Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

BIOLOGY **0610/31**

Paper 3 Theory (Core) **May/June 2017**

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **21** printed pages and **3** blank pages.

© UCLES 2017

CAMBRIDGE International Examinations

BLANK PAGE

© UCLES 2017

1 Fig. 1.1 shows a diagram of the eye.

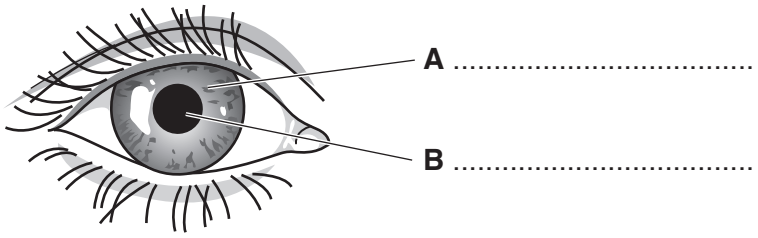


Fig. 1.1

(a) State the name of **A** and **B**.

View solution

Write your answers on Fig. 1.1.

[2]

(b) **(i)** Describe how **B** will change when a bright light shines on it.

View solution

.....

.....[1]

(ii) Suggest how this change protects the eye.

View solution

.....

.....

.....

.....[2]

[Total: 5]

2 The boxes on the left contain the names of parts of the body that produce hormones.

The boxes in the centre contain the names of hormones.

The boxes on the right contain functions of these hormones.

(a) Draw one straight line to link each hormone to the part of the body where it is produced.

Draw one straight line to link each hormone to its function.

View solution

part of the body	hormone	function
adrenal gland	adrenaline	lowers blood sugar level
ovary	insulin	increases rate of breathing
pancreas	oestrogen	causes growth of hairs on chest
testis	testosterone	causes breast development

[6]

(b) State how hormones are transported round the body.

View solution

.....

.....[1]

[Total: 7]

© UCLES 2017

3 Fig. 3.1 shows the blood flow to certain parts of the body of a student who is sitting down.

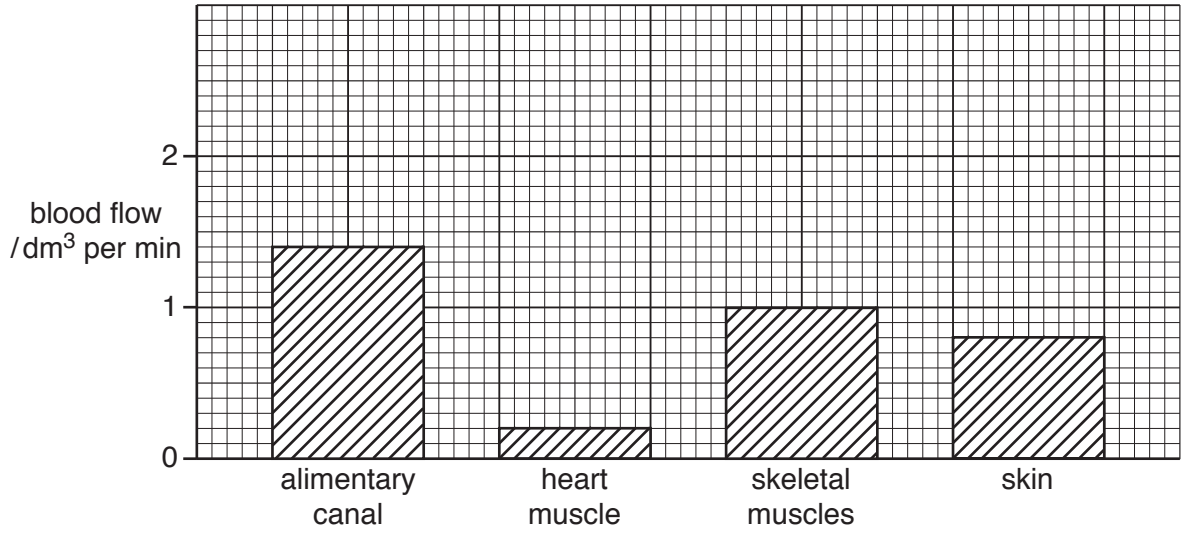


Fig. 3.1

(a) Use Fig. 3.1 to state the blood flow to the skeletal muscles in the student when he is sitting down.

