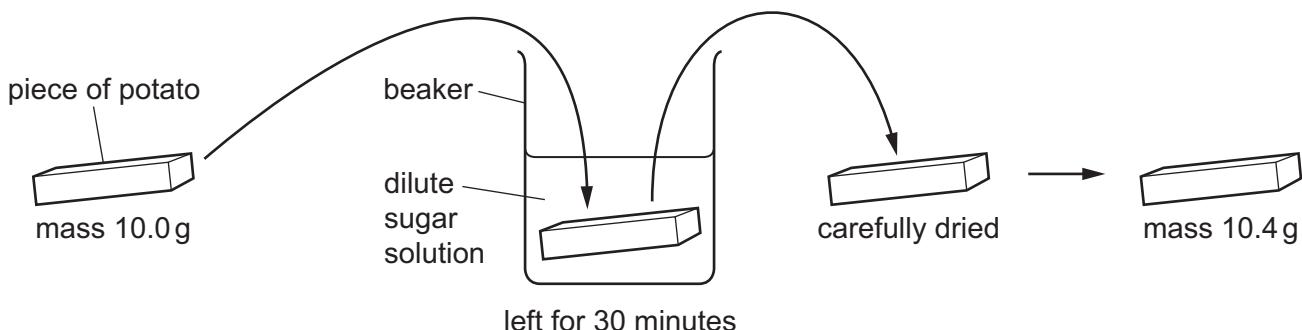
2 The diagram shows a plant cell.



Which row names X and describes its function?

	name	function
A	cell membrane	controls which substances enter or leave the cell
B	cell membrane	maintains cell shape
C	cell wall	controls which substances enter or leave the cell
D	cell wall	maintains cell shape

3 The diagram shows the stages of an experiment.



Which statement explains the increase in mass?

- A Sugar has moved into the cells of the potato by osmosis.
- B Sugar has moved out of the cells of the potato by osmosis.
- C Water has moved into the cells of the potato by osmosis.
- D Water has moved out of the cells of the potato by osmosis.

4 Which statements about enzymes are correct?

- 1 Enzymes are biological catalysts.
- 2 Enzymes are made of fat.
- 3 Enzymes are made of protein.

- A 1 and 2
- B 1 and 3
- C 1 only
- D 3 only

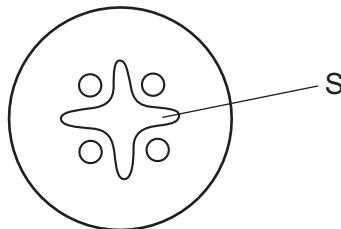
5 Which statement about photosynthesis is correct?

- A A plant uses carbon dioxide and glucose to produce oxygen and water.
- B A plant uses carbon dioxide and water to produce glucose and oxygen.
- C A plant uses glucose and oxygen to produce carbon dioxide and water.
- D A plant uses oxygen and water to produce glucose and carbon dioxide.

6 Which food helps prevent scurvy?

- A bread
- B cheese
- C eggs
- D lemons

7 The diagram shows a cross-section of a plant root.



Which row is correct for tissue S?

	name of tissue	substance transported
A	phloem	amino acids and sucrose
B	phloem	water
C	xylem	amino acids and sucrose
D	xylem	water

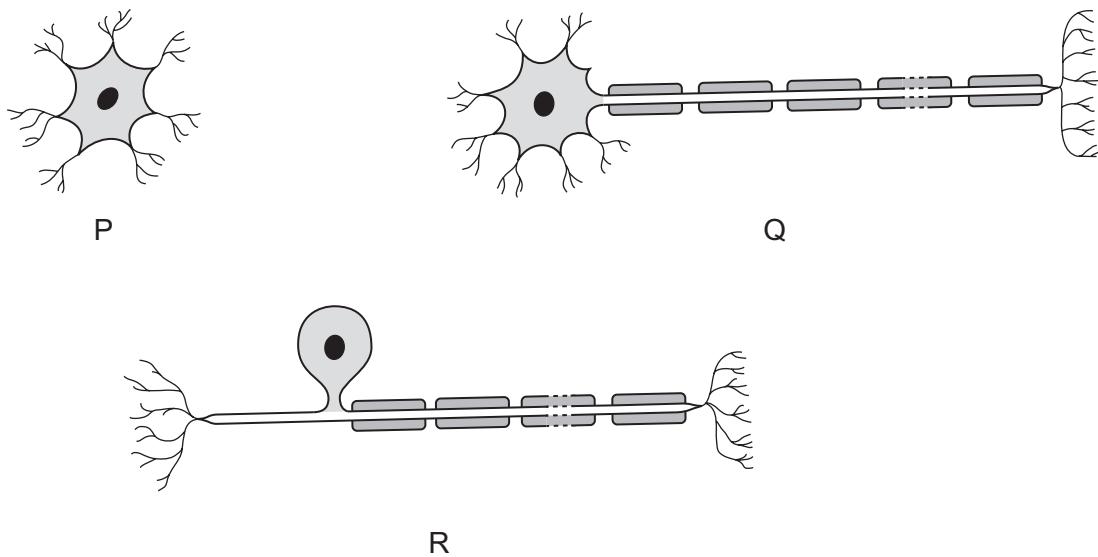
8 What increases the risk of coronary heart disease?

