CAMBRIDGE
International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

BIOLOGY **0610/42**

Paper 4 Theory (Extended) **May/June 2026**

1 hour 15 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS
- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen. Do **not** use correction fluid or tape.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION
- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

© Cambridge University Press & Assessment 2026

1 **(a)** A student investigated the effect of wind speed on the rate of transpiration in a plant shoot.

View solution

Figure 1.1 shows the apparatus used.

As water is taken up by the plant shoot, the air bubble in the capillary tube moves towards the shoot.

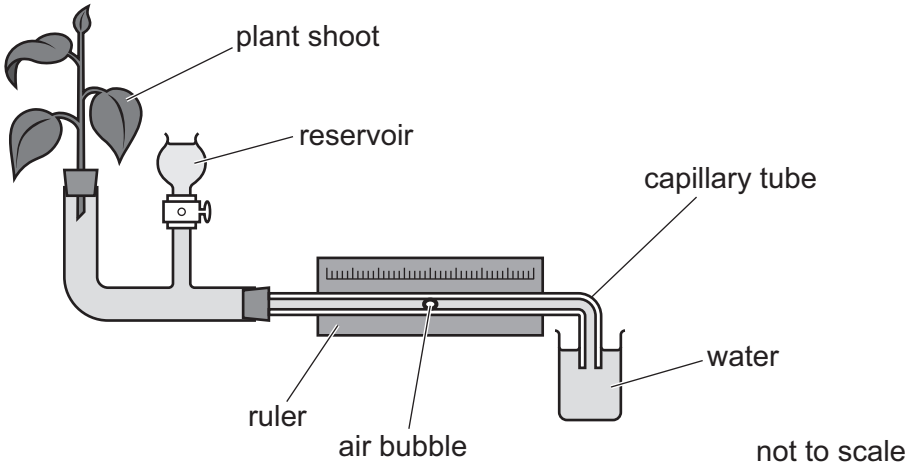


Figure 1.1

The student used a fan set at different speeds to change the wind speed.

He measured the distance travelled by the air bubble in 300 seconds.

The results of the student's investigation are shown in Table 1.1.

Table 1.1

wind speed / m s^{-1}	**distance travelled by the air bubble in 300 s / mm**	**rate of transpiration / mm s^{-1}**
0	2	0.01
2	12	0.04
4	20	0.07
6	35	0.12
8	115	0.38
10	135	.....

(i) Calculate the rate of transpiration for a wind speed of 10 m s^{-1} where the distance moved by the bubble was 135 mm in 300 seconds.

Write your answer in Table 1.1. [1]

© Cambridge University Press & Assessment 2026

(ii) Describe the effect on the rate of transpiration of increasing the wind speed in this investigation.

.....

.....

.....

.....

..... [2]

(iii) Suggest why the rate of transpiration is only an estimate of water uptake in a plant.

.....

.....

..... [1]

(iv) State **two** other environmental factors that can change the rate of transpiration in a plant shoot.

1 .....

2 .....

[2]

View solution

(b) Explain how transpiration causes the movement of water in the xylem.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 10]

© Cambridge University Press & Assessment 2026

2 **(a)** Describe what is meant by a sustainable resource.

.....

.....

.....

.....

..... [2]

(b) Tilapia is a type of fish that is eaten by many people around the world.

View solution

In the wild, tilapia feed on producers.

Fish farmers grow these fish in water in outdoor ponds.

The ponds are positioned to maximise access to sunlight.

Suggest how maximising sunlight leads to an increase in the growth of tilapia.

.....

.....

.....

.....

.....

.....

..... [3]

(c) Tilapia are a good source of protein. Some farmers add waste organic material to the ponds as a source of mineral ions for the fish.

(i) State the name of the mineral ion that provides an element found in all proteins.

View solution

..... [1]

(ii) State **one** reason why proteins are important in the human diet.

View solution

..... [1]

(iii) State the name of a process that could occur if the farmer adds excessive waste organic material to the pond.

