



# Cambridge IGCSE™

## CO-ORDINATED SCIENCES

0654/12

Paper 1 Multiple Choice (Core)

February/March 2024

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

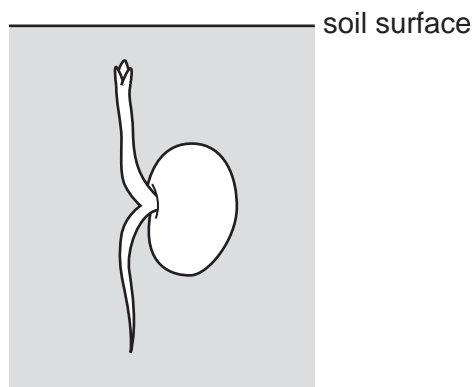
- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

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



## 2

- 1 The diagram shows a germinating seed below the soil surface.

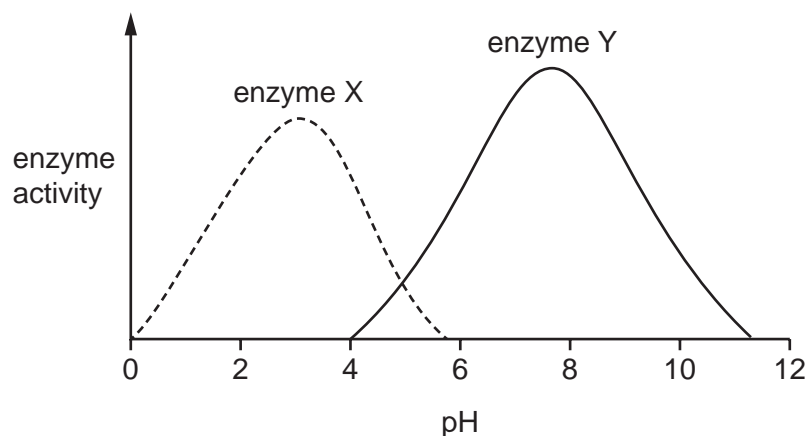


Which characteristic of living organisms ensures that the shoot grows upwards and the root grows downwards?

- A excretion
  - B nutrition
  - C reproduction
  - D sensitivity
- 2 What is the net movement of molecules during diffusion?
- A from a higher concentration to a lower concentration down a concentration gradient
  - B from a higher concentration to a lower concentration up a concentration gradient
  - C from a lower concentration to a higher concentration down a concentration gradient
  - D from a lower concentration to a higher concentration up a concentration gradient
- 3 Which smaller molecules is glycogen made from?
- A amino acids
  - B fatty acids
  - C glucose
  - D glycerol

3

- 4 The graph shows the effect of pH on two different enzymes.



Which statement is correct?

- A** Both enzymes show no activity in conditions of pH 4.
  - B** Both enzymes are active in conditions of pH 5.
  - C** Only enzyme X is active in conditions of pH 10.
  - D** Only enzyme Y is active in conditions of pH 3.
- 5 Which word is missing from the word equation for photosynthesis?

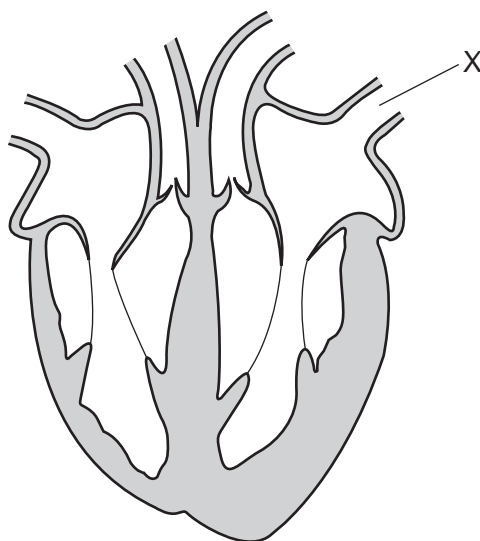
carbon dioxide + ..... → glucose + oxygen

- A** carbohydrate
  - B** chlorophyll
  - C** light
  - D** water
- 6 Calcium and iron are components of the diet.

