Paper Reference(s) **1BI0/2F**

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

Biology

Paper 2
Foundation Tier

Friday 7 June 2019 – Afternoon

Time: 1 hour 45 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	B	I	0	/	2	F

Pearson

- 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 100.
- The marks for EACH question are shown in brackets – use this as a guide as to how much time to spend on each question.
- In questions marked with an ASTERISK (*), marks will be awarded for your ability to structure your answer logically showing how the points that you make are related or follow on from each other where appropriate.

(Instructions continue on next page)

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.

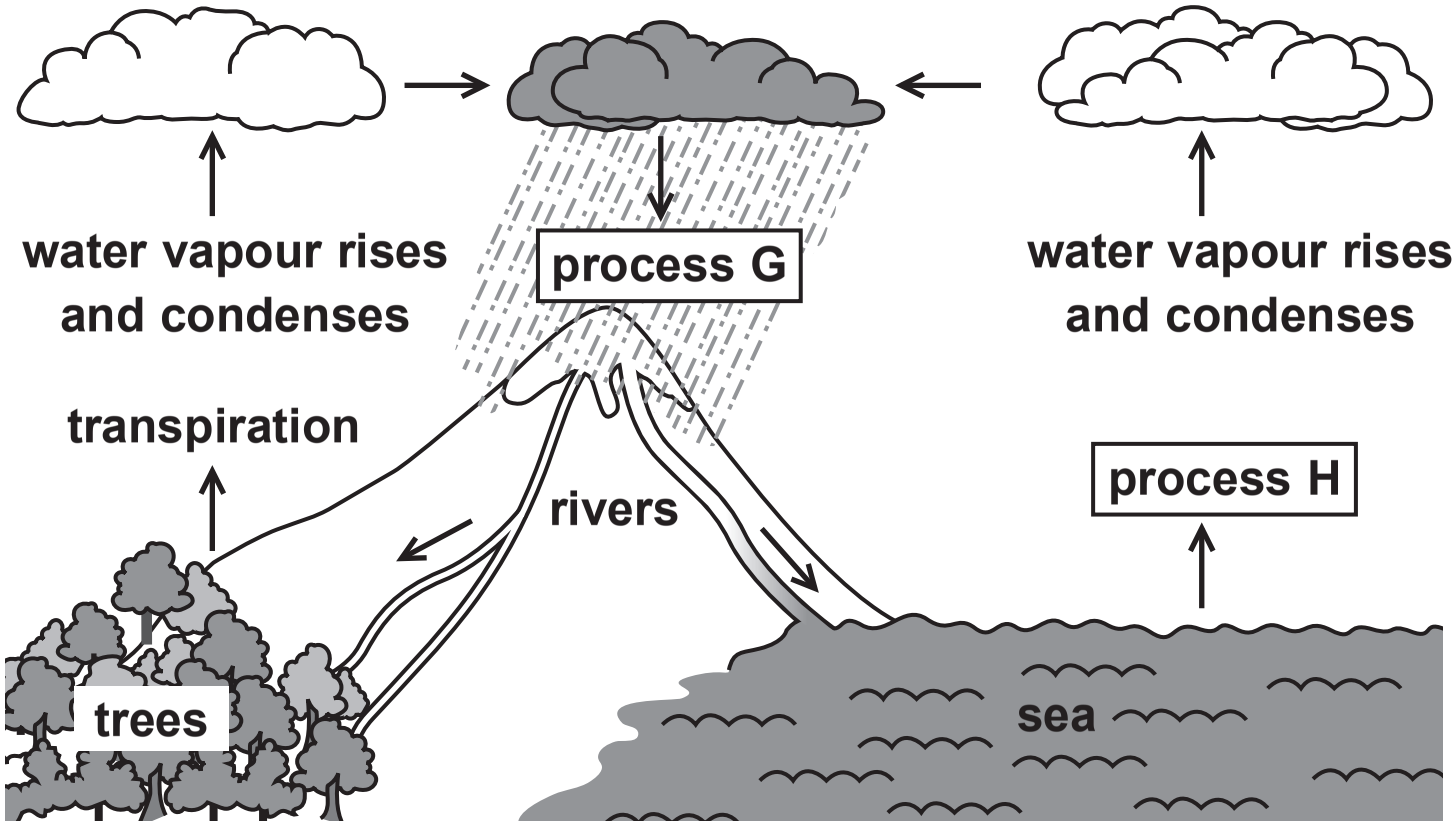

Figure 1

(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.