View solution

.....[1]

(b) State the name of **two** organs in the body whose blood flow is **not** shown on the graph.

View solution

1 .....

2 .....

[2]

Fig. 3.2 shows the blood flow to the same parts of the body when the student is exercising.

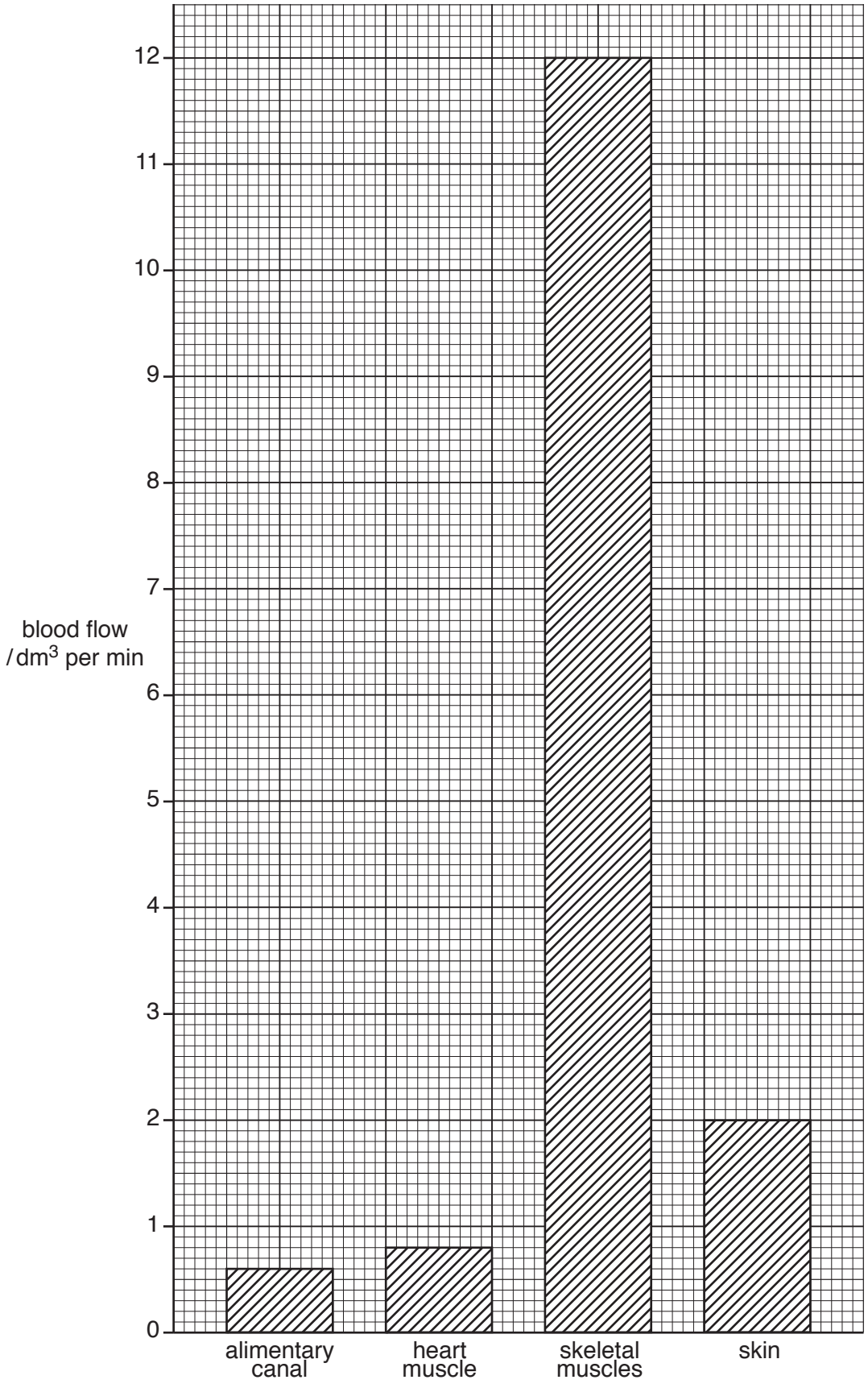


Fig. 3.2

© UCLES 2017

(c) (i) Use the information from Fig. 3.1 and Fig. 3.2 to calculate the percentage increase in the blood flow to the skeletal muscles when the student exercises.