Which parts of the body need these components?

	dietary component	
	calcium	iron
<b>A</b>	blood	bone
<b>B</b>	bone	skin
<b>C</b>	bone	blood
<b>D</b>	skin	bone

- 7 The diagram shows a section through the human heart and the blood vessels associated with it.



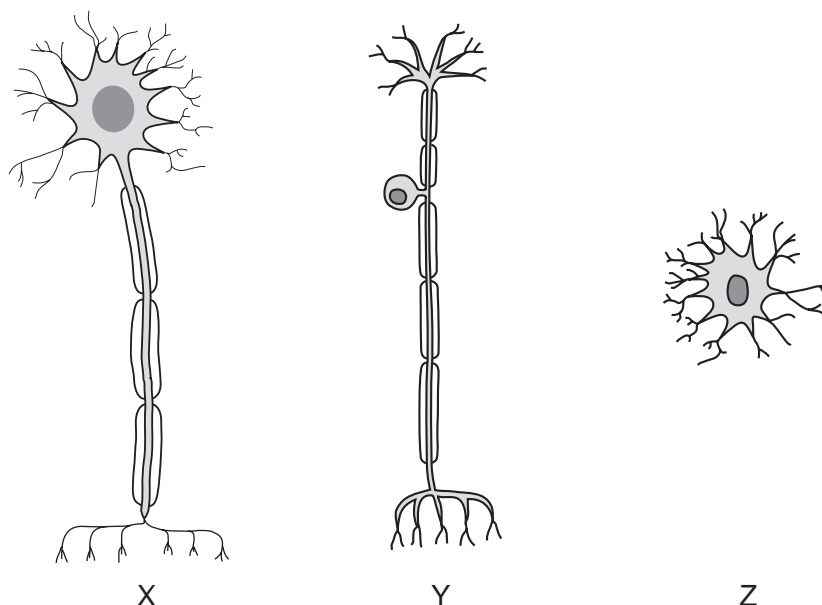
Which row names vessel X and correctly describes the direction of blood flow in vessel X?

	vessel X	direction of blood flow
<b>A</b>	pulmonary vein	away from the lungs and towards the heart
<b>B</b>	pulmonary vein	towards the lungs and away from the heart
<b>C</b>	vena cava	away from the lungs and towards the heart
<b>D</b>	vena cava	towards the lungs and away from the heart

- 8 What is used to test for the presence of carbon dioxide?

- A** Benedict's solution
- B** ethanol
- C** iodine solution
- D** limewater

- 9 The diagram shows three different neurones which form the reflex arc.



Which row correctly identifies X, Y and Z?

	neurone X	neurone Y	neurone Z
<b>A</b>	motor	relay	sensory
<b>B</b>	motor	sensory	relay
<b>C</b>	sensory	motor	relay
<b>D</b>	sensory	relay	motor

- 10 Which statements about asexual reproduction are correct?

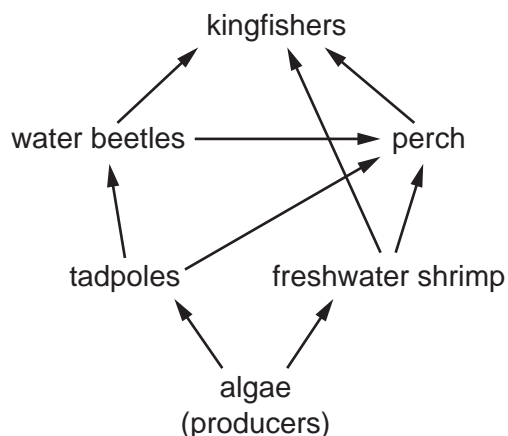
- 1 It involves gametes.
- 2 It produces genetically identical offspring.
- 3 It only requires one parent.

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

- 11 What is the correct term for an allele that is always expressed in the phenotype if it is present?