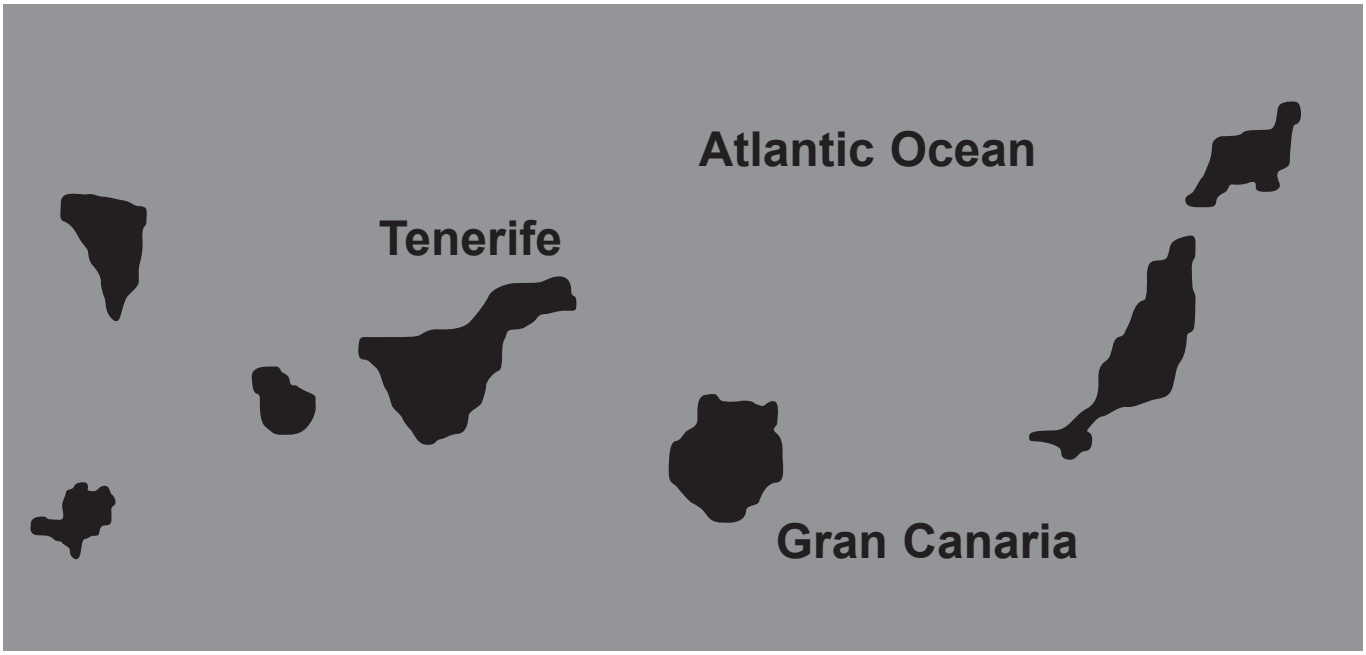

Figure 2

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.**

