Please write clearly in block capitals.

F

Centre number ☐☐☐☐☐ Candidate number ☐☐☐☐

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE

COMBINED SCIENCE: TRILOGY

Foundation Tier Biology Paper 1

Practice Paper Series – Set 2

Time allowed: 1 hour 15 minutes

Materials

For this paper you must have:

- a ruler
- a scientific calculator.

Instructions

- Use black ink or black ball-point pen.
- Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you work out your answer.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 70.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- When answering question 04.1 you need to make sure that your answer:
  - is clear, logical, sensibly structured
  - fully developed
  - shows how the points that you make are related or follow on from each other where appropriate.

For Examiner's Use

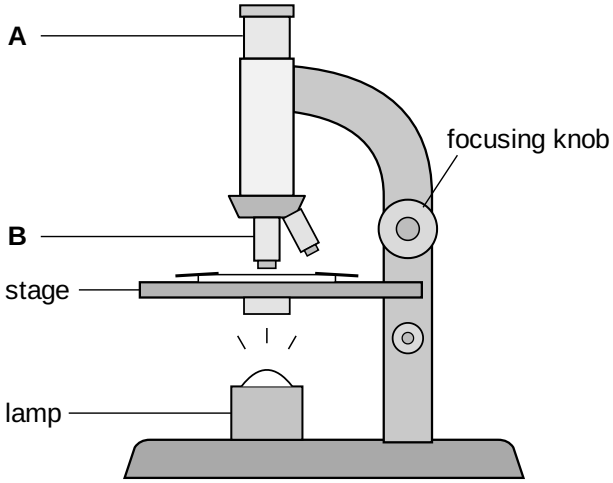
Question	Mark
1	
2	
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5	
6	
7	
8	
9	
TOTAL	

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0 1 A student used a light microscope to look at onion cells.

Figure 1 shows the light microscope.

Figure 1



0 1 . 1 Name parts **A** and **B**. [2 marks]

A .....

B .....

0 1 . 2 The student prepared a slide of onion cells. [2 marks]

The steps in the method are shown below. They are **not** in the correct order.

P	Carefully lower a coverslip onto the onion cells.
Q	Peel a thin layer of cells from the inside of a piece of onion.
R	Add a drop of iodine solution to the onion cells.
S	Place the layer of cells flat on a drop of water on a microscope slide.

Write the letters **P**, **Q**, **R** and **S** in the boxes to show the correct order.

☐ → ☐ → ☐ → ☐

0 1 . 3 Why did the student add iodine solution to the onion cells? [1 mark]

Tick (✓) **one** box.

- To kill the cells ☐
- To make the cell structures easier to see ☐
- To make the cells bigger ☐
- To stop the cells drying out ☐

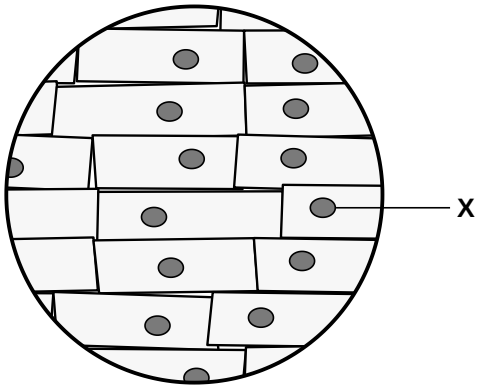
Question 1 continues on the next page

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Figure 2 shows the onion cells seen with the microscope.

Figure 2



0 1 . 4 Name structure **X** in **Figure 2**. [1 mark]

.....

0 1 . 5 These onion bulb cells do **not** contain chloroplasts. [1 mark]

Suggest why.

.....

.....

0 1 . 6 The student took a photograph of the onion cells through the microscope. [2 marks]

In the photograph, the image of one onion cell is 30 mm long.

The magnification of the photograph is ×120

Calculate the real length of the onion cell.

Use the equation:

$$\text{real size} = \frac{\text{image size}}{\text{magnification}}$$

Give your answer in mm.

Real length = ... mm

Turn over for the next question

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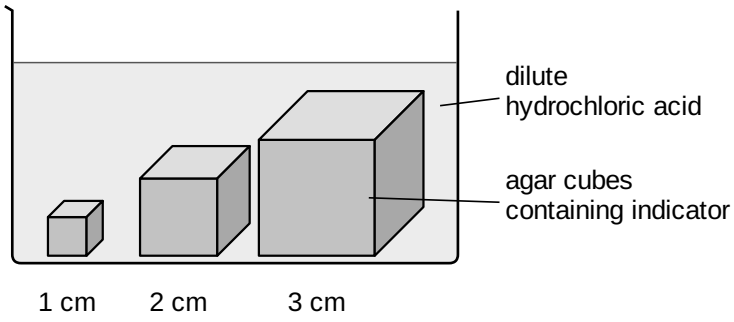
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0 2 A student investigated how the size of a cube of agar jelly affects the time taken for acid to move into the cube.