- A** dominant
- B** heterozygous
- C** homozygous
- D** recessive

12 The diagram shows a food web.



Which animals are carnivores?

- A kingfishers, perch and water beetles
- B kingfishers only
- C perch and water beetles only
- D tadpoles and freshwater shrimp

13 Which process is **not** part of the carbon cycle?

- A combustion
- B fossilisation
- C transpiration
- D photosynthesis

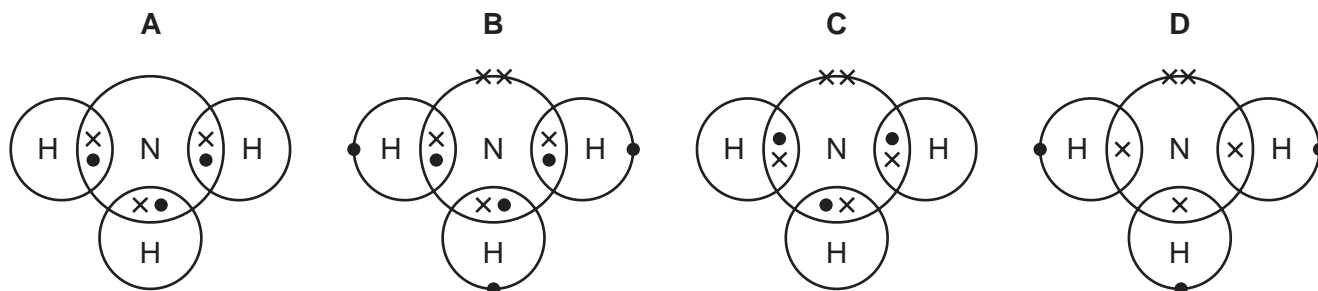
14 Which change is a chemical change?

- A combustion of hydrocarbons
- B filling a balloon with air
- C freezing a glass of water
- D mixing salt and sand

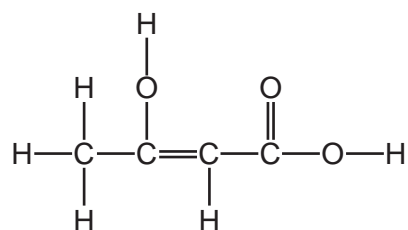
15 Which row shows the particles in the nucleus of an atom of  $^{25}_{12}\text{Mg}$ ?

	protons	neutrons
<b>A</b>	12	12
<b>B</b>	12	13
<b>C</b>	13	12
<b>D</b>	13	13

16 Which dot-and-cross diagram represents a molecule of ammonia?



17 The structure of a molecule of an organic compound is shown.



What is the formula of this compound?

- A** C<sub>4</sub>H<sub>4</sub>O<sub>3</sub>      **B** C<sup>4</sup>H<sup>4</sup>O<sup>3</sup>      **C** C<sub>4</sub>H<sub>6</sub>O<sub>3</sub>      **D** 4C<sub>6</sub>H<sub>3</sub>O

18 Concentrated aqueous sodium chloride is electrolysed using inert electrodes.

Which row describes observations of the tests on the gases collected at the electrodes?

	anode gas	cathode gas
<b>A</b>	turns damp red litmus paper blue	'pops' with a lighted splint
<b>B</b>	turns damp red litmus paper blue	relights a glowing splint
<b>C</b>	turns damp red litmus paper white	'pops' with a lighted splint
<b>D</b>	turns damp red litmus paper white	relights a glowing splint

- 19** In a test-tube, magnesium reacts with dilute hydrochloric acid to form a salt and hydrogen.

The reaction makes the test-tube warm.

Which statement about the reaction explains this observation?

- A** It is a combustion reaction.
- B** It is a neutralisation reaction.
- C** It is endothermic.
- D** It is exothermic.

- 20** Which statement explains why the rusting of iron is an oxidation reaction?

- A** Iron gains oxygen.
- B** Iron is a transition element.
- C** Iron is very reactive.
- D** Iron loses oxygen.