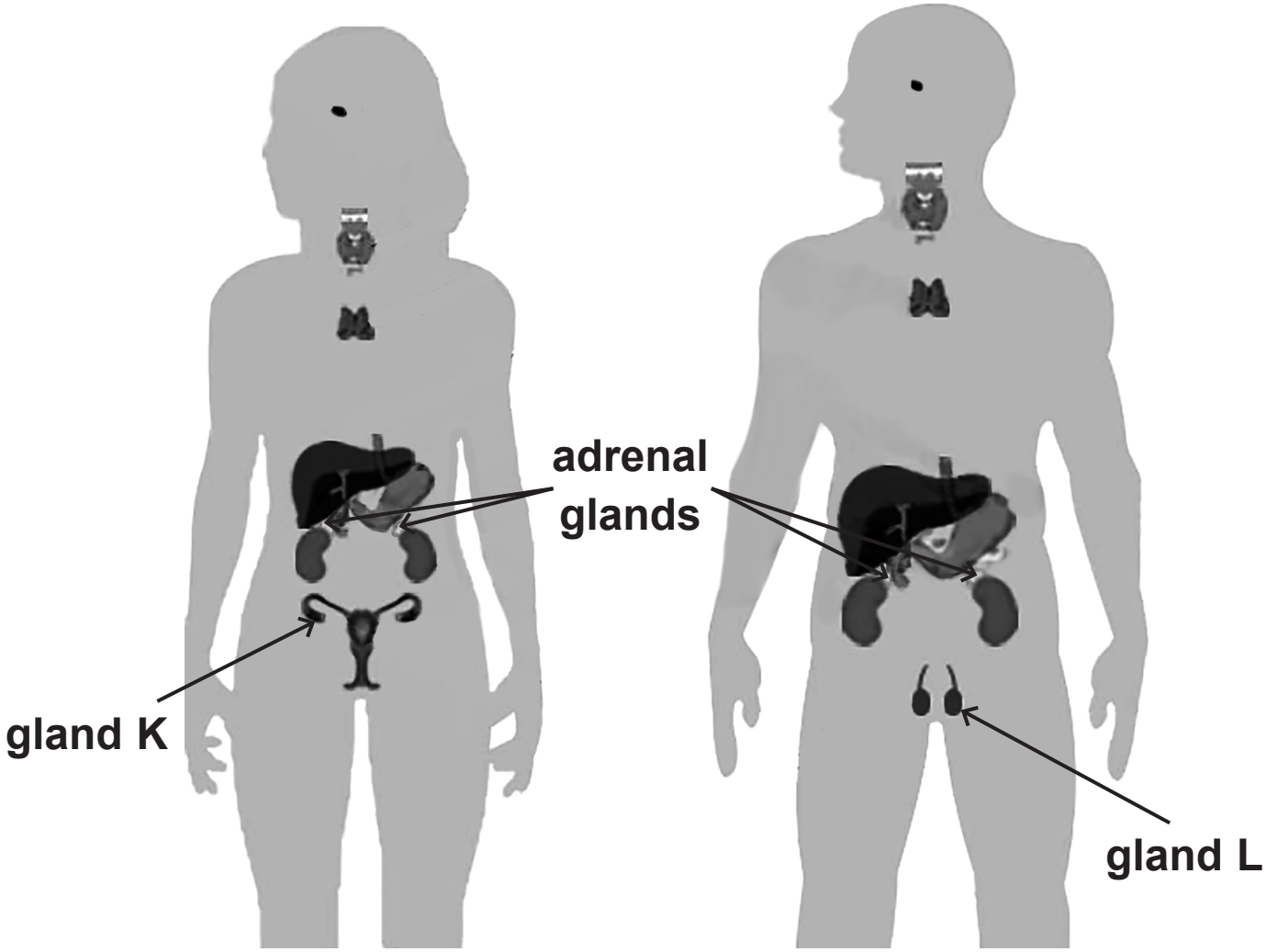

Figure 3

(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.

