Paper Reference(s) **1SC0/2BF**

Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Combined Science
Paper 4: Biology 2
Foundation Tier

Friday 7 June 2019 – Afternoon

Time: 1 hour 10 minutes plus your additional time allowance

INSTRUCTIONS TO CANDIDATES
Write your centre number, candidate number, surname, other names and your signature in the boxes below. Check that you have the correct question paper.

Centre No.							
Candidate No.							
Surname							
Other names							
Signature							
Paper Reference	1	S	C	0	/	2	B	F

- Use BLACK ink or ball-point pen.
- Answer ALL questions.
- Answer the questions in the spaces provided – there may be more space than you need.
- Calculators may be used.
- Any diagrams may NOT be accurately drawn, unless otherwise indicated.
- You must show all your working out with your answer clearly identified at the end of your solution.

MATERIALS REQUIRED FOR EXAMINATION
Calculator, ruler

ITEMS INCLUDED WITH QUESTION PAPERS
Nil

INFORMATION FOR CANDIDATES
- The total mark for this paper is 60.
- The marks for EACH question are shown in brackets – use this as a guide as to how much time to spend on each question.

(Instructions continue on next page)

- **Questions labelled with an ASTERISK (*) are ones where the quality of your written communication will be assessed. You should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.**
- **The marks available for spelling, punctuation and grammar are clearly indicated.**

ADVICE TO CANDIDATES

- **Read each question carefully before you start to answer it.**
- **Try to answer every question.**
- **Check your answers if you have time at the end.**

Answer ALL questions. Write your answers in the spaces provided.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

(Questions begin on next page)

1 (a) Figure 1 shows the water cycle.

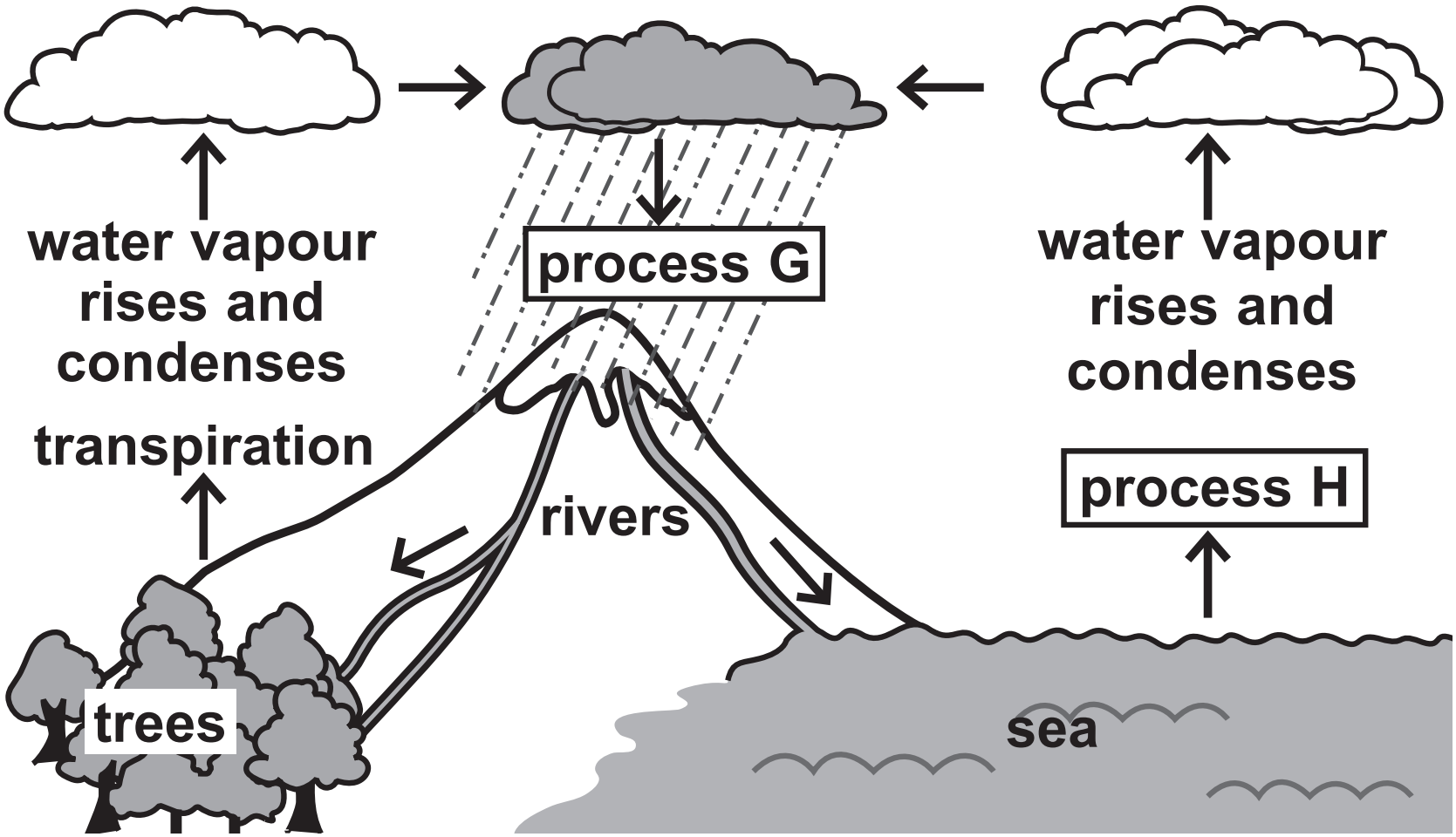


Figure 1

5

(Question continues on next page)