- A reduced salt diet
- B relaxation therapy
- C regular exercise
- D smoking tobacco

9 Which row shows the percentages for inspired air and expired air?

	inspired air/%		expired air/%	
	oxygen	carbon dioxide	oxygen	carbon dioxide
A	21	0.04	17	4
B	21	0.04	21	0.04
C	17	4	17	4
D	17	4	21	0.04

10 The diagram shows three types of neurone.



Which order do impulses pass through the neurones in a reflex action?

- A P → R → Q
- B Q → P → R
- C R → P → Q
- D R → Q → P

11 Which statement about reproduction is correct?

- A Sexual reproduction involves the fusion of two gamete nuclei.
- B Sexual reproduction results in the production of genetically identical offspring.
- C Asexual reproduction involves the fusion of two gamete nuclei.
- D Asexual reproduction results in the production of genetically different offspring.

12 Which row is correct for a human gamete?

	name of gamete	chromosome carried by gamete	where gamete is produced
A	egg cell	X	testes
B	egg cell	Y	ovaries
C	sperm	X	testes
D	sperm	Y	ovaries

13 Which statement describes a producer?

- A an organism that obtains its energy from dead or waste organic matter
- B an organism that makes its own organic nutrients using energy from sunlight
- C an organism that obtains its energy from feeding on other organisms
- D an animal that obtains its energy from eating plants

14 Which row describes particles present in  $^{25}_{12}\text{Mg}^{2+}$ ?

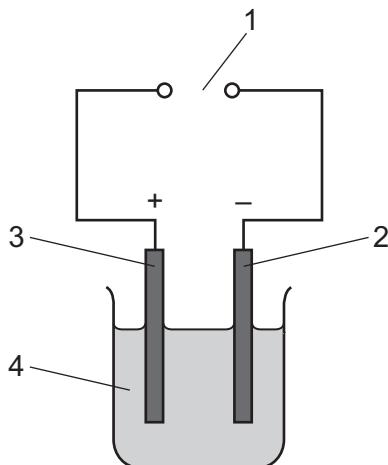
	neutrons	electrons
A	12	10
B	12	12
C	13	12
D	13	10

15 The formula of ethanol is  $\text{C}_2\text{H}_5\text{OH}$ .

How many different elements are present in ethanol?

- A 1
- B 3
- C 4
- D 9

16 The apparatus used in the electrolysis of concentrated aqueous sodium chloride is shown.



Which row identifies the electrolyte and the cathode?

	electrolyte	cathode
<b>A</b>	1	2
<b>B</b>	1	3
<b>C</b>	4	2
<b>D</b>	4	3

17 Which statements about endothermic reactions are correct?

- 1 Thermal energy is taken in from the surroundings.
- 2 Thermal energy is released to the surroundings.
- 3 The temperature of the reaction mixture decreases.
- 4 The temperature of the reaction mixture increases.