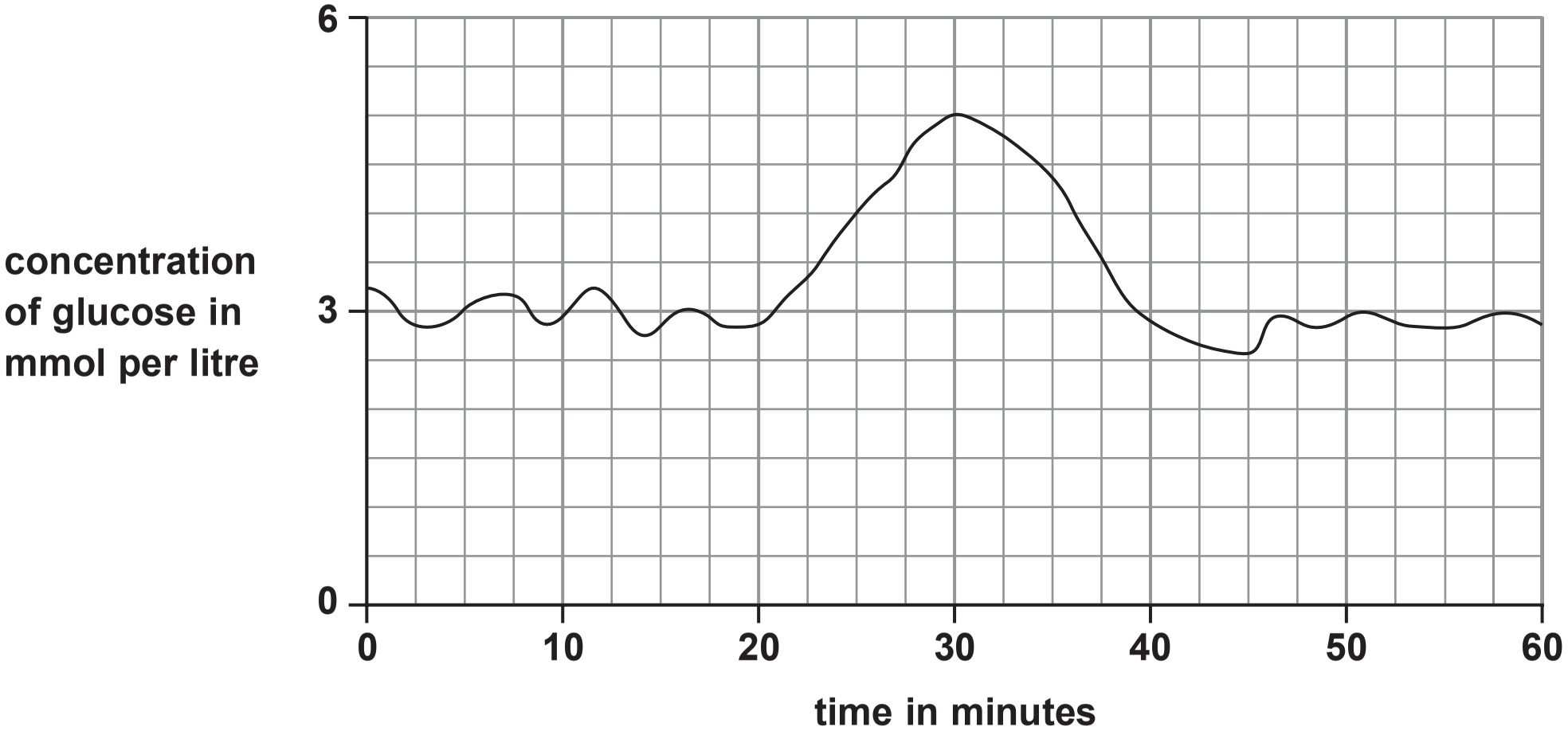

Figure 4

(Question continues on next page)

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

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

(Continue your answer on next page)

(TOTAL FOR QUESTION 2 = 8 MARKS)

(Questions continue on next page)

3 (a) Photosynthesis occurs in leaves.

(i) Which substance is needed for photosynthesis? (1 mark)

☐ A carbon dioxide

☐ B glucose

☐ C oxygen

☐ D nitrogen

(ii) A leaf cell is 0·08 mm long.

Calculate the length of the image of this cell after it has been magnified 50 times using a microscope. (2 marks)

_____ mm

(Question continues on next page)

Pine trees can live in dry soil.

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

thickness	water	light
area	chlorophyll	volume

The pine leaf has stomata in pits to reduce the loss of _____ .

The pine leaf is needle-shaped to reduce the surface _____ .

(Question continues on next page)

(c) Figure 5 shows young tomato plants growing in a glasshouse.

Figure 5

The young tomato plants are growing towards the light.

Explain how a plant hormone causes these shoots to grow towards the light. (2 marks)

_____

_____

(Continue your answer on next page)

(TOTAL FOR QUESTION 3 = 7 MARKS)

(Questions continue on next page)

4 (a) Figure 6 shows a cross section of an artery and a vein.