View solution

Show your working.

.....%
[2]

(ii) During exercise the muscles need more energy.

View solution

Name **two** chemicals the muscles absorb from the blood to release energy for contraction.

1 .....

2 .....
[2]

(iii) Explain why blood flow to the **heart** muscle increases when the person exercises.

View solution

.....

.....

.....

.....

.....

.....[3]

(d) Fig. 3.1 and Fig. 3.2 show that during exercise the blood flow to the alimentary canal and the blood flow to the skin change.

(i) Describe the changes in blood flow that occur in the alimentary canal and the skin during exercise.

alimentary canal .....

.....

.....

skin .....

.....

.....

[3]

(ii) Suggest a reason for the change in blood flow to the alimentary canal during exercise.

.....

.....

.....[1]

(iii) Explain why the blood flow to the skin changes during exercise.

View solution

.....

.....

.....

.....

.....[3]

[Total: 17]

© UCLES 2017

4 Choose words from the list to complete the sentences about respiration.

View solution

Each word may be used once, more than once or not at all.

alcohol **carbon dioxide** **glucose**

glycerol **lactic acid** **oxygen** **water**

During exercise muscle cells can respire anaerobically and convert ..... to ..... .

When yeast cells respire anaerobically they produce ..... and ..... .

[4]

[Total: 4]

5 An *adaptive feature* helps an organism survive in its environment.

Adaptive features are inherited.

Fig. 5.1 contains diagrams of three animals.

(a) For each animal, select **one** adaptive feature visible in Fig. 5.1 and briefly suggest how it helps the animal to survive.

An example has been done for you.

View solution

not drawn to scale

animal C

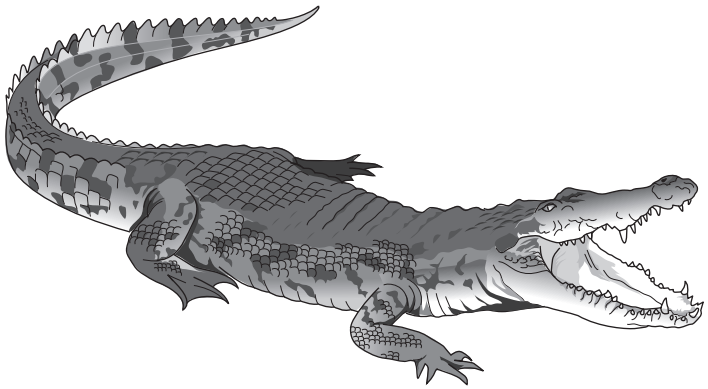


red deer

adaptive feature: antlers (horns) on head

help in survival: used for defence against predators

animal D



saltwater crocodile

adaptive feature: .....

help in survival: .....

.....

.....

© UCLES 2017

animal E



golden eagle

adaptive feature: .....

help in survival: .....

.....

.....

Fig. 5.1

[4]

(b) Fig. 5.2 shows a giraffe and an okapi.