The agar contained an alkali and an indicator. The indicator is pink in alkali and colourless in acid.

Figure 3 shows the apparatus.

Figure 3



0 2 . 1 The acid moves into the agar by diffusion. [1 mark]

What is diffusion?

Tick (✓) **one** box.

- The movement of water through a partially permeable membrane ☐
- The net movement of particles from an area of higher concentration to an area of lower concentration ☐
- The movement of particles from a dilute solution to a more concentrated solution using energy ☐
- The loss of water vapour from the leaves of a plant ☐

The student timed how long it took for each cube to become completely colourless.

Table 1 shows the results.

Table 1

Length of side in cm	Surface area in cm^2	Volume in cm^3	Surface area : volume ratio	Time to become colourless in minutes
1	6	1	6 : 1	4
2	**X**	8	**Y**	15
3	54	27	2 : 1	34

0 2 . 2 Calculate surface area **X**. [1 mark]

Surface area **X** = ... cm^2

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0 2 . 3 Calculate the surface area : volume ratio **Y**. [1 mark]

Ratio **Y** = ... : 1

0 2 . 4 Describe the relationship between the surface area : volume ratio of a cube and the time taken for the cube to become colourless. [1 mark]

.....

.....

0 2 . 5 Explain why the 3 cm cube took the longest time to become colourless. [2 marks]

.....

.....

.....

.....

0 2 . 6 Give **one** variable the student should have kept the same. [1 mark]

.....

0 2 . 7 The student found it difficult to measure the times accurately. [1 mark]

Suggest why.

.....

.....

0 3 This question is about cell division.

0 3 . 1 Complete the sentences. [2 marks]

Choose answers from the box. Each word may be used once, more than once or not at all.

cell walls	chromosomes	genes	mitochondria	ribosomes

The nucleus of a body cell contains structures called ..... .

Each of these structures carries a large number of ..... .

Question 3 continues on the next page

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0 3 . 2 An onion cell contains 16 chromosomes. [1 mark]

The cell divides by mitosis.

How many chromosomes are in each new cell?

Tick (✓) **one** box.

- 8 ☐
- 16 ☐
- 32 ☐
- 64 ☐

0 3 . 3 Cells in the tips of plant roots and shoots divide by mitosis. [1 mark]

What is the name of this type of plant tissue?

.....

0 3 . 4 A rare plant produces only two seeds each year. Gardeners can use its meristem cells to produce thousands of clones. [1 mark]

Suggest **one** advantage of using this method to conserve the rare plant.

.....

.....

0 3 . 5 A committee must decide whether to allow scientists to destroy human embryos to obtain stem cells for research. [1 mark]

Give **one** ethical reason against allowing this research.

.....

.....

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Turn over for the next question

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0 4 Food contains carbohydrates, proteins and lipids.

0 4 . 1 A teacher gave a student four solutions, **A**, **B**, **C** and **D**. [6 marks]

- One solution contains starch.
- One solution contains glucose.
- One solution contains protein.
- One solution is water.

Describe how the student could use food tests to find out which solution is which.

Give the result you would expect for each test.

Do not write outside the box

0 4 . 2 A sample from one of the solutions turns blue-black when iodine solution is added. [1 mark]

Which substance does the sample contain?

Tick (✓) **one** box.

Fat	☐
Glucose	☐
Protein	☐
Starch	☐

0 4 . 3 The student tested two sports drinks, **P** and **Q**, with Benedict's solution. [1 mark]

- Drink **P** turned green.
- Drink **Q** turned brick red.

Which drink contained more sugar?

Give a reason for your answer.

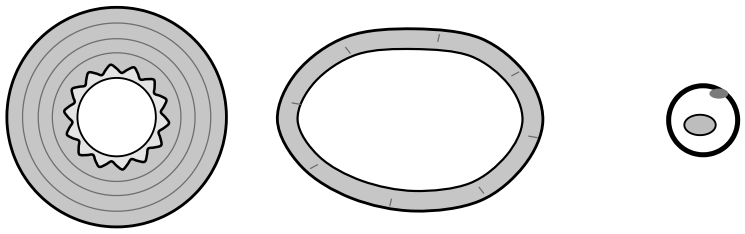
Drink .....

.....

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0 5 **Figure 4** shows cross-sections of three types of blood vessel, **P**, **Q** and **R**.

Figure 4



P **Q** **R**

Not drawn to scale

0 5 . 1 Which type of blood vessel is **P**, **Q** and **R**? [2 marks]

Choose answers from the box.

artery	capillary	vein

P .....

Q .....

R .....