(i) Name process G and process H. (2 marks)

process G _____

process H _____

(ii) What causes the water vapour to condense and form clouds? (1 mark)

☐ A the water vapour cools down

☐ B the water vapour heats up

☐ C the temperature of the water vapour stays the same

☐ D the trees absorb more water

(Question continues on next page)

(b) Water from rivers is treated before it is safe to drink.

Use words from the box to complete the sentences. (2 marks)

filtering	fish	heating
mud	pathogens	stirring

During water treatment, the solids

in river water are removed by

_____ .

Chlorine is then added to the water

to kill _____ .

(Question continues on next page)

(c) Figure 2 shows the Canary Islands.

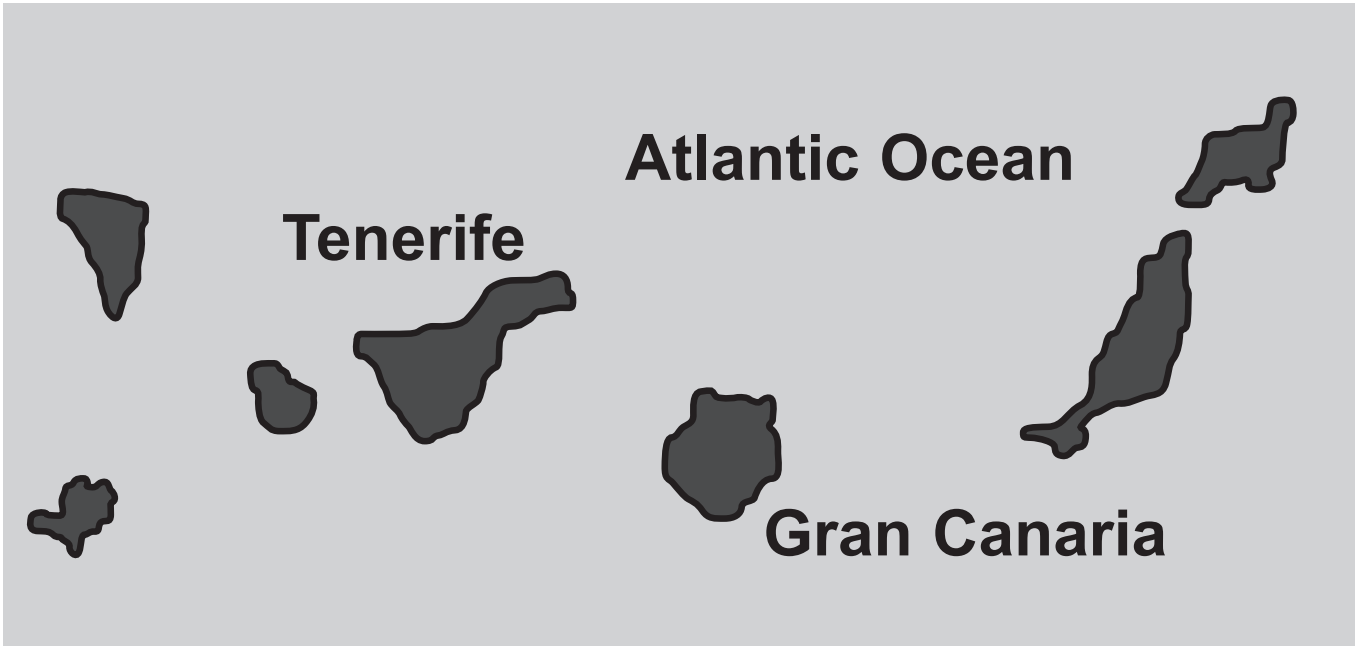


Figure 2

The Canary Islands do not have enough fresh water.

Describe how seawater can be turned into drinking water. (2 marks)

(Continue your answer on next page)

(TOTAL FOR QUESTION 1 = 7 MARKS)

(Questions continue on next page)