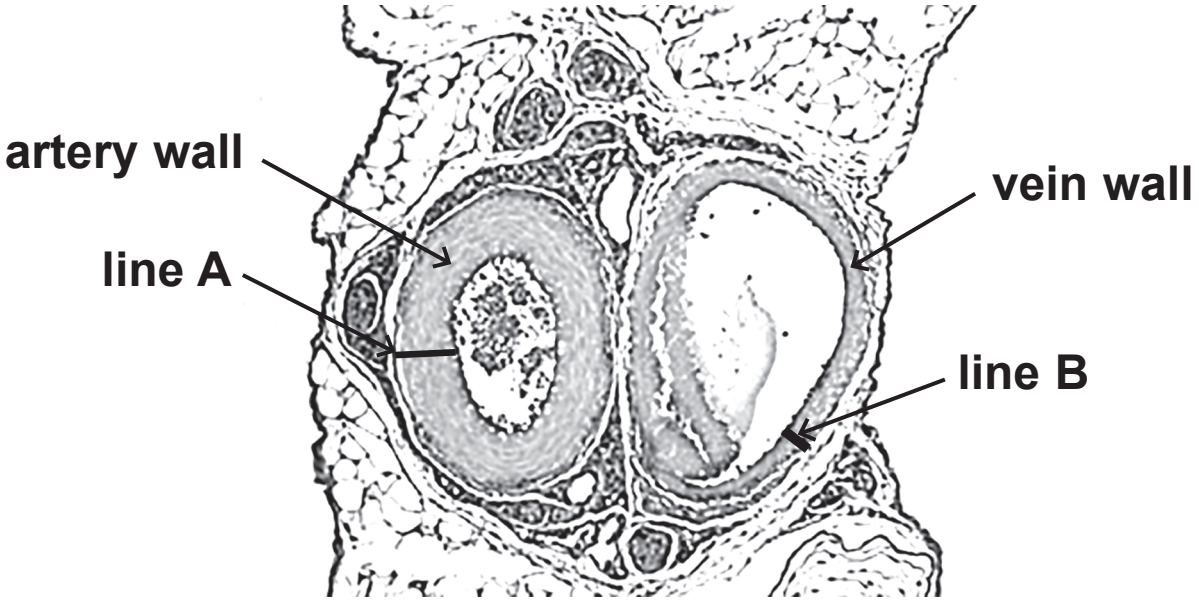

Figure 6

(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)

_____

_____

_____

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

_____

(Question continues on next page)

(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.

Figure 7 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 7

(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 4 = 9 MARKS)

(Questions continue on next page)

5 Figure 8 shows an area of nettle plants.

Figure 8

Grass does not grow among the nettles.

(a) Explain why grass does not grow where there are nettles. (2 marks)

(Continue your answer on next page)

(Question continues on next page)

(b) Figure 9 shows caterpillars eating nettle leaves.

Figure 9

A caterpillar has a body mass of 6·0 grams.
One week later, its body mass had increased to 7·5 grams.
Caterpillars convert 10% of food eaten into body mass.

(Question continues on next page)

(i) Calculate the mass of nettles that the caterpillar ate. (2 marks)

_____ grams

(Question continues on next page)

(ii) Describe what happens to food eaten that is not converted into the body mass of the caterpillar. (2 marks)

(c) Devise a method a scientist could use to investigate how temperature affects nettle growth. (4 marks)

(Continue your answer on next page)

(TOTAL FOR QUESTION 5 = 10 MARKS)

(Questions continue on next page)