Question 5 continues on the next page

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Table 2 shows the blood pressure in three types of blood vessel.

Table 2

Blood vessel	Blood pressure in kPa
Artery	13.0
Capillary	3.5
Vein	1.0

0 5 . 2 Describe how the blood pressure changes as blood flows from an artery, through the capillaries and into a vein. [1 mark]

.....

.....

0 5 . 3 Explain why the wall of an artery is thicker than the wall of a vein. [2 marks]

Use **Table 2**.

.....

.....

.....

.....

0 5 . 4 Draw **one** line from each part of the blood to its function. [2 marks]

Part of the blood	Function
Plasma	Carries oxygen
Platelets	Helps the blood to clot
Red blood cells	Produces antibodies
	Transports dissolved substances such as glucose

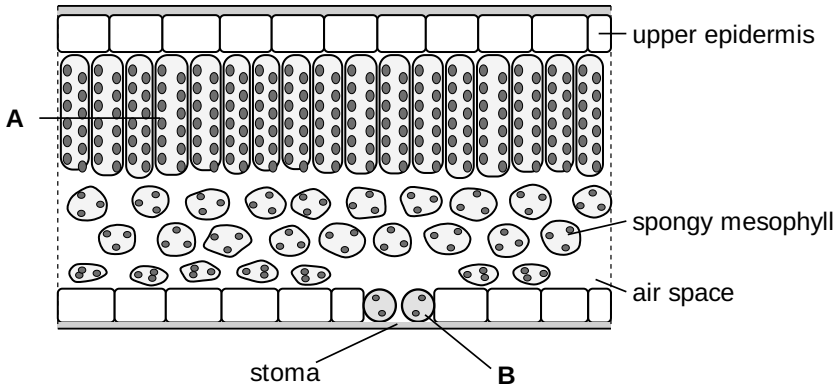
Turn over for the next question

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0 6 **Figure 5** shows a section through a leaf.

Figure 5



0 6 . 1 Name tissue **A**. [1 mark]

.....

0 6 . 2 Cell **B** is a guard cell. [1 mark]

What is the function of guard cells?

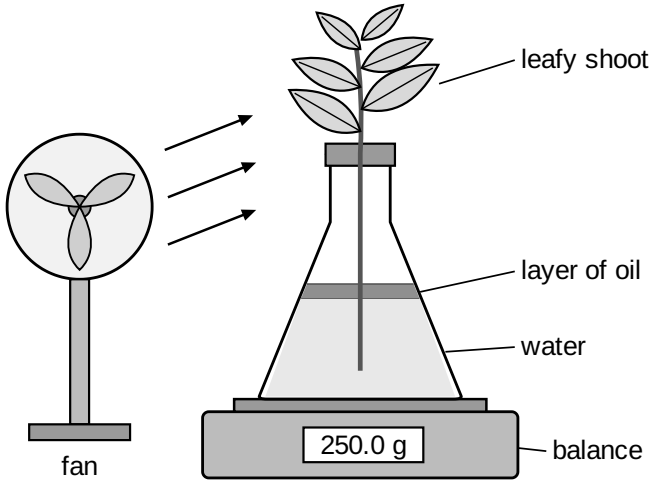
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A student investigated the effect of moving air on water loss from a leafy shoot.

Figure 6 shows the apparatus.

Figure 6



The mass of the apparatus was 250.0 g at the start.

After 4 hours the mass was 235.6 g

Question 6 continues on the next page

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0 6 . 3 Calculate the mean rate of water loss from the shoot in grams per hour. [2 marks]

Mean rate of water loss = _____ g per hour

0 6 . 4 Why was there a layer of oil on the water? [1 mark]

0 6 . 5 The student repeated the investigation without the fan. [2 marks]

Predict how the rate of water loss would change.

Explain your answer.

0 6 . 6 The student concluded: [1 mark]

'Moving air increases the rate of water loss from all plants.'

Give **one** reason why this conclusion may **not** be valid.

Turn over for the next question

Do not write outside the box

0 7 A student investigated photosynthesis and respiration in pondweed.

Hydrogencarbonate indicator changes colour when the concentration of carbon dioxide changes.

Table 3 shows the colours.

Table 3

Concentration of carbon dioxide	Colour of indicator
Higher than in air	Yellow
The same as in air	Red
Lower than in air	Purple

The student set up three tubes, **A**, **B** and **C**, as shown in **Figure 7**.