2 Figure 3 shows the positions of the endocrine glands in a woman and a man.

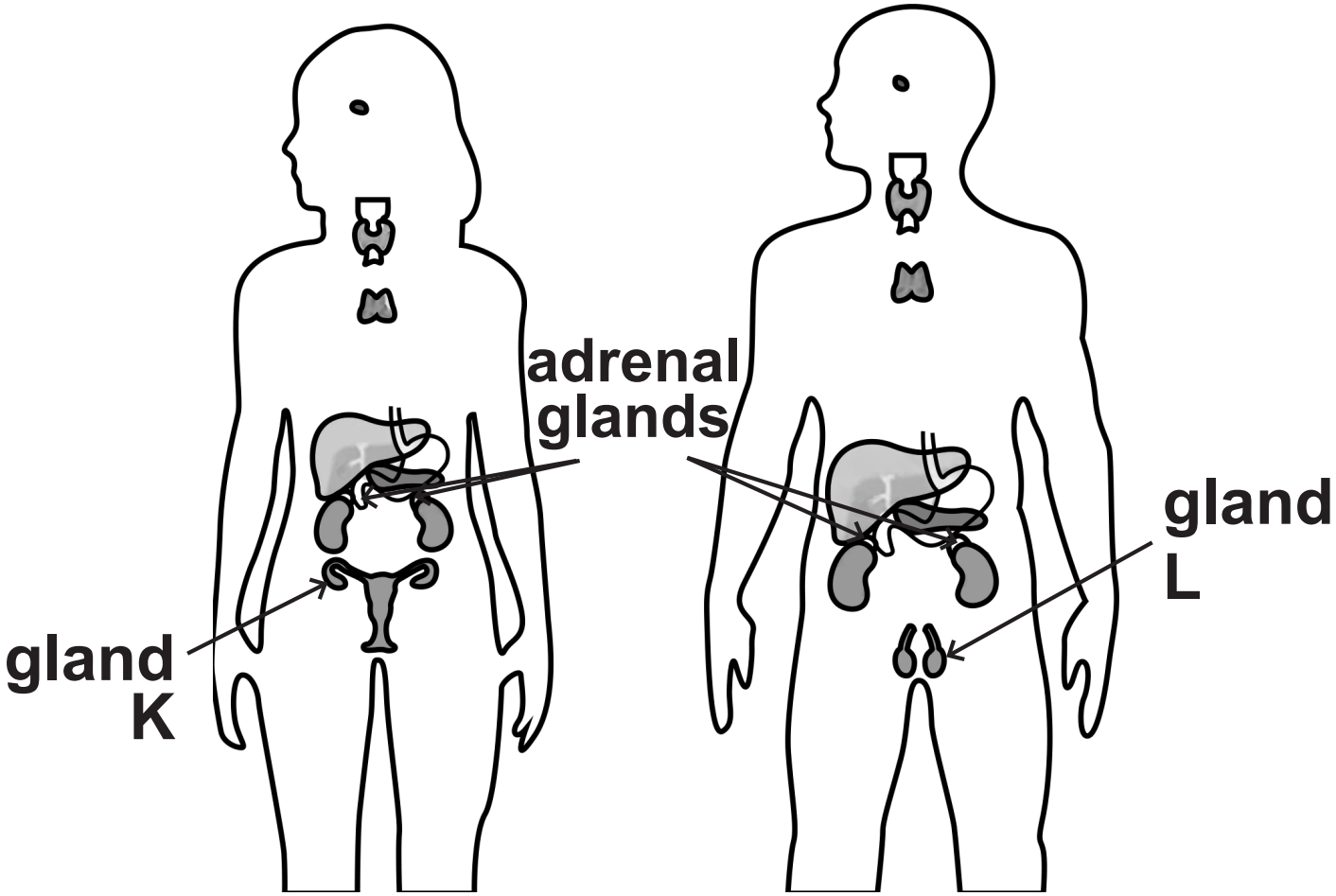


Figure 3

(Question continues on next page)

(a) Draw ONE straight line from each hormone to the effect of the hormone on the body. (2 marks)

hormone	effect of hormone
	increases glucose levels
hormone from gland K in the woman	prepares the uterus lining for a fertilised egg
	causes facial hair to grow
hormone from gland L in the man	controls the water content of the body
	decreases sweating

(Question continues on next page)

(b) How is adrenalin transported from the adrenal glands to its target organs? (1 mark)

☐ A by transpiration

☐ B by osmosis

☐ C dissolved in blood plasma

☐ D carried by red blood cells

(c) What name is given to the process of maintaining the internal body conditions? (1 mark)

☐ A respiration

☐ B diffusion

☐ C digestion

☐ D homeostasis

(Question continues on next page)

(d) Figure 4 shows the concentration of glucose in the blood of a person.