- 21** What reacts with ammonia gas?

	hydrochloric acid	sodium hydroxide	
<b>A</b>	✓	✓	key ✓ = reacts ✗ = does not react
<b>B</b>	✓	✗	
<b>C</b>	✗	✓	
<b>D</b>	✗	✗	

- 22** The halogens are elements in Group VII of the Periodic Table.

They are .....1..... non-metals.

They become .....2..... in colour down the group.

Which words complete gaps 1 and 2?

	1	2
<b>A</b>	diatomic	darker
<b>B</b>	diatomic	lighter
<b>C</b>	monatomic	darker
<b>D</b>	monatomic	lighter





27 Which substance reacts with ethene to produce ethanol?

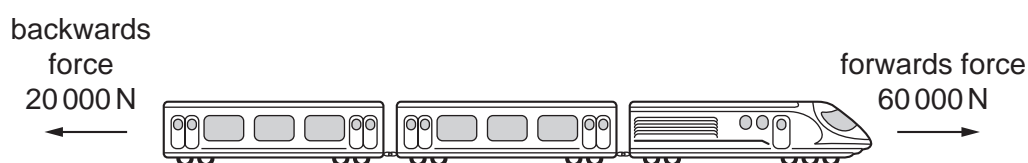
- A bromine
- B hydrogen
- C oxygen
- D steam

28 A car travels 100 m in the first 10 s of a journey and 300 m in the next 15 s.

What is the average speed of the car for this 25 s journey?

- A 5.0 m/s      B 8.0 m/s      C 15 m/s      D 16 m/s

29 A train travels along a horizontal track at constant speed. Two of the forces acting on the train are shown.



A force of air resistance is also acting on the train to give it a resultant force of zero.

What is this air resistance force?

- A 40 000 N backwards
- B 80 000 N backwards
- C 40 000 N forwards
- D 80 000 N forwards

30 Some energy resources do not require a rotating turbine when used to generate electricity.

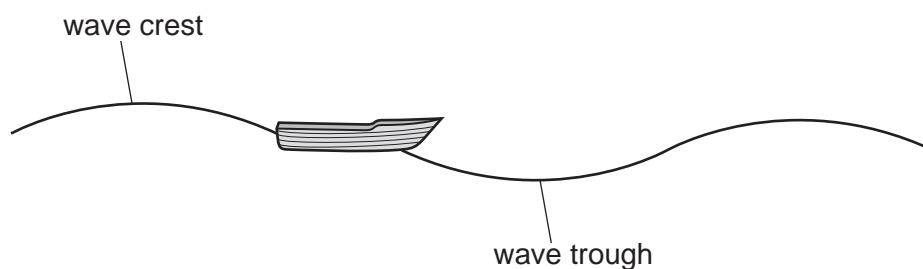
Which energy resource does **not** require a rotating turbine?

- A geothermal
- B nuclear
- C solar
- D wind

31 In a liquid-in-glass thermometer, which physical property of the liquid is used to measure temperature?

- A colour
- B mass
- C pressure
- D volume

32 A boy watches a water wave passing a boat that is floating on the sea.

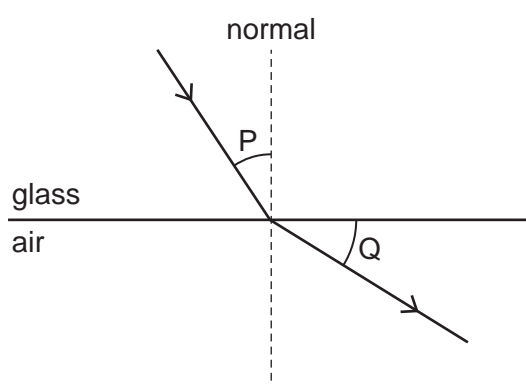


Which single measurement allows the boy to be able to calculate the amplitude of the wave?