View solution

..... [1]

© Cambridge University Press & Assessment 2026

(d) One way of conserving wild fish stocks is to regulate the size of the holes in the nets that are used to catch the fish.

View solution

Explain how this helps to conserve fish stocks.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

(e) Some species are threatened with extinction.

View solution

Explain the reasons why species become endangered.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

© Cambridge University Press & Assessment 2026

(f) Organisms can be conserved in captive breeding programmes by using the techniques of artificial insemination (AI) and *in vitro* fertilisation (IVF).

View solution

Describe the processes of artificial insemination (AI) and *in vitro* fertilisation (IVF).

artificial insemination (AI) .....

.....

.....

.....

.....

.....

in vitro fertilisation (IVF) .....

.....

.....

.....

.....

.....

[5]

[Total: 23]

© Cambridge University Press & Assessment 2026

Turn over

© Cambridge University Press & Assessment 2026

3 Figure 3.1 shows the human male reproductive system.

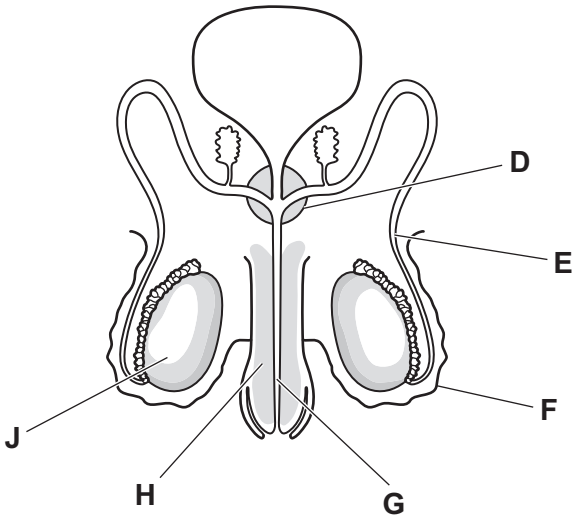


Figure 3.1

(a) Use the information in Figure 3.1 to complete Table 3.1.

View solution

Table 3.1

name	letter from Figure 3.1	function
	E	
prostate gland		
	F	
		tube for urine and sperm to pass through
penis		

[5]

© Cambridge University Press & Assessment 2026

(b) Meiosis occurs in structure **J** in Figure 3.1.

View solution

Explain the importance of meiosis occurring in structure **J**.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 9]

© Cambridge University Press & Assessment 2026

4 Glucose is a carbohydrate.

(a) List the chemical elements that are found in all carbohydrates.

View solution

..... [1]

(b) Figure 4.1 is a diagram that shows part of the human body.