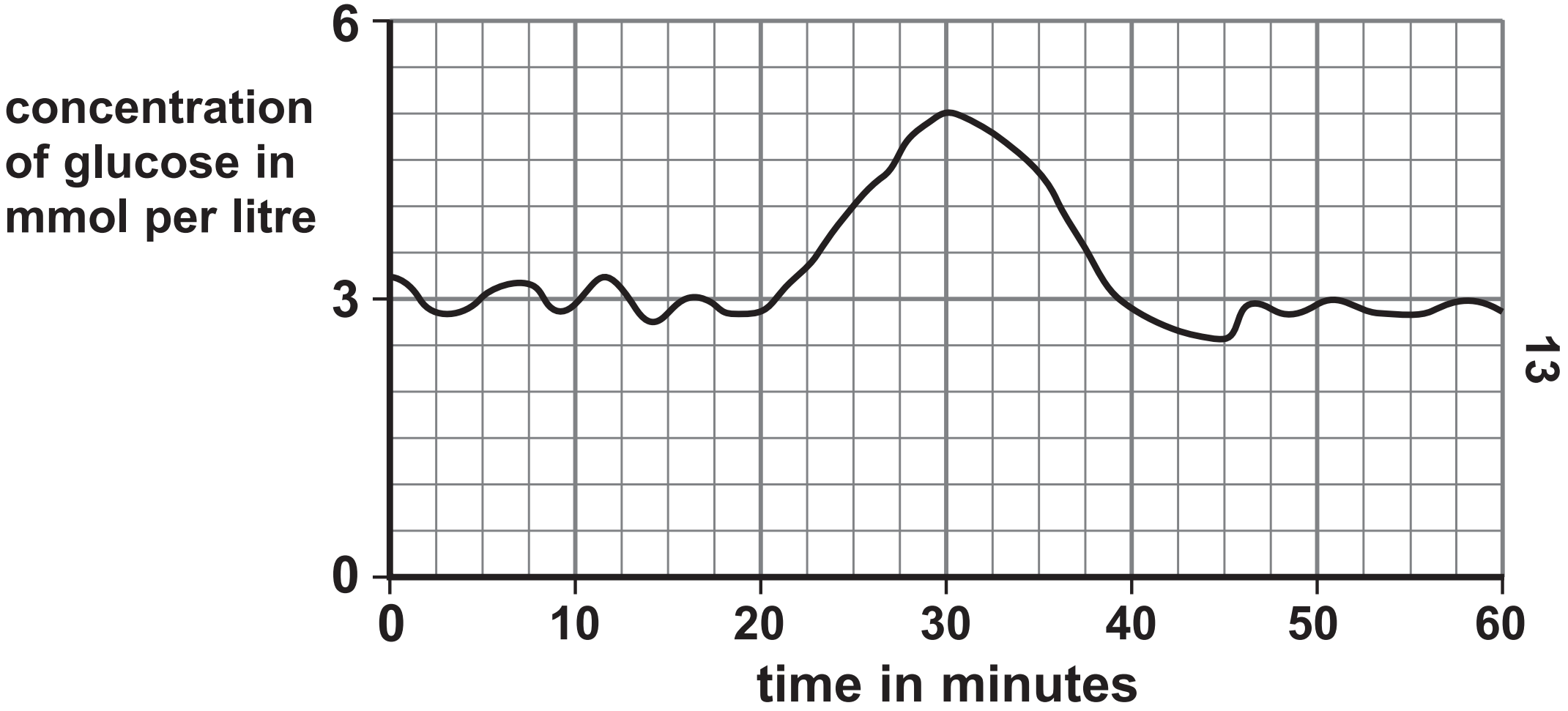


Figure 4

(Question continues on next page)

(Turn over)

(i) Describe the trends shown in Figure 4 from 0 minutes to 30 minutes. (2 marks)

(Question continues on next page)

(ii) Explain why the concentration of glucose decreases from 30 minutes to 40 minutes.
(2 marks)

(TOTAL FOR QUESTION 2 = 8 MARKS)

(Questions continue on next page)

3 (a) Figure 5 shows a cross section of an artery and a vein.