View solution

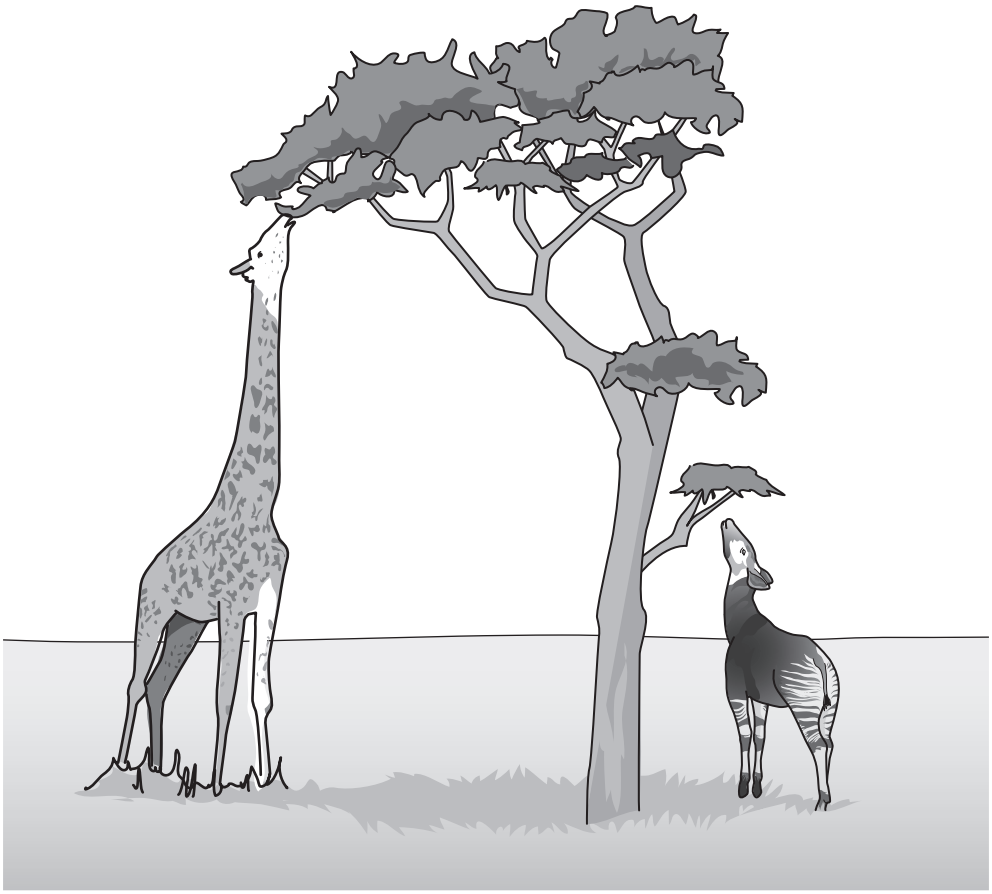


Fig. 5.2

The long neck is an adaptive feature for giraffes.

It helps them feed on leaves that other animals like the okapi cannot reach.

Giraffes developed long necks by the process of natural selection.

© UCLES 2017

The statements in Table 5.1 are about how natural selection occurred in giraffes.

Table 5.1

statement number	statement
1	More giraffes are born than can survive.
2	Giraffes have necks of different length.
3	The giraffes with the longest necks survive and reproduce.
4	There is competition for food between giraffes.
5	The surviving giraffes pass on their alleles for long necks to their offspring.

Arrange these statements in a sequence to explain how natural selection occurred in giraffes.

One has been done for you.



[3]

[Total: 7]

6 Fig. 6.1 shows a section of a bronchiole from the lungs of a person who never smoked cigarettes (non-smoker) and a section of a bronchiole from a person who smoked cigarettes for several years (smoker).

The two sections were taken from the same relative position in the lungs and are drawn to the same scale.