6 Figure 10 shows a plant cell as seen under a light microscope.

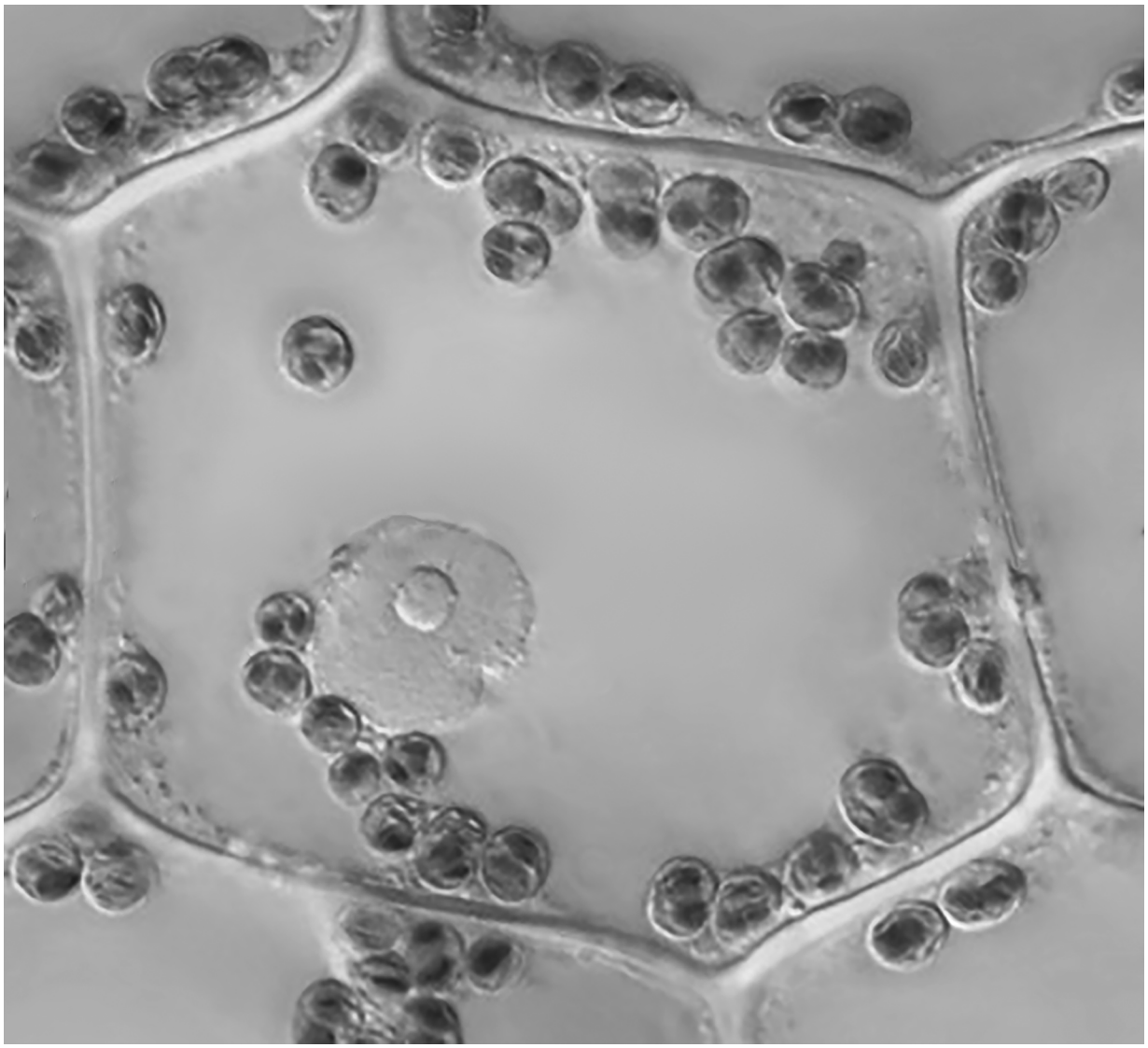

Figure 10

(a) Draw this plant cell in the box on page 32.

Label THREE parts of this cell. (4 marks)

(Question continues on next page)

(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 11.

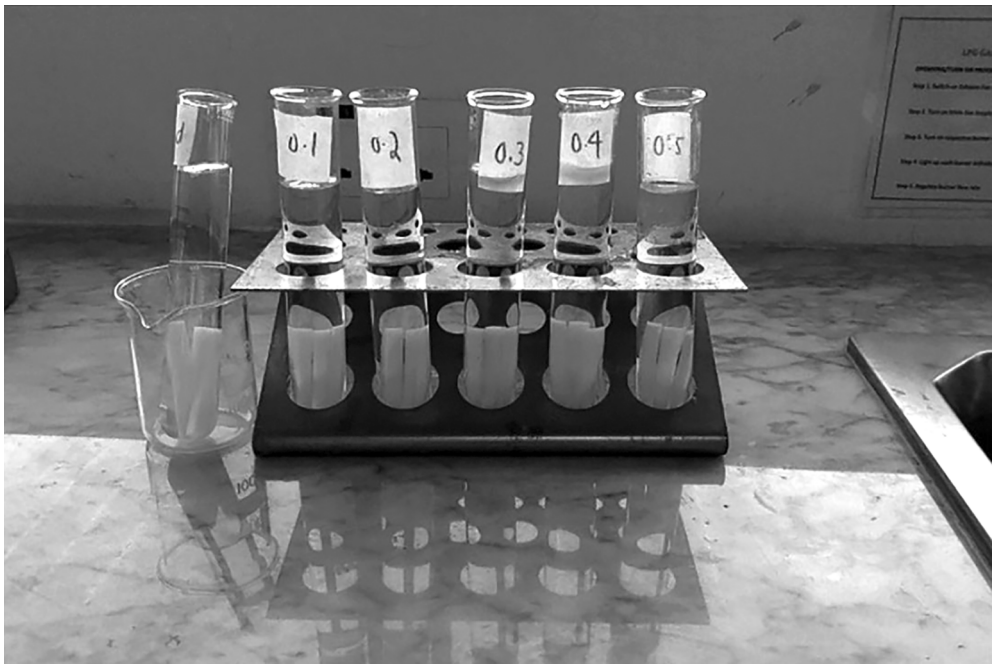

Figure 11

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

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.

(Question continues on next page)

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

_____

_____

_____

(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 6 = 11 MARKS)

(Questions continue on next page)

7 The increasing human population is affecting farming and the habitats of animals.

Figure 12 shows the human population of the UK from 1960 to 2018.