View solution

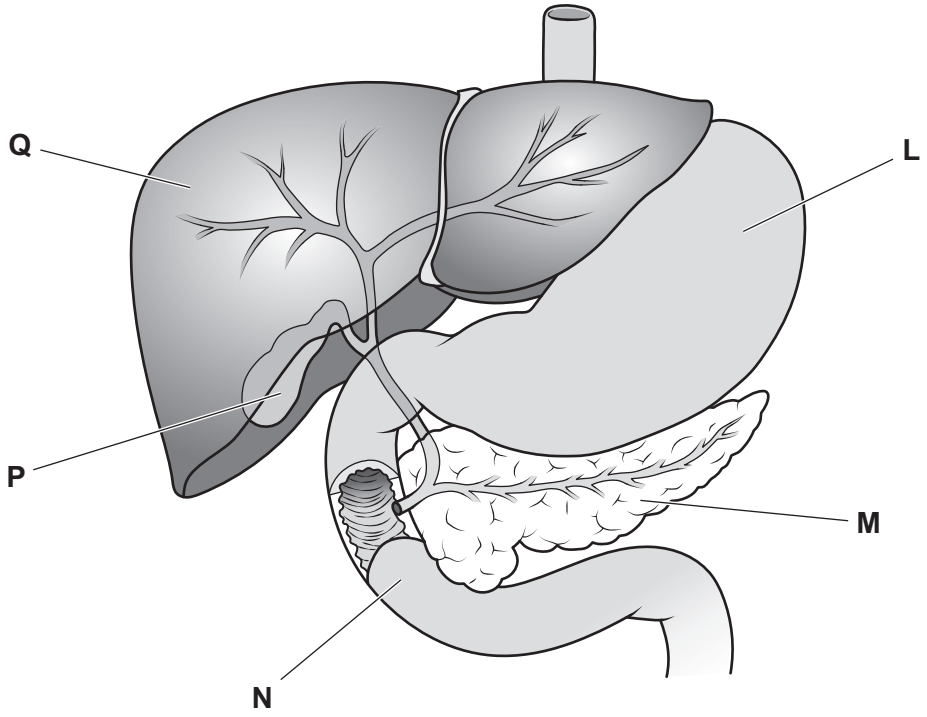


Figure 4.1

(i) State the letter of the structure shown in Figure 4.1 that:

produces urea .....

produces pepsin .....

[2]

© Cambridge University Press & Assessment 2026

(ii) Structure **M** in Figure 4.1 releases a hormone that increases blood glucose concentration.

View solution

State the name of this hormone **and** explain how it increases blood glucose concentration.

.....

.....

.....

.....

.....

.....

..... [3]

(iii) State the name of **one other** hormone that increases blood glucose concentration.

..... [1]

View solution

© Cambridge University Press & Assessment 2026

(c) People with diabetes cannot control their blood glucose concentration.

Figure 4.2 is a graph that shows the changes in blood glucose concentration after eating a meal in a person without diabetes and in a person with diabetes.