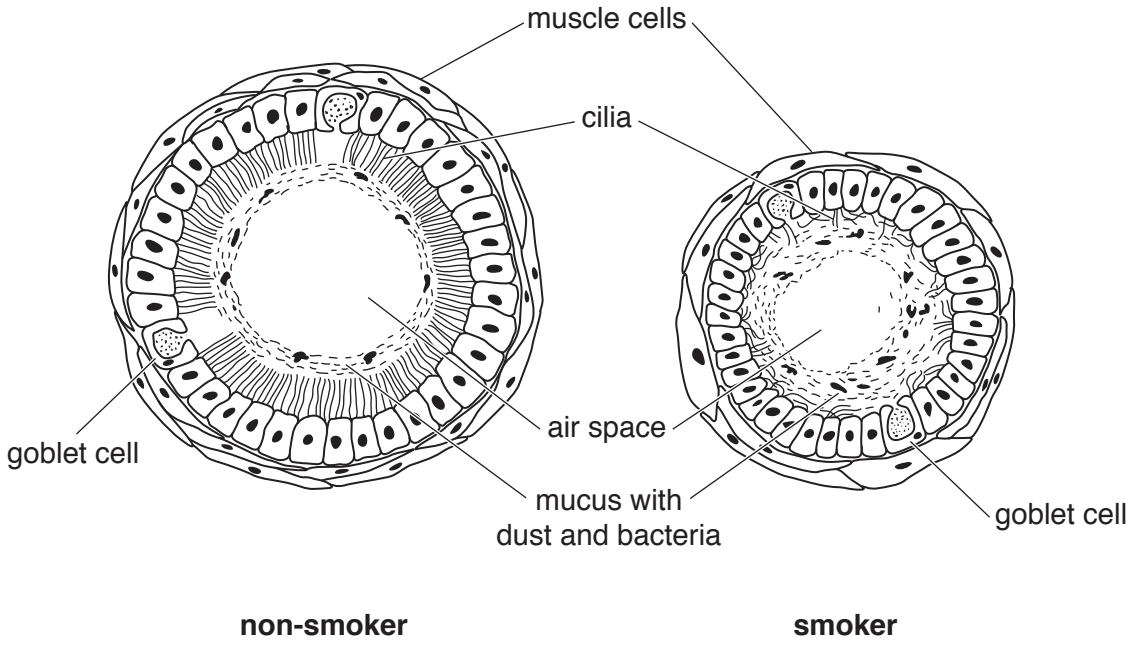


Fig. 6.1

(a) (i) Table 6.1 gives a comparison between the bronchiole of a non-smoker and a smoker.

View solution

Use Fig. 6.1 to complete Table 6.1.

An example has been done for you.

Table 6.1

feature	bronchiole of non-smoker	bronchiole of smoker
length of cilia		
number of cilia		
size of air space	wide	narrow
mucus layer		

[3]

(ii) Identify **two** other ways in which the bronchiole in a non-smoker is different from the bronchiole in a smoker.

1 .....

.....

2 .....

.....

[2]

(b) A person who smokes has a higher risk of lung infections than a person who does not smoke.

Use evidence from Fig. 6.1 to explain why the smoker has a higher risk of lung infections than a non-smoker.

.....

.....

.....

.....

.....[2]

(c) State the name of **two** substances in tobacco smoke that are harmful.

View solution

1 .....

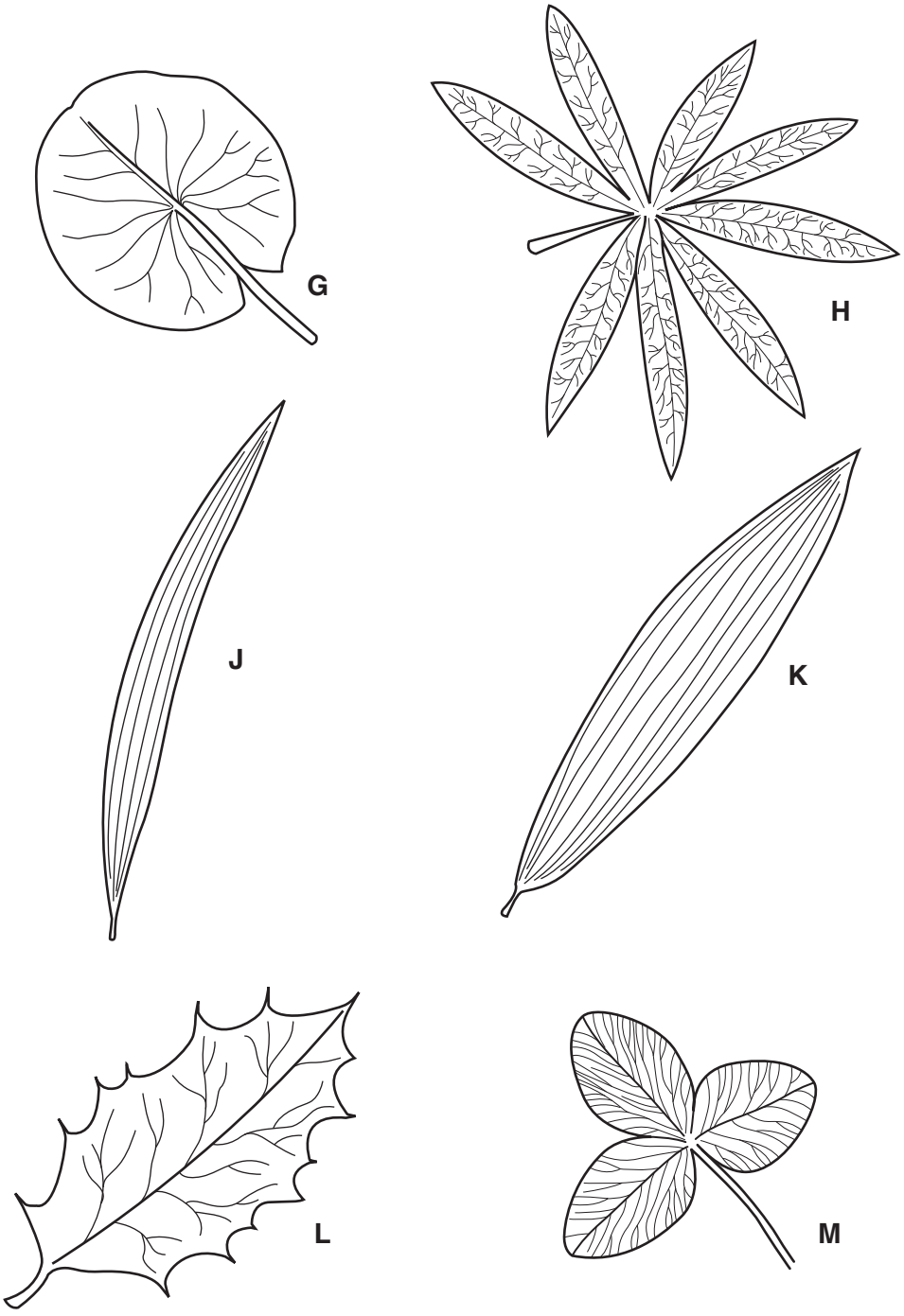
2 .....