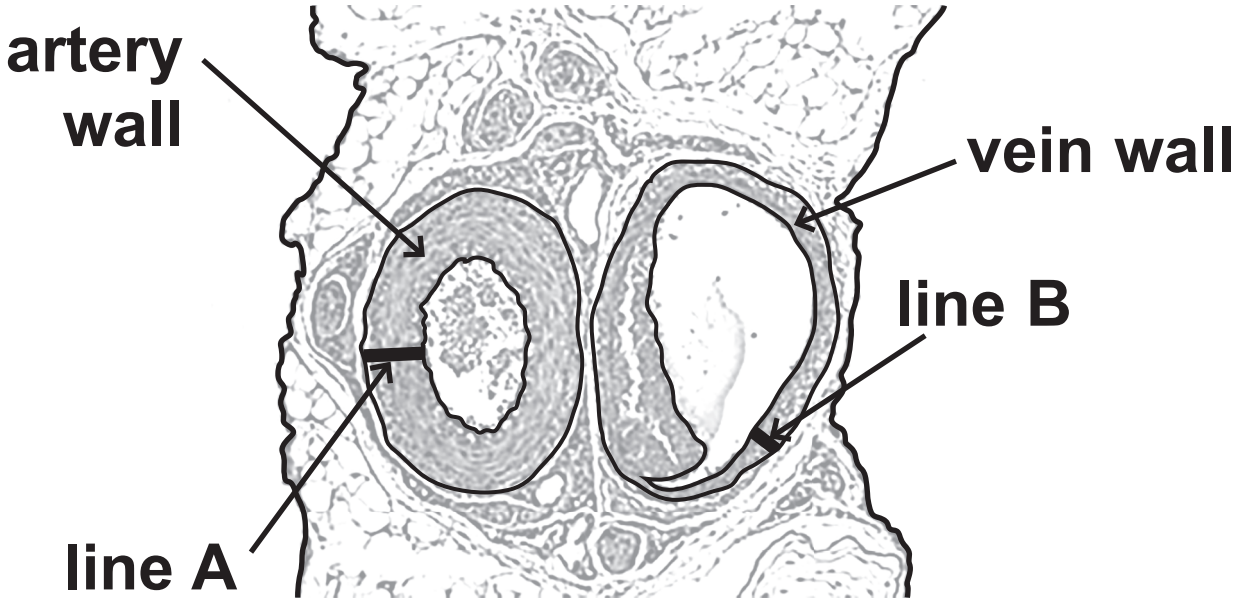


Figure 5

(i) Measure the length of line A and the length of line B in mm. (1 mark)

line A _____ mm

line B _____ mm

(Question continues on next page)

(ii) State the ratio of the thickness of the artery wall to the thickness of the vein wall. (1 mark)

_____

(b) (i) Give a reason why veins have valves. (1 mark)

_____

_____

_____

(Question continues on next page)

(ii) Name the artery that transports oxygenated blood from the heart to the body. (1 mark)

(c) A scientist investigated the relationship between exercise and the ability to run at 3 metres per second for 20 minutes.

The scientist collected data from six groups of people.

Each group exercised for a different number of hours per week for six months.

There were 100 people in each group.

(Question continues on next page)

Figure 6 shows their results.

group	number of hours of exercise per week	number of people who could run at 3 metres per second for 20 minutes
A	0	9
B	2	20
C	4	33
D	6	52
E	8	61
F	10	62

Figure 6

(Question continues on next page)

(i) Describe the relationship shown by this data. (2 marks)

(Question continues on next page)

(ii) Explain why some people's leg muscles tired quickly and developed cramp when they were running. (3 marks)

(TOTAL FOR QUESTION 3 = 9 MARKS)

(Questions continue on next page)