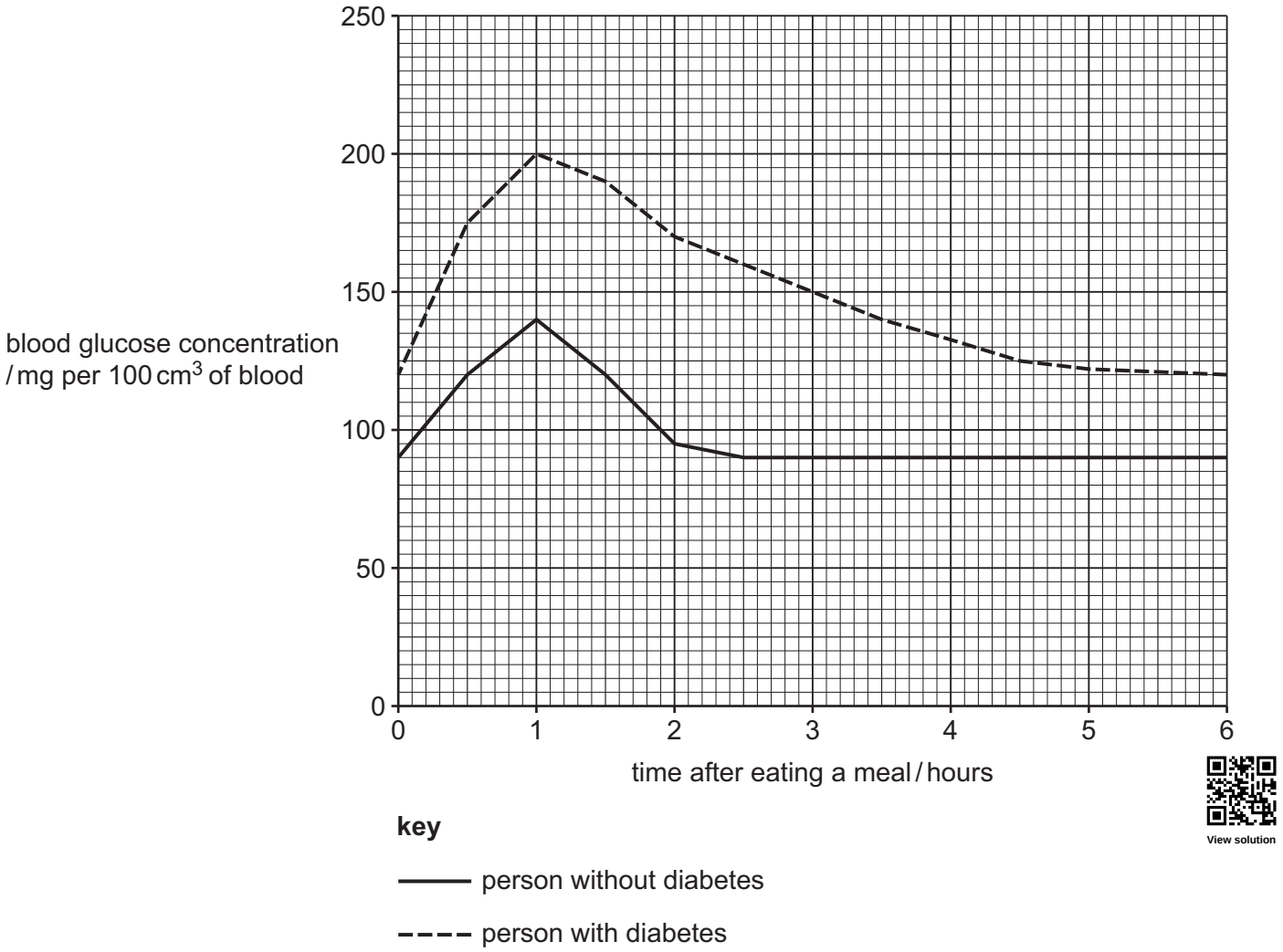


Figure 4.2

Describe the differences between the blood glucose concentrations of the person without diabetes and the person with diabetes.

.....

.....

.....

.....

.....

.....

..... [3]

© Cambridge University Press & Assessment 2026

(d) Outline the treatment for type 1 diabetes.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 13]

View solution

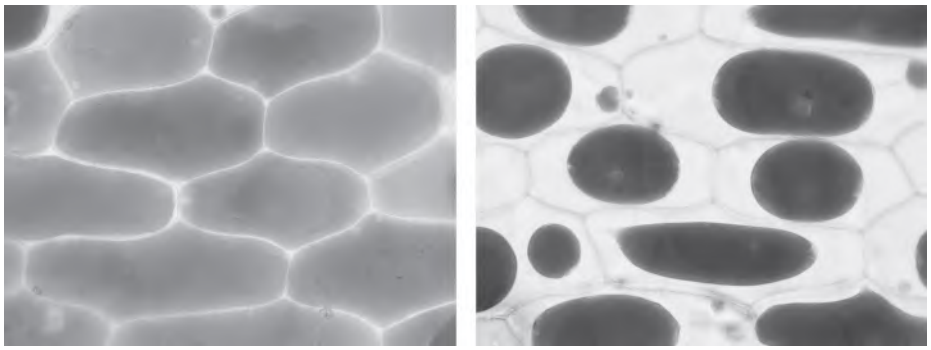
© Cambridge University Press & Assessment 2026

5 **(a)** A student investigated the effect of salt solution concentration on some plant cells.

View solution

The student immersed cells from one onion plant in two different concentrations of salt solution, labelled **A** and **B**.

Figure 5.1 shows photomicrographs of the plant cells one hour after being placed in the different salt solutions.



solution **A** solution **B**

Figure 5.1

Explain the appearance of the plant cells shown in Figure 5.1.

cells in solution **A** .....

.....

.....

.....

.....

.....

cells in solution **B** .....

.....

.....

.....

.....

.....

[6]

© Cambridge University Press & Assessment 2026

(b) (i) Describe the roles of mitosis in a root.

.....

.....

.....

.....

.....

.....

..... [3]

(ii) Roots contain stem cells.

View solution

Suggest the role of stem cells in a root.

.....

.....

..... [1]

(iii) Roots absorb magnesium ions from the soil.

State the name of the substance that contains magnesium ions in a palisade mesophyll cell.

..... [1]

(iv) Explain how mineral ions are absorbed by roots.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 14]

© Cambridge University Press & Assessment 2026

6 When surgeons operate on a heart, the patient can be connected to a heart-lung machine to keep blood flowing around the body during the operation.

