



# Science

Stage 7

Paper 1

**2023**

## Cambridge Lower Secondary Progression Test

Name

Class

Date

**45 minutes**

No additional materials are needed.

### INSTRUCTIONS

- Answer **all** questions.
- Write your answer to each question in the space provided.
- You should show all your working on the question paper.

### INFORMATION

- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [ ].

1 This question is about cells.

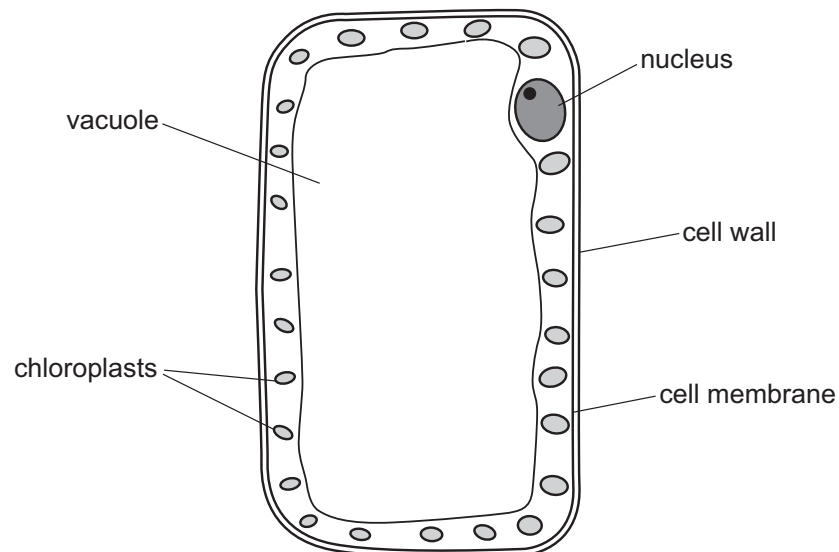


(a) Draw a straight line to match each **part of a cell** to its correct **function**.

part of a cell	function
cell membrane	controls the movement of substances into and out of the cell
cytoplasm	contains genetic information and controls what happens inside the cell
mitochondria	jelly-like substance, where chemical reactions happen
	where most respiration reactions happen

[2]

(b) Look at the diagram of a plant palisade cell.



Describe how the palisade cell is specialised to allow it to photosynthesise.

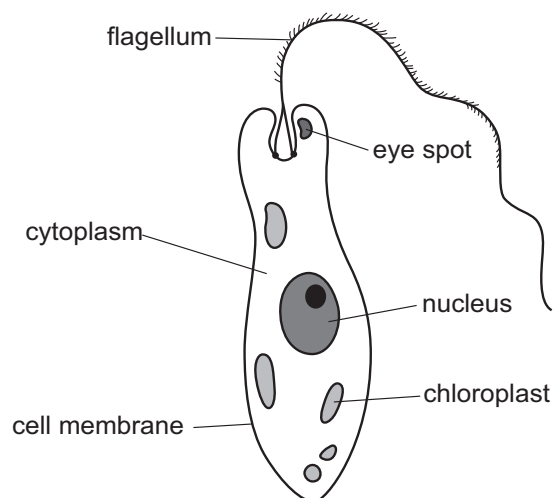
.....

.....

..... [2]

(c) Euglena is a single-celled organism.

Look at the diagram of an euglena.



Explain why euglena is difficult to classify as either a plant cell or an animal cell.

.....

..... [1]

2 This question is about materials.



Draw a straight line to match each **material** to its correct **description**.

material	description
alloy	a pure substance containing the same type of atom
compound	a pure substance containing different types of atoms bonded together
element	a mixture containing two different types of metal atoms
	an impure substance containing the same type of atom
	a substance containing atoms that are free to move

[3]

3 Sound is reflected by hard surfaces.



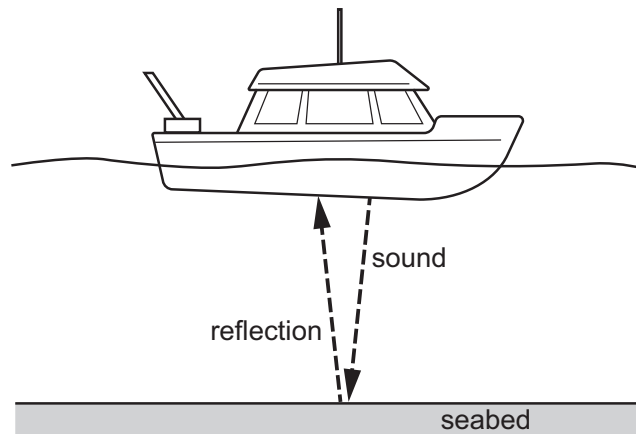
(a) What is the name given to a reflected sound?