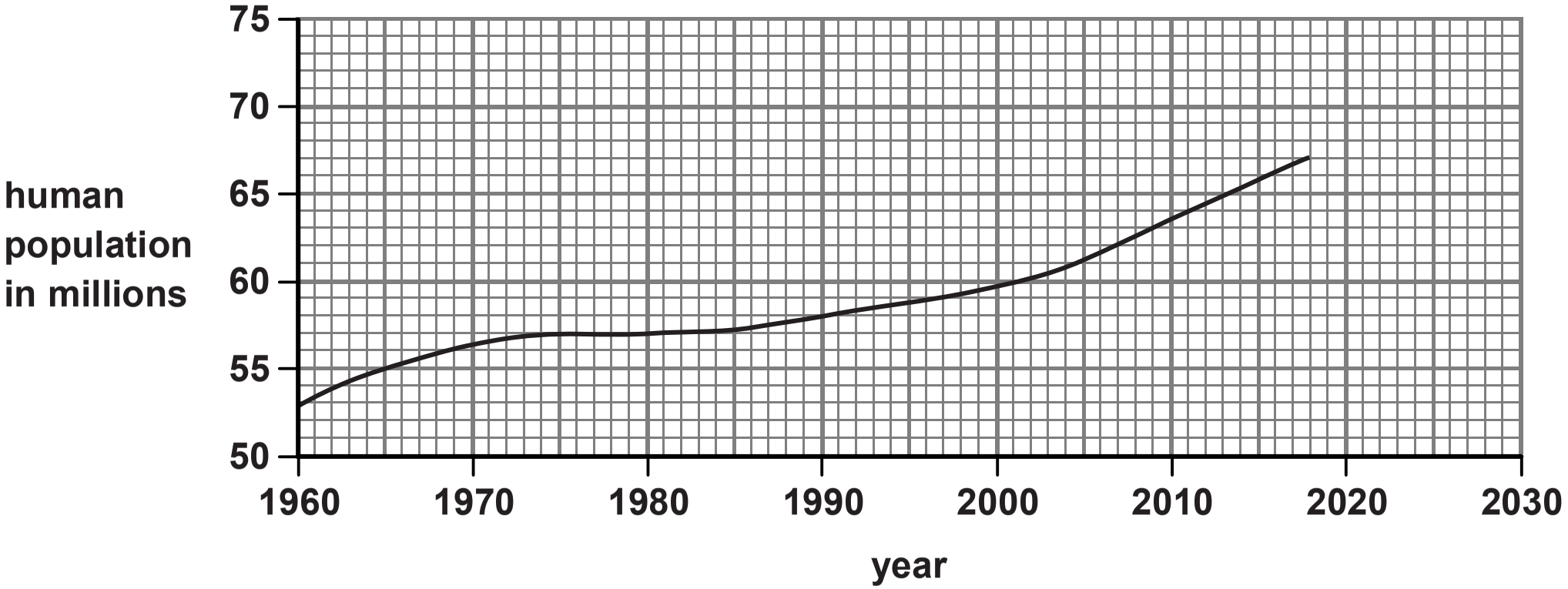

Figure 12

(Question continues on next page)

(Turn over)

(a) Extend the line to estimate the human population of the UK in 2030 if this trend continues. (1 mark)

_____ million

(b) Food security means that a population has enough safe and healthy food.

Which of these would improve food security? (1 mark)

☐ A increased reforestation

☐ B increased animal farming

☐ C increased human population

☐ D increased crop yield

(Question continues on next page)

(c) A scientist tested three samples of different foods.

Figure 13 shows the results.

food sample	result of adding iodine solution	result of boiling with Benedict's solution	result of adding Biuret solution	result of emulsion test
E	black	blue	blue	clear
F	brown	orange	purple	clear
G	brown	orange	purple	cloudy

Figure 13

(i) Name the food group in sample E. (1 mark)

_____

(ii) Name the food groups in sample F. (1 mark)

_____

(Question continues on next page)

(iii) The emulsion test shows that food sample G contained fat.

Describe how fat is digested in the body.
(2 marks)

(Question continues on next page)

*(d) Figure 14 shows a field of a crop in one area of Africa.

The crop cannot be eaten by people.

The crop is used to produce biofuel.

Figure 14

Describe the advantages and disadvantages of growing this crop to produce biofuel. (6 marks)

(Continue your answer on next page)

(Continue your answer on next page)

(TOTAL FOR QUESTION 7 = 12 MARKS)

(Questions continue on next page)

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

Figure 15 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 15

(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 8 = 12 MARKS)

(Questions continue on next page)

9 (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 16 on page 50.