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

18 Which element causes a compound to be coloured?

- A** a Group I element
- B** a Group II element
- C** a Group VIII element
- D** a transition element

19 Which property explains why aluminium is used to make food containers?

- A low density
- B high strength
- C resistant to corrosion
- D shiny

20 What is an alloy?

- A a compound
- B a mixture
- C a metallic element
- D a non-metallic element

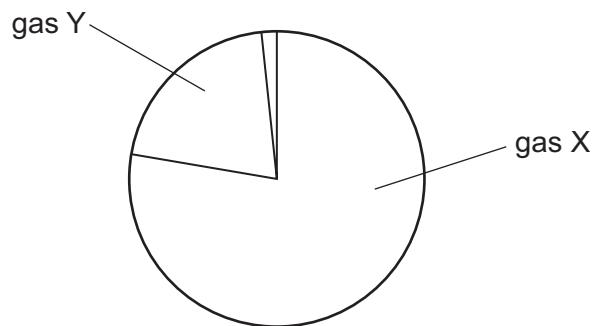
21 Which row describes the order of reactivity of the metals?

	most reactive → least reactive			
A	copper	calcium	zinc	potassium
B	copper	zinc	calcium	potassium
C	potassium	calcium	zinc	copper
D	potassium	zinc	calcium	copper

22 Which row shows the colour of copper(II) sulfate and of cobalt(II) chloride when they are added to water?

	copper(II) sulfate	cobalt(II) chloride
A	blue	blue
B	blue	pink
C	white	blue
D	white	pink

23 The diagram represents the composition of clean, dry air.



Which row identifies gas X and gas Y?

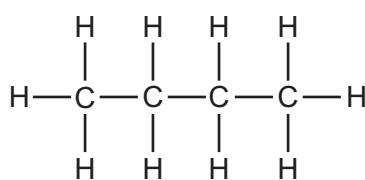
	gas X	gas Y
<b>A</b>	nitrogen	oxygen
<b>B</b>	oxygen	nitrogen
<b>C</b>	oxygen	carbon dioxide
<b>D</b>	carbon dioxide	nitrogen

24 Which property allows petroleum to be separated by fractional distillation?

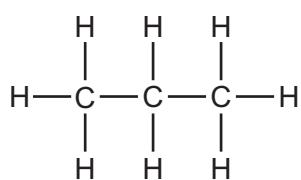
- A** boiling point
- B** colour
- C** density
- D** melting point

25 Which compound is the main constituent of natural gas?

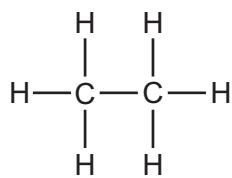
**A**



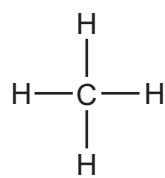
**B**



**C**



**D**



26 Which statement about alkanes is correct?

- A They contain one double covalent bond.
- B They contain only single covalent bonds.
- C They form polymers.
- D They react with aqueous bromine.

27 When aqueous copper(II) sulfate reacts with aqueous sodium hydroxide, a blue precipitate forms.

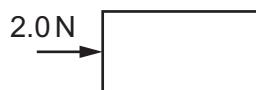
Which method is used to remove the precipitate from the reaction mixture?

- A chromatography
- B distillation
- C filtration
- D crystallisation

28 The diagrams show the only forces acting on each of four objects moving in a straight line.

Which object is moving at constant speed in a straight line?

A



B



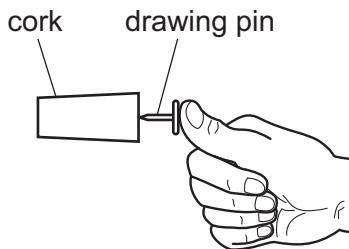
C



D



29 A person pushes a drawing pin into a cork with their thumb.



Which statement explains why the pin goes into the cork and **not** into the thumb?

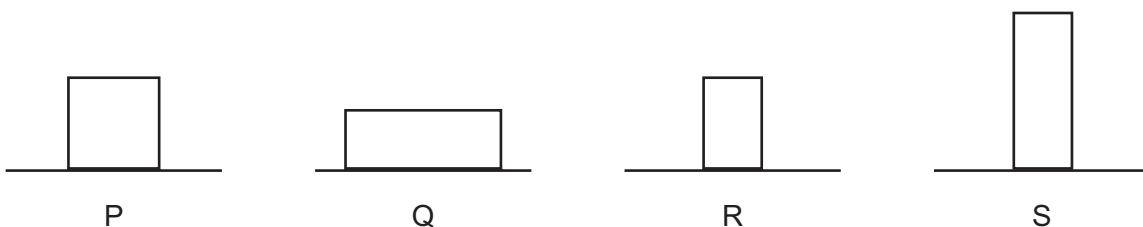
A The force on the cork is greater than the force on the thumb.

B The force on the cork is less than the force on the thumb.