Figure 6.1 is a diagram of a heart-lung machine connected to a human heart.

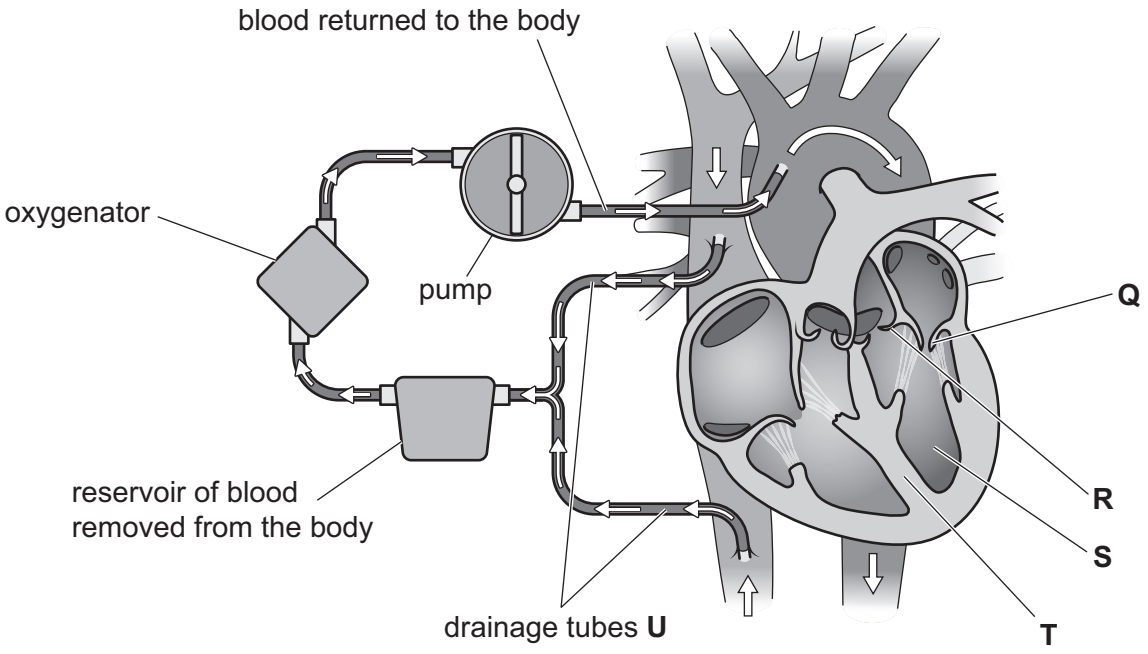


Figure 6.1

View solution

(a) (i) State the name of the heart structures labelled **Q**, **R** and **S** in Figure 6.1.

Q .....

R .....

S .....

[3]

(ii) State the letter of the heart structure in Figure 6.1 that separates oxygenated and deoxygenated blood.

..... [1]

(iii) State the name of the blood vessel in Figure 6.1 that the drainage tubes labelled **U** are connected to.

..... [1]

(iv) State the name of the organ that the oxygenator replaces in Figure 6.1.

..... [1]

© Cambridge University Press & Assessment 2026

(b) State the name of the arteries that supply the heart muscle with oxygen.

..... [1]

View solution

(c) Complete the sentences about the human circulatory system.

In a human, blood passes through the heart ..... during one complete circuit of the body.

This type of circulatory system is called a ..... circulation.

An advantage of this type of circulatory system is that blood can be transported at ..... pressure around the body. This increases the efficiency of supplying oxygen molecules to cells for ..... to release energy. [4]

[Total: 11]

© Cambridge University Press & Assessment 2026

BLANK PAGE

© Cambridge University Press & Assessment 2026

BLANK PAGE

© Cambridge University Press & Assessment 2026

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (Cambridge University Press & Assessment) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in our Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge International Education is the name of our awarding body and a part of Cambridge University Press & Assessment, which is a department of the University of Cambridge.

© Cambridge University Press & Assessment 2026