[2]

[Total: 9]

7 Fig. 7.1 shows six leaves.

View solution



not drawn to scale

Fig. 7.1

© UCLES 2017

Use the key to identify the plants that these leaves came from.

Write the letter for each leaf in the key.

Key

description		name of organism	letter
1 (a)	veins parallel	go to 2	
(b)	veins not parallel	go to 3	
2 (a)	leaf length more than six times leaf width at its widest point	*Plantago maritima*	
(b)	leaf length less than six times leaf width at its widest point	*Plantago lanceolata*	
3 (a)	leaf has thorns (spikes)	*Ilex aquifolium*	
(b)	leaf has no thorns (spikes)	go to 4	
4 (a)	leaf not divided into sections	*Nymphaea alba*	
(b)	leaf divided into sections	go to 5	
5 (a)	leaf divided into 3 sections	*Trifolium pratense*	
(b)	leaf divided into 8 sections	*Lupinus arboreus*	

[5]

[Total: 5]

© UCLES 2017

8 **(a)** Define the term *chemical digestion.*

.....

.....

.....

.....

.....

.....

.....[3]

Fig. 8.1 shows a diagram of the alimentary canal.

View solution

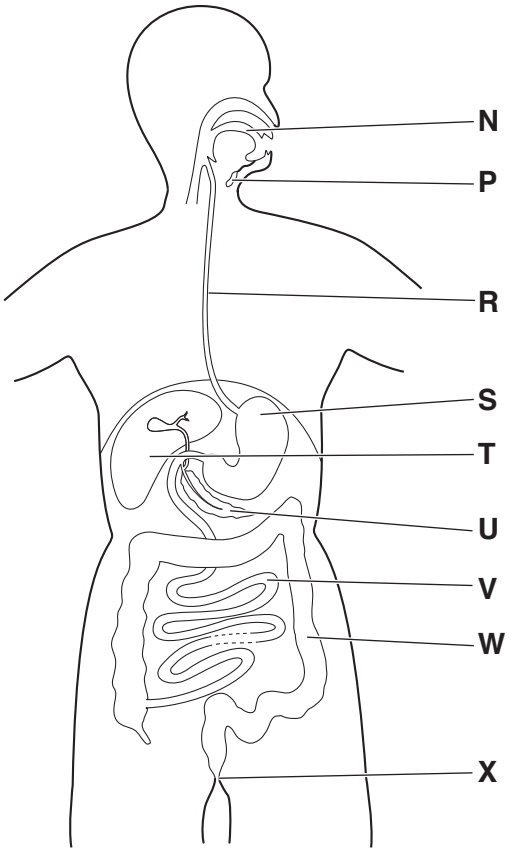


Fig. 8.1

(b) Identify the structures in Fig. 8.1 and use the letters to complete Table 8.1.

An example has been done for you.