..... [1]

(b) A ship is using sound to calculate the distance to the seabed.

The ship produces a sound.

The sound travels to the seabed and is reflected back to the ship.



In water, sound travels a distance of 1500 m in one second.

The reflected sound is detected after 4 seconds.

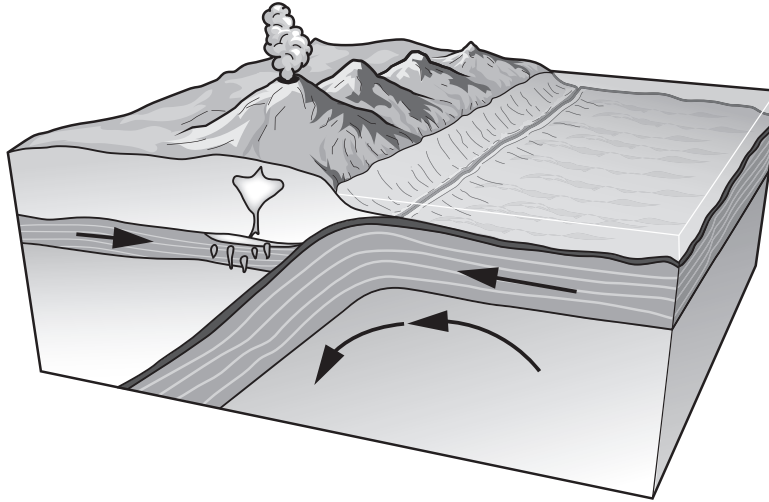
Calculate the distance from the bottom of the ship to the seabed.

..... m [2]

4 The solid outer layer of the Earth is made up of large tectonic plates.



Look at the diagram showing a model of what happens when two tectonic plates meet.



(a) Write down the name of the **two** parts of the Earth that form this solid outer layer.

1 .....

2 .....

[2]

(b) Write down **three different** events that happen near the boundaries of tectonic plates.

1 .....

2 .....

3 .....

[3]

(c) Describe the **strengths** and **limitations** of this model about the movement of tectonic plates.

.....

.....

..... [2]

- 5 The incomplete dichotomous key shows different features of vertebrates.



Write words from the list in the boxes to complete the key.