4 Figure 7 shows a plant cell as seen under a light microscope.

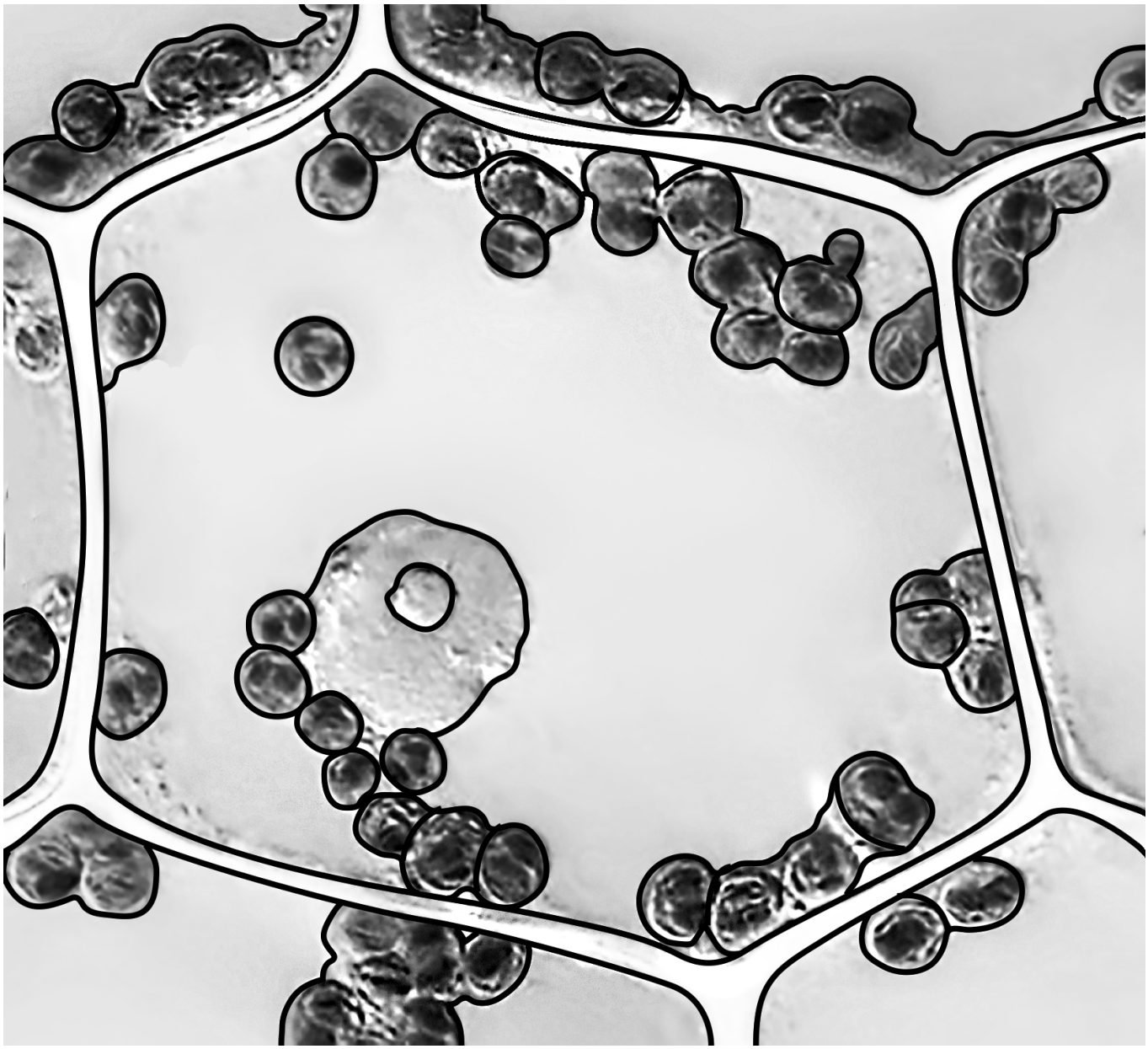
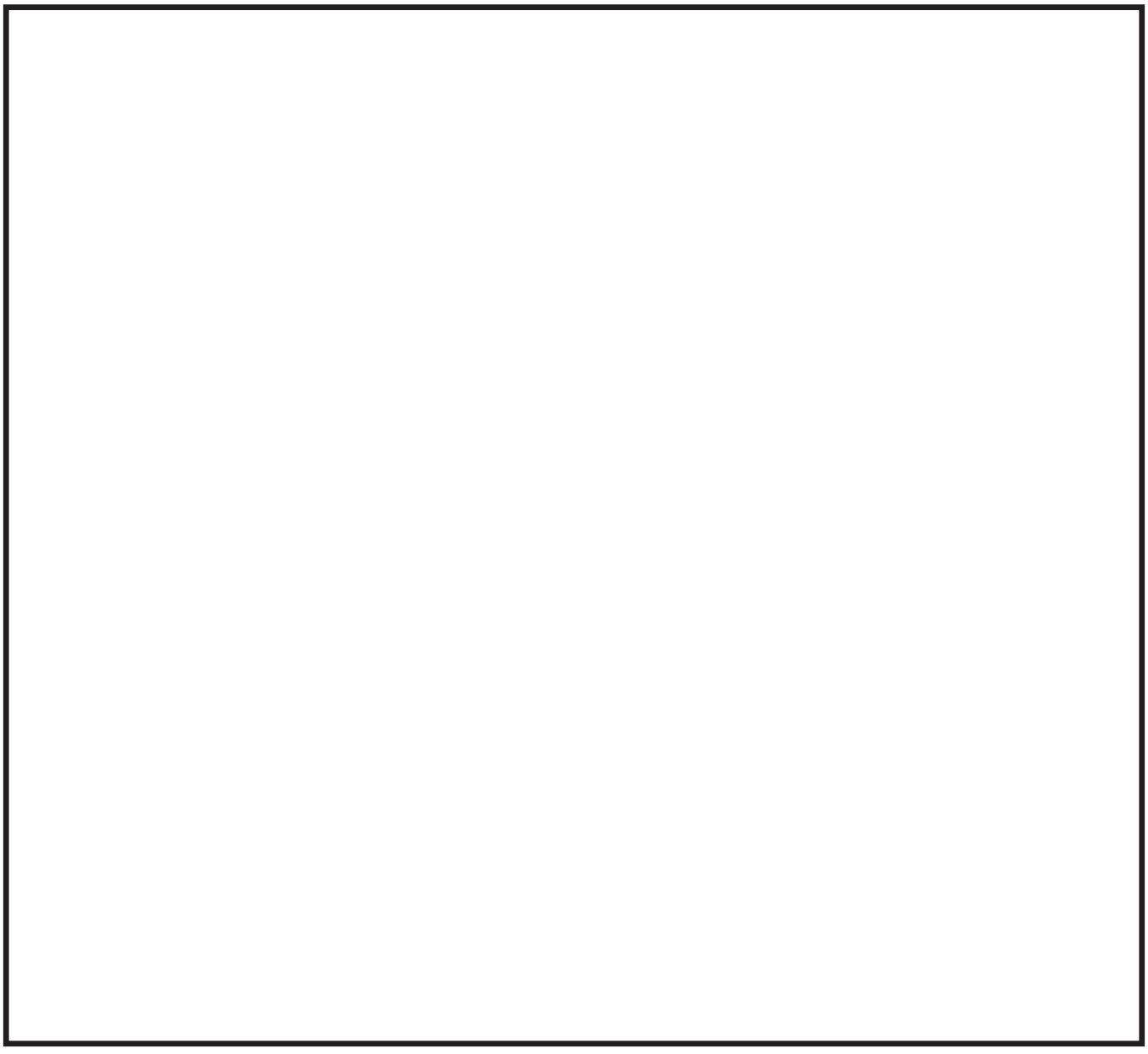


Figure 7

(Question continues on next page)

(a) Draw this plant cell in the box below.

Label THREE parts of this cell.
(4 marks)



(Question continues on next page)

(b) Mitochondria cannot be seen with a light microscope.