(Question continues on next page)

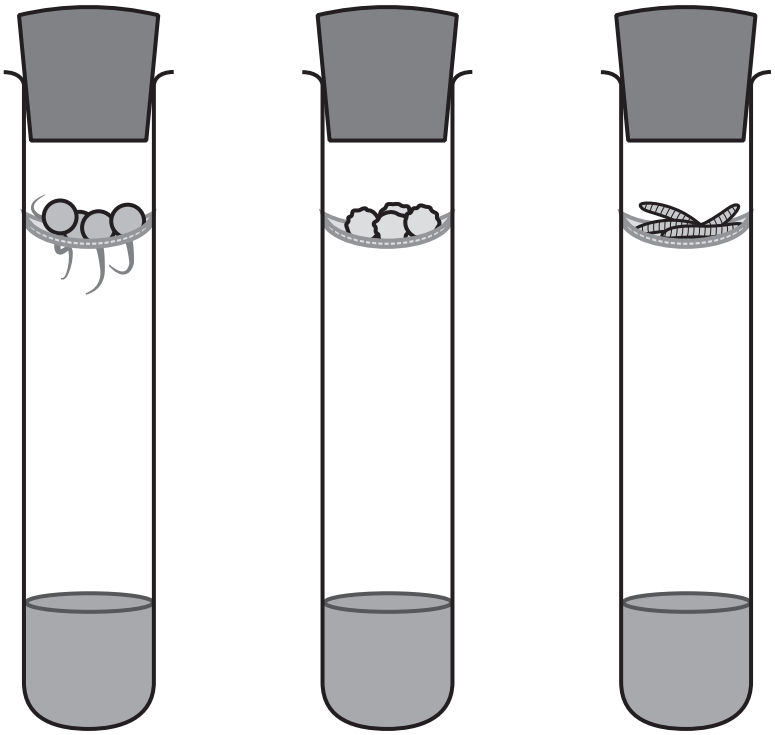

Figure 16

(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 17.

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

Figure 17

(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

*(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)

(Continue your answer on next page)

(TOTAL FOR QUESTION 9 = 13 MARKS)

(Questions continue on next page)

10 A student was investigating the effect of sweating.

The student set up two conical flasks each with a thermometer as shown in Figure 18.

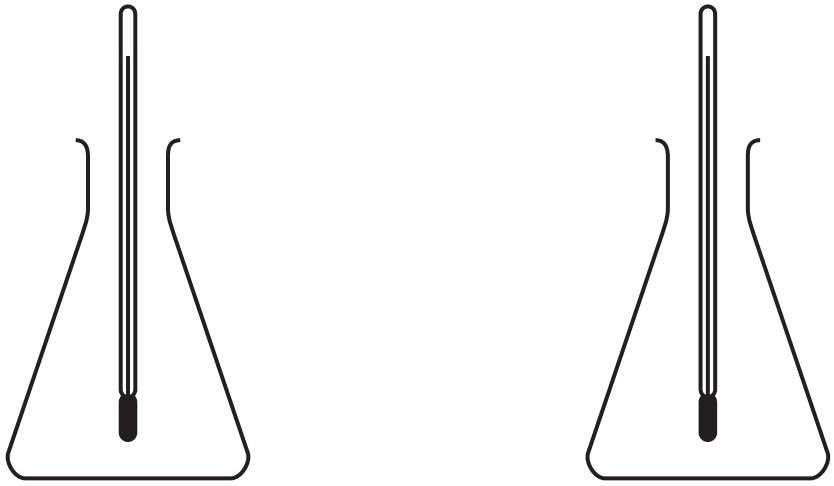

Figure 18

Flask 1 was covered in WET tissue paper.

Flask 2 was covered with DRY tissue paper.

Hot water was added to each of the flasks.

The temperature of the water in each flask was recorded every minute for 10 minutes.

(Question continues on next page)

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

1 _____

_____

_____

2 _____

_____

_____

(Question continues on next page)

(b) The results of this investigation are shown in Figure 19.

time in minutes	flask 1 (wet tissue paper) temperature in ^{o}C	flask 2 (dry tissue paper) temperature in ^{o}C
1	98	98
2	82	91
3	71	84
4	60	76
5	50	69
6	39	61
7	31	56
8	22	49
9	22	42
10	22	37

Figure 19

(Question continues on next page)

(i) Calculate the rate of temperature change in flask 1 from 1 to 8 minutes. (2 marks)

_____ ^{o}C per minute

(ii) Compare the trends shown in the data for flask 1 and flask 2. (2 marks)

_____

_____

_____

_____

_____

_____

(Question continues on next page)

(c) Explain how sweating helps to cool the body. (2 marks)

(d) Which part of the brain controls internal body temperature? (1 mark)

- ☐ A cerebellum
- ☐ B medulla oblongata
- ☐ C hypothalamus
- ☐ D pituitary gland

(Question continues on next page)

(e) Explain why it is important to control the internal temperature of the human body. (2 marks)

(TOTAL FOR QUESTION 10 = 11 MARKS)

TOTAL FOR PAPER = 100 MARKS

END