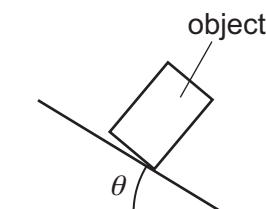
C The pressure on the cork is greater than the pressure on the thumb.

D The pressure on the cork is less than the pressure on the thumb.

30 The diagram shows four objects, P, Q, R and S, with uniform density, resting on different horizontal surfaces. The objects are all drawn to the same scale.



The surfaces are slowly tilted through an angle  $\theta$  until the object falls over.



For which object is the value of  $\theta$  the greatest?

A object P

B object Q

C object R

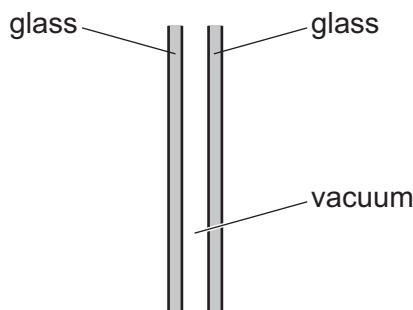
D object S

31 Liquid in a beaker evaporates quickly.

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

	mass	temperature
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

32 The diagram shows a type of double glazing in a window. The double glazing consists of two sheets of glass separated by a vacuum.



Which methods of energy transfer are prevented by the vacuum?

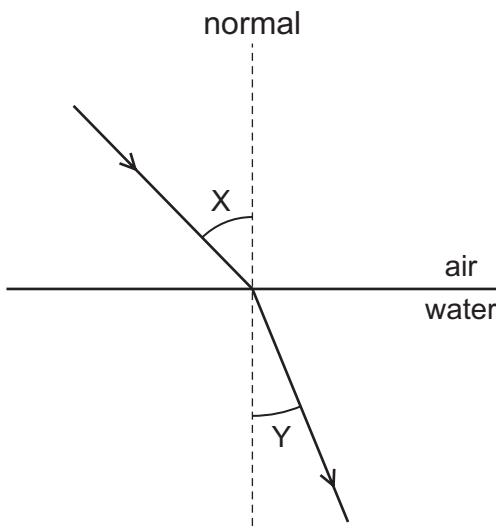
- A conduction and convection only
- B conduction and radiation only
- C convection and radiation only
- D conduction, convection and radiation

33 A student investigates the motion of a small ball that is floating on water in a tank. A wave passes along the water surface from left to right.

What happens to the ball?

- A It does not move.
- B It moves only to the left.
- C It moves only to the right.
- D It moves up and down.

34 Light travels from air into water.



What are the names of angle X and angle Y?

	angle X	angle Y
<b>A</b>	angle of incidence	angle of reflection
<b>B</b>	angle of incidence	angle of refraction
<b>C</b>	angle of refraction	angle of incidence
<b>D</b>	angle of refraction	angle of reflection

35 The table shows the highest frequency of sound heard by different animals.

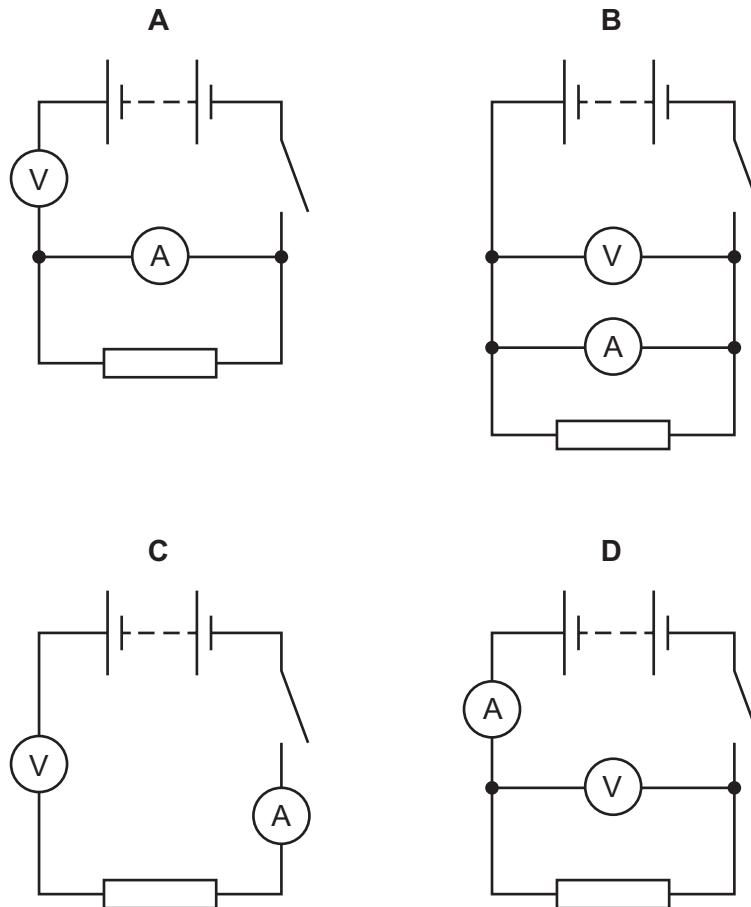
animal	highest frequency heard/kHz
bat	200
bird	10
cat	79