What is the function of mitochondria in a plant cell? (1 mark)

☐ A respiration

☐ B make proteins

☐ C photosynthesis

☐ D store water

(Question continues on next page)

(c) A student wanted to investigate the movement of water into and out of cells in potatoes.

The student had the equipment shown in Figure 8.

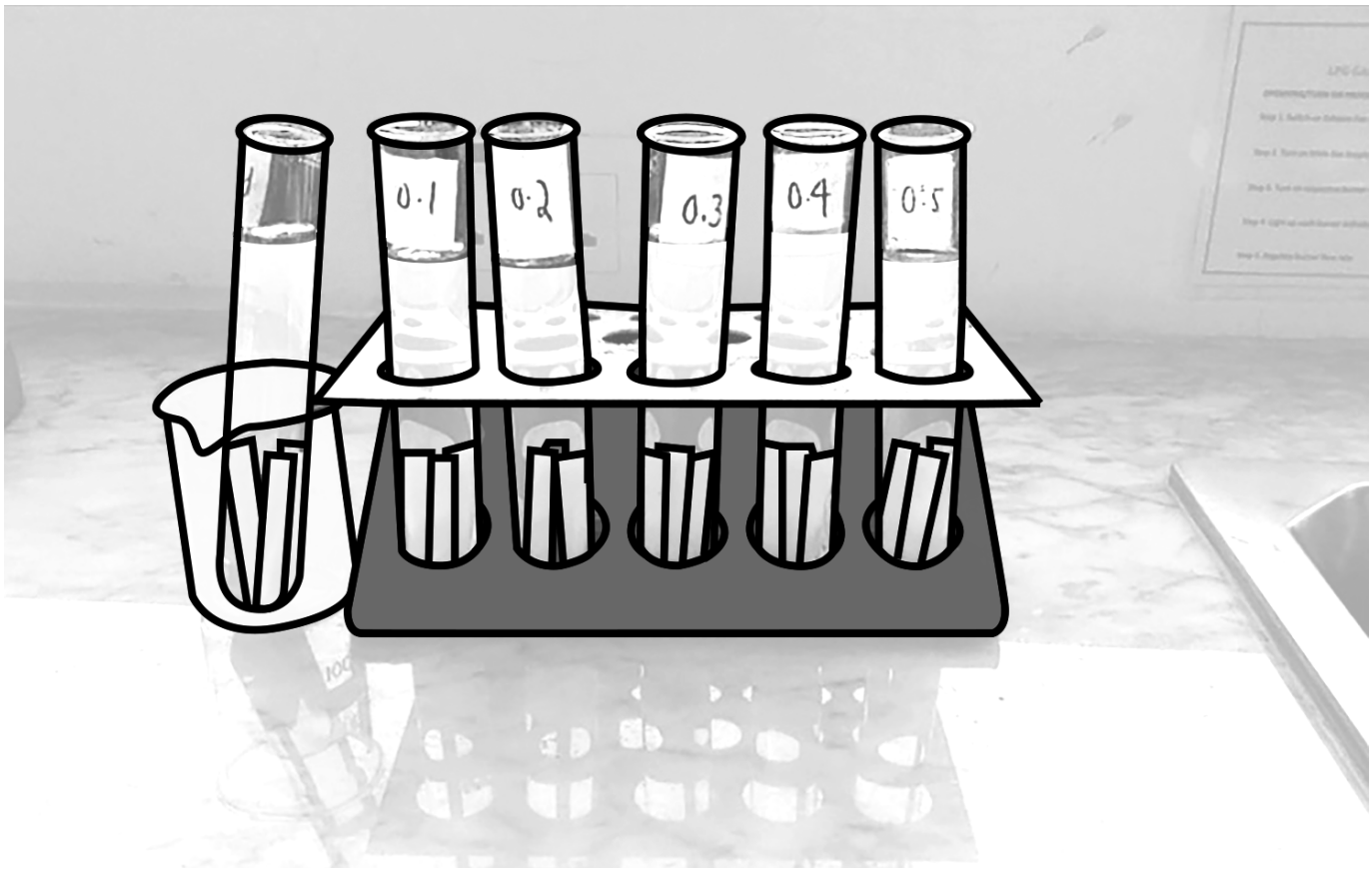


Figure 8

The test tubes in the rack contain different concentrations of sodium chloride solution.

(Question continues on next page)

The solutions were 0·1 M, 0·2 M, 0·3 M, 0·4 M and 0·5 M sodium chloride solution.

The test tube in the beaker contains distilled water.

There are three potato chips in each of the six test tubes.

(i) State why the test tube in the beaker only contains distilled water and three potato chips. (1 mark)

(Question continues on next page)

(ii) State TWO variables that need to be controlled in this investigation. (2 marks)

1 _____

_____

_____

2 _____

_____

_____

(Question continues on next page)

(iii) Explain why the chips in the 0·5 M sodium chloride solution lost mass. (3 marks)

(TOTAL FOR QUESTION 4 = 11 MARKS)

(Questions continue on next page)

5 (a) A student was investigating the populations of organisms in a garden.