- A the distance between one wave crest and the next
- B the time taken for a wave crest to travel the length of the boat
- C the time taken for the boat to move from its lowest point to its highest point
- D the vertical distance between the highest point and the lowest point of the boat

33 The diagram shows a ray of light passing from glass into air.

Two angles P and Q are labelled.



What is the angle of refraction?

- A P
- B Q
- C  $90^\circ - P$
- D  $90^\circ - Q$

- 34** A student claps his hands once when standing 100 m away from a large wall.

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

How long after clapping does the student hear an echo?

- A** 0.30 s                      **B** 0.61 s                      **C** 1.7 s                      **D** 3.3 s

- 35** Two charged rods X and Y repel each other.

Which row gives a possible description of how the rods became charged?

	X charged by	Y charged by
<b>A</b>	gaining electrons	gaining electrons
<b>B</b>	gaining electrons	losing protons
<b>C</b>	losing electrons	gaining electrons
<b>D</b>	losing electrons	losing protons

- 36** There is a current of 4.0 A in a resistor and a potential difference (p.d.) of 12 V across it.

What is the resistance of the resistor?

- A**  $0.33\ \Omega$                       **B**  $3.0\ \Omega$                       **C**  $8.0\ \Omega$                       **D**  $48\ \Omega$

- 37** The current in an electric heater is 6.0 A when in normal use.

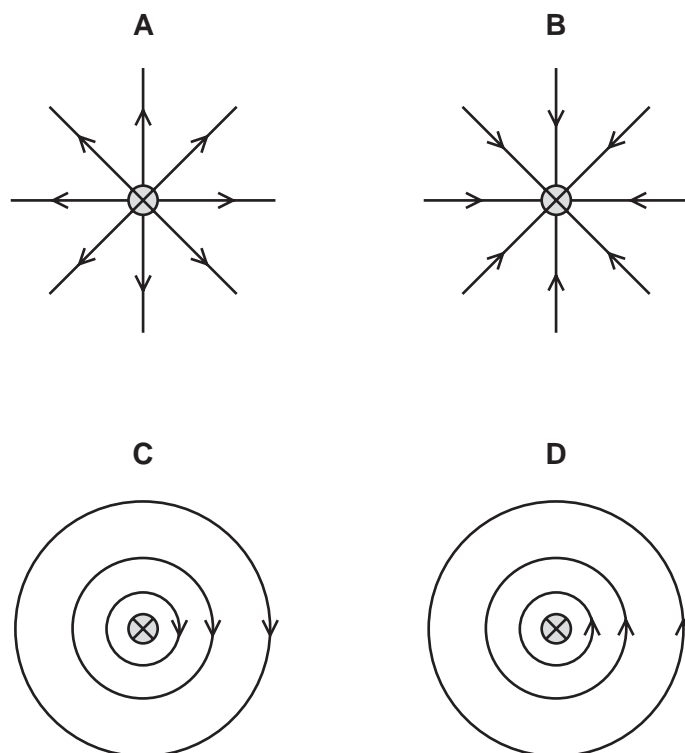
Four fuses with different ratings are available to protect the wire to the heater.

Which fuse is most suitable?

- A** 1 A                      **B** 5 A                      **C** 8 A                      **D** 20 A

**38** The diagrams show the cross-section of a straight wire carrying a current into the page.

Which diagram shows the pattern and direction of the magnetic field around the wire?



**39** A radioactive sample emits 1280 beta ( $\beta$ )-particles per second.

After 20 minutes, it emits 80 beta ( $\beta$ )-particles per second.

What is the half-life of the radioactive sample?

- A** 4.0 minutes
- B** 5.0 minutes
- C** 10 minutes
- D** 60 minutes

**40** A radioactive nucleus emits an alpha ( $\alpha$ )-particle.

What happens to the proton number and what happens to the nucleon number of the nucleus?

	proton number	nucleon number
<b>A</b>	decreases by 2	decreases by 4
<b>B</b>	decreases by 2	does not change
<b>C</b>	increases by 1	decreases by 1
<b>D</b>	increases by 1	does not change

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