The highest frequency sound that a healthy human ear can hear is  $f$ .

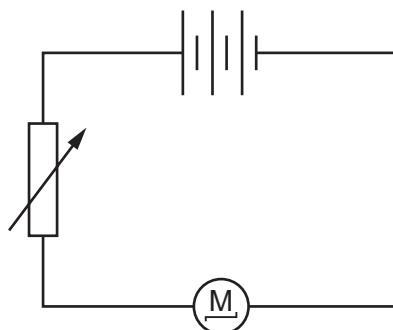
Which animals **cannot** hear sound of frequency  $f$ ?

- A** a bird only
- B** a bird and a cat only
- C** a bat, a bird and a cat
- D** none of the animals in the table

36 Which circuit is suitable for determining the resistance of the fixed resistor?



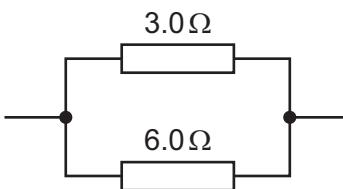
37 The diagram shows a circuit containing three cells, a variable resistor and an electric motor.



Which actions together **must** increase the speed of the motor?

- A decreasing the number of cells and decreasing the resistance of the variable resistor
- B decreasing the number of cells and increasing the resistance of the variable resistor
- C increasing the number of cells and decreasing the resistance of the variable resistor
- D increasing the number of cells and increasing the resistance of the variable resistor

38 The diagram shows a  $3.0\Omega$  resistor connected to a  $6.0\Omega$  resistor.



What is a possible combined resistance of the two resistors?

A  $2.0\Omega$       B  $3.0\Omega$       C  $4.5\Omega$       D  $9.0\Omega$

39 A scientist works with a radioactive source that emits gamma ( $\gamma$ )-rays. The scientist takes several precautions.

Which precaution does **not** give the scientist any protection?

A Keep a lead screen between the scientist and the source.  
 B Use a detector to measure the count rate of the source.  
 C Only use the source for a short period of time.  
 D Have a large distance between the scientist and the source.

40 The orbit of a planet lies between the orbit of Venus and the orbit of Mars.

What is the planet?

A Saturn  
 B Jupiter  
 C Earth  
 D Uranus

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## The Periodic Table of Elements

Group		Group																				
		I		II		III		IV		V		VI		VII		VIII						
3	4	Li	Be	beryllium	9																	
7		lithium																				
11	12	Na	Mg	magnesium	24																	
19	20	K	Ca	calcium	40	21	22	Ti	V	Cr	Mn	Fe	Co	Zn	Ga	Ge	As	Se	Br	Kr		
39		potassium				scandium	45	titanium	48	vanadium	51	chromium	52	cobalt	59	gallium	70	germanium	73	80	krypton	
37	38	Rb	Sr	strontium	88	39	40	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	I	Xe	
85		rubidium				yttrium	89	zirconium	91	niobium	93	molybdenum	96	ruthenium	101	palladium	106	cadmium	112	tin	119	xenon
56	57	Cs	Ba	barium	137	57-71	72	Ta	W	Re	Os	Ir	Pt	Hg	Pb	Bi	Tl	Te	Te	127	Rn	
133		caesium				lanthanoids	178	tantalum	181	tungsten	184	rhenium	186	osmium	190	platinum	195	mercury	201	thallium	204	radon
87	88	Fr	Ra	radium	-	89-103	104	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	F	Po	At	-	
		francium				actinoids		rutherfordium	dubnium	seaborgium	bohrium	hassium	meitnerium	darmstadtium	roentgenium	copernicium	nihonium	fermium	moscovium	tennessine	oganesson	-