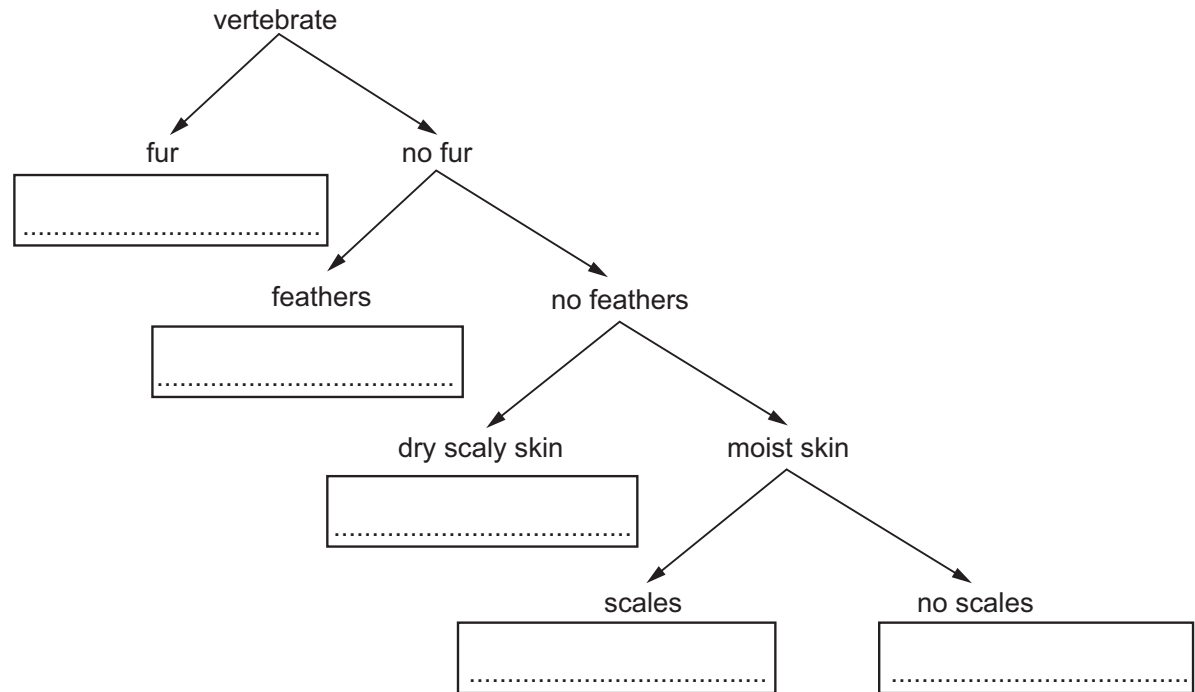
**amphibian**

**bird**

**fish**

**mammal**

**reptile**

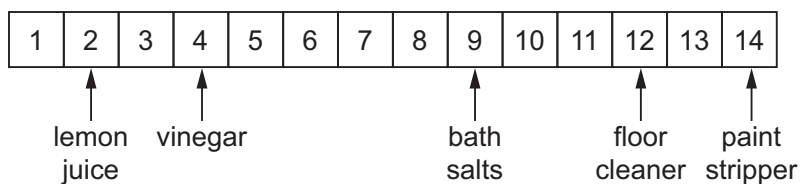


[3]

6 Chen tests some chemicals with Universal Indicator.



His results are shown on a pH chart.



Use the pH chart to answer the questions.

(a) Write down the **pH** of vinegar.

.....

[1]

(b) Paint stripper is tested with Universal Indicator.

Write down the **colour** of the Universal Indicator after the test.

.....

[1]

(c) Pure water is **neutral**.

Write down the **pH** of a neutral solution.

.....

[1]

(d) Which chemical in the pH chart is the **most acidic**?

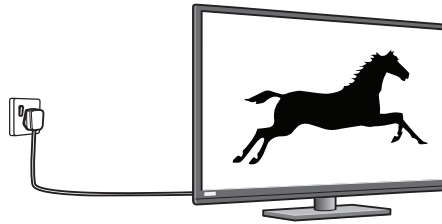
.....

[1]

7 Energy is transferred from one form into another.



(a) The diagram shows a television.



Complete the energy transfer for the television.

..... energy

..... energy → ..... energy

..... energy

[1]

(b) A car transfers chemical energy in gasoline (petrol) into thermal energy, sound energy and kinetic energy **only**.

The car transfers 100 J of chemical energy into 70 J of thermal energy and 10 J of sound energy.

(i) Calculate how much chemical energy is transferred into kinetic energy.

..... J [1]

(ii) Describe what happens to the sound and thermal energy.

..... [1]



- 8 Look at the table showing the percentage by volume of different gases in clean, dry air.



gas	percentage by volume
.....	78
oxygen	.....

Complete the table with the name of the missing gas **and** the missing percentage.

[2]

- 9 Donkeys mate and produce new generations of donkeys.



Horses mate and produce new generations of horses.

A male donkey and a female horse mate and produce a mule.

Mules mate but do **not** produce offspring.

Tick (✓) to show which of the animals are **species**.

donkey ☐ horse ☐ mule ☐

Explain your answer.

.....

.....

[2]

10 Safia investigates chemical reactions.



(a) Safia adds two colourless solutions together.

She sees that a white solid is made.

Name the process that happens when this white solid is made from the two solutions.

Circle the correct answer.

**alloying**

**decomposition**

**melting**

**precipitation**

[1]

(b) Safia now adds sodium hydroxide solution to dilute hydrochloric acid.

Sodium hydroxide solution is an alkali.

What happens to the pH of the dilute hydrochloric acid as the sodium hydroxide solution is added?

.....

Explain your answer.

.....

.....

[2]

11 Blessy collects some information about gravity on different planets in the Solar System.



(a) What is gravity?

.....

.....

..... [2]

(b) Look at the information Blessy collects.

planet	relative mass (Earth = 1)	relative gravity (Earth = 1)
Mercury	0.06	0.4
Mars	0.1	0.4
Venus	0.8	0.9
Earth	1	1.0
Uranus	15	0.9
Neptune	17	1.1
Saturn	95	0.9
Jupiter	318	2.4

(i) Write down the name of the planet that has the **greatest** gravity.

..... [1]

(ii) Write down a conclusion about the relationship between mass of planet and gravity.

Include information from the table in your answer.


.....

.....





.....

..... [2]

12 A research chemist investigates some compounds.

 She wants to dissolve them in water and test the pH of the solution.

Look at the table showing the compounds she uses and their hazard symbols.

compound	hazard symbol	description of hazard
sulfuric acid		.....
potassium nitrate		hazardous to the environment
ethanol		.....
mercury nitrate		.....