- Each tube contained the same volume of red indicator.
- Tubes **A** and **B** each contained the same mass of pondweed.
- Tube **C** contained no pondweed.
- Tube **B** was covered with aluminium foil.
- The tubes were left near a lamp for 4 hours

Figure 7

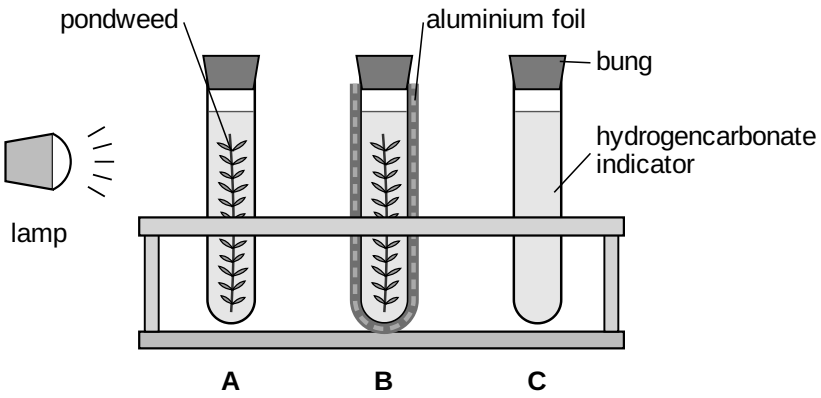


Table 4 shows the results.

Table 4

Tube	Colour of indicator after 4 hours
A	Purple
B	Yellow
C	Red

Question 7 continues on the next page

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0 7 . 1 Explain the colour of the indicator in tube **A** after 4 hours [2 marks]

0 7 . 2 Explain the colour of the indicator in tube **B** after 4 hours [2 marks]

0 7 . 3 Why did the student set up tube **C**? [1 mark]

0 7 . 4 Give **one other** variable the student should have kept the same in tubes **A** and **B**. [1 mark]

0 7 . 5 The lamp could increase the temperature of the tubes. [1 mark]

Suggest how the student could stop this happening.

0 7 . 6 The pondweed uses some of the glucose made in photosynthesis for respiration. [2 marks]

Give **two** other ways the pondweed uses glucose.

1

2

Turn over for the next question

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0 8 New drugs must be tested before they can be used to treat patients.

0 8 . 1 New drugs are first tested on cells, tissues and live animals. [2 marks]

Explain why.

Scientists tested a new drug to lower blood pressure.

800 patients with high blood pressure took part in a double-blind trial. Half of the patients were given the new drug and half were given a placebo.

Table 5 shows the results after 8 weeks.

Table 5

	New drug	**Placebo**
Mean decrease in blood pressure in mmHg	18	4
Percentage of patients with side effects	12	9

0 8 . 2 Explain why the trial was double blind. [2 marks]

0 8 . 3 Calculate the ratio of the mean decrease in blood pressure with the new drug to the mean decrease with the placebo. [1 mark]

Ratio = _____ : 1

Question 8 continues on the next page

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0 8 . 4 A doctor says the new drug should be used to treat patients with high blood pressure. [2 marks]

Give **one** reason for and **one** reason against the doctor's view.

For

.....

.....

Against

.....

.....

0 9 Malaria is a disease caused by a protist.

0 9 . 1 Describe how malaria is spread from one person to another. [2 marks]

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.....

0 9 . 2 Give **two** ways of reducing the spread of malaria. [2 marks]

1

.....

2

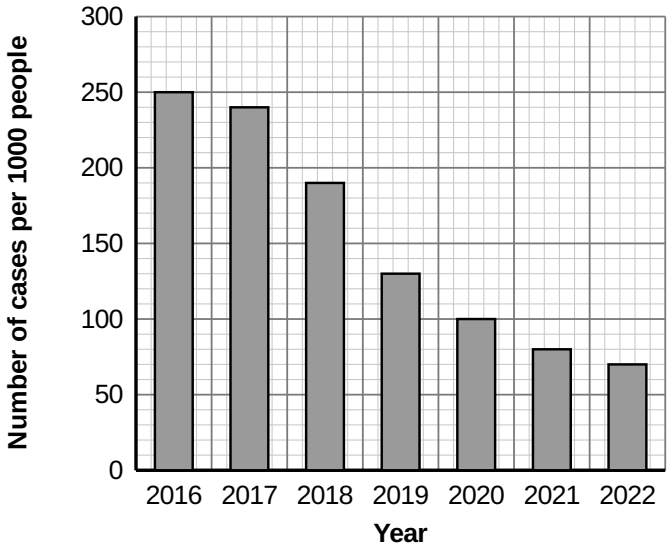
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Question 9 continues on the next page

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Figure 8 shows the number of cases of malaria in one country from 2016 to 2022

Figure 8



0 9 . 3 Calculate the percentage decrease in the number of cases of malaria from 2016 to 2022 [2 marks]

Percentage decrease = ... %

0 9 . 4 In 2016 the government set a target to halve the number of cases of malaria by 2020 [2 marks]

Did the government meet its target?

Use data from **Figure 8** to support your answer.

.....

.....

.....

.....

END OF QUESTIONS

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Additional page, if required.

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