Figure 9 shows the estimates of the number and biomass of some of the organisms in the garden.

organism	number	mean biomass of each organism in grams	biomass of population in grams
cabbages (plants)	80	70	5600
earthworms	620	3·4	?
slugs	30	4·1	123
hedgehogs	1	620	620
squirrels	2	600	1200

Figure 9

(Question continues on next page)

(i) Calculate the biomass of the population of earthworms in the garden. (1 mark)

(Question continues on next page)

(ii) Hedgehogs eat slugs and earthworms.
Slug pellets were used to kill the slugs.

Explain how killing the slugs would affect the population of earthworms in this garden.
(2 marks)

(Question continues on next page)

(iii) Describe a method that could be used to estimate the population of slugs in the garden. (3 marks)

(Question continues on next page)

(b) Explain how cabbages, earthworms and squirrels contribute to the carbon cycle. (3 marks)

(Question continues on next page)

(c) State THREE ways the concentration of nitrates in soil can be increased. (3 marks)

1 _____

_____

_____

2 _____

_____

_____

3 _____

_____

_____

(TOTAL FOR QUESTION 5 = 12 MARKS)

(Questions continue on next page)

6 (a) A student investigated respiration in three different organisms.

Red hydrogencarbonate indicator was placed in each of three test tubes.

Gauze was placed in each test tube to hold the organisms.

In test tube 1 the student placed four germinating peas.

In test tube 2 the student placed four dried peas.

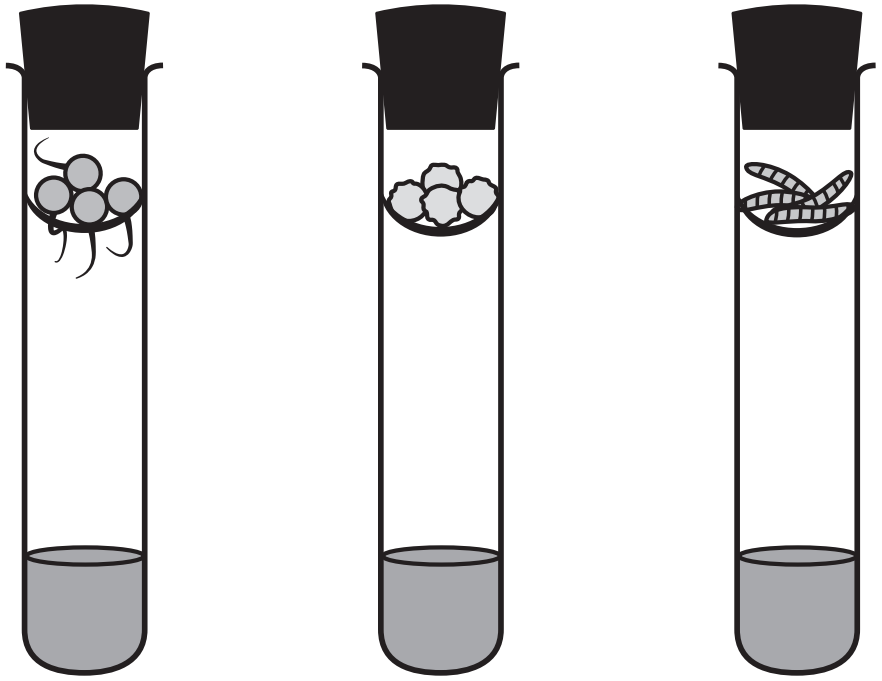
In test tube 3 the student placed four mealworms.

Bungs were added to each of the test tubes.

The three test tubes were left for one hour.

The equipment used is shown in Figure 10.

(Question continues on next page)



test tube 1 test tube 2 test tube 3

Figure 10

(Question continues on next page)

(i) State TWO ways this method could be improved to make the results for these three organisms more comparable. (2 marks)

1 _____

_____

_____

2 _____

_____

_____

(Question continues on next page)

(ii) Describe a suitable control for this investigation. (2 marks)

(Question continues on next page)

(b) Hydrogencarbonate indicator changes from red to yellow when more carbon dioxide is present.

The results for this investigation are shown in Figure 11.

organisms	colour of hydrogencarbonate indicator
germinating peas	yellow
dried peas	red
mealworms	yellow

Figure 11

(Question continues on next page)

(i) Explain why the result for the germinating peas is different from the result for the dried peas. (2 marks)

(Question continues on next page)

(ii) How was the carbon dioxide produced in this investigation? (1 mark)

☐ A by photosynthesis

☐ B when glucose is broken down in the presence of oxygen

☐ C when glucose is broken down in the absence of oxygen

☐ D by the reaction between oxygen and water

(Question continues on next page)

*(c) Carbon dioxide is carried in blood plasma.

Human blood also contains red blood cells and white blood cells.

Explain how the structure of red blood cells and white blood cells is related to their function. (6 marks)

(Continue your answer on next page)

(Continue your answer on next page)

(TOTAL FOR QUESTION 6 = 13 MARKS)

TOTAL FOR PAPER = 60 MARKS

END