Complete the table to describe the hazard for each compound.

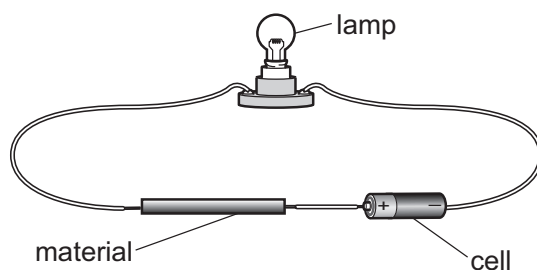
One has been done for you.

[3]

13 Oliver investigates electricity.



He makes an electrical circuit using different materials to complete the circuit.



He records his observations.

Look at his results.

material	does the lamp light?
iron	yes
steel	yes
plastic	no
wood	no
rubber	no
graphite	yes
aluminium	yes

(a) Write down **all** the materials in the table that conduct electricity.

..... [1]

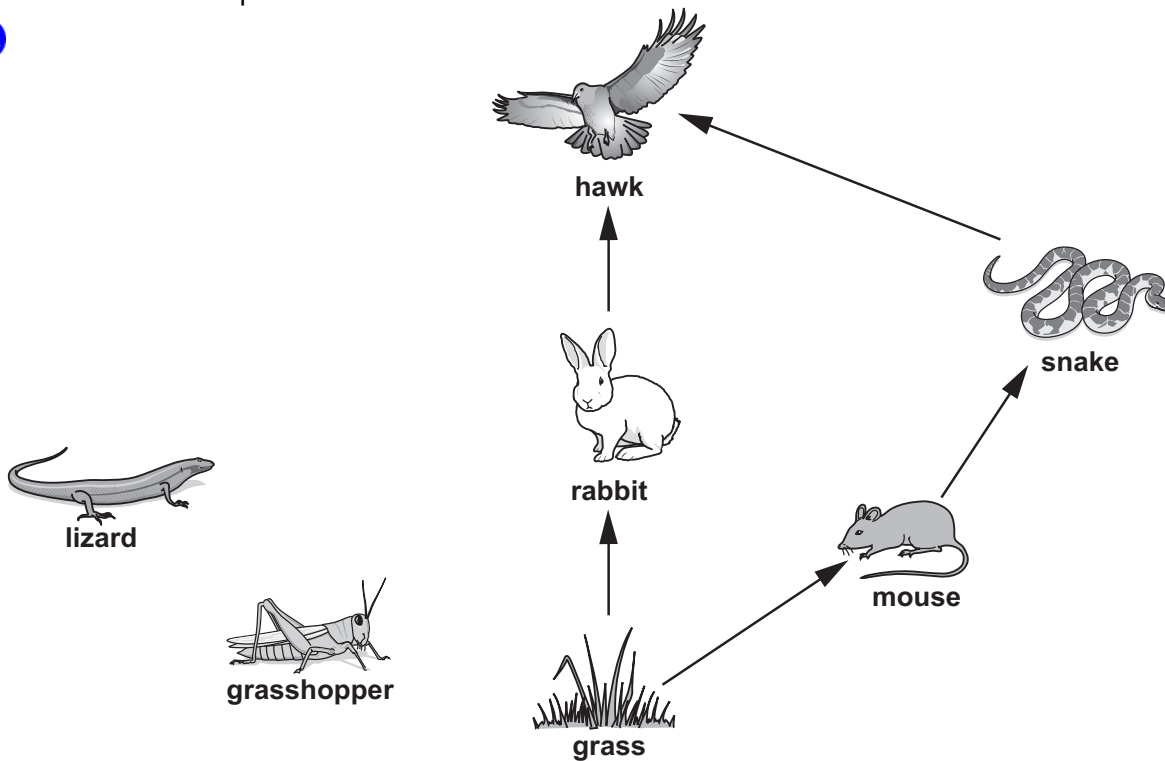
(b) Write down the name of the particles that flow through conductors.

..... [1]

(c) Write down the word used to describe materials that do **not** conduct electricity.

..... [1]

14 Look at the incomplete food web.



The grasshopper feeds on grass.

The lizard feeds on the grasshopper.

The hawk feeds on the snake, the rabbit, the grasshopper and the lizard.

(a) Draw arrows to complete the food web.

[2]

(b) The hawk is a top predator and is **not** eaten by other predators.

Write down **two** ways that energy from the hawk is returned to the grass.

1 .....

2 .....

[2]