View solution

Table 8.1

name of structure	letter from Fig. 8.1
salivary gland	**P**
anus	
large intestine	
mouth	
pancreas	
stomach	

[5]

(c) State **one** function of the liver and **one** function of the small intestine.

View solution

function of the liver .....

.....

function of the small intestine .....

.....

[2]

(d) Describe how the protein in food is digested in the alimentary canal.

View solution

.....

.....

.....

.....

.....

.....

.....

.....

.....[4]

(e) The condition where watery faeces are lost from the body is called diarrhoea.

View solution

Outline **one** way in which diarrhoea can be treated.

.....

.....[1]

[Total: 15]

9 Fig. 9.1 shows a photomicrograph of a section through a leaf.

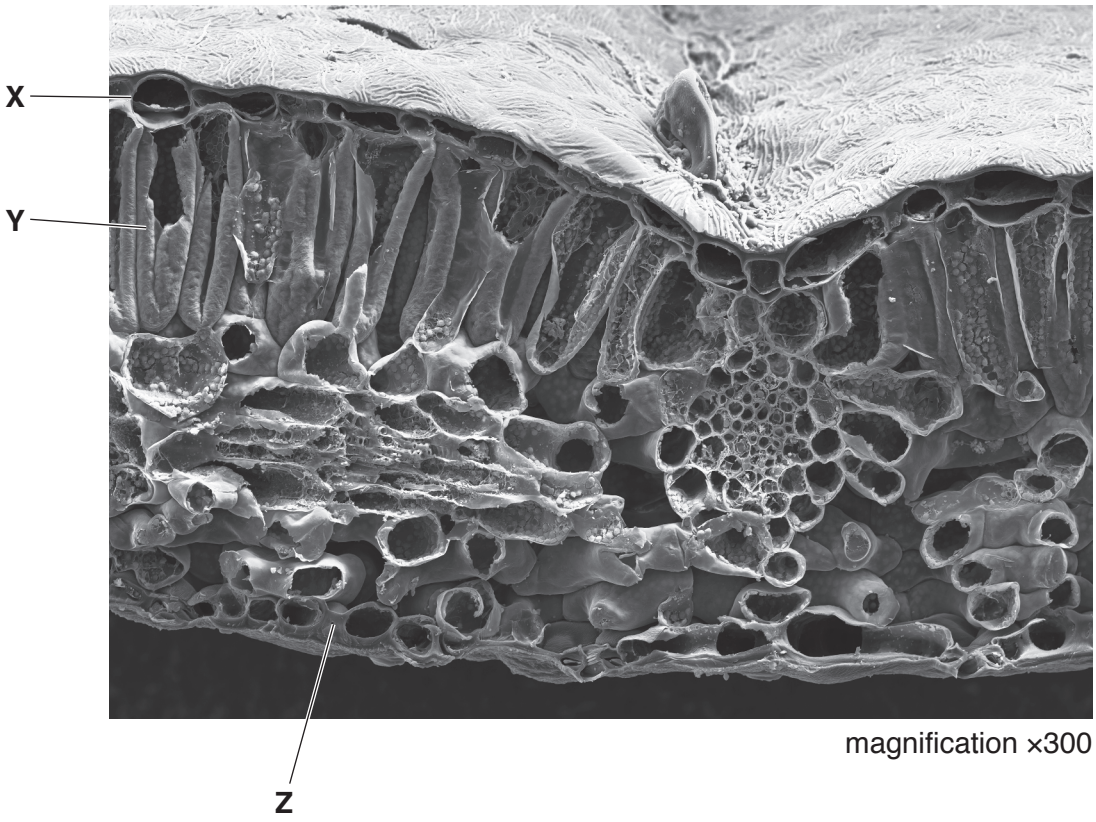


Fig. 9.1

(a) (i) State the name of the layers of the leaf labelled **X** and **Y** in Fig. 9.1.

View solution

X .....

Y .....

[2]

(ii) The cells in layer **X** are transparent.

View solution

Suggest a reason for this.

.....

.....[1]

(b) (i) State the name of the structure labelled **Z** in Fig. 9.1.

View solution

.....[1]

(ii) State the name of the process by which gases move into and out of **Z**.

.....[1]

View solution

(iii) Complete Table 9.1 by placing **one** tick in each row to show the net movement of gases through **Z** on a hot, dry, sunny day.

View solution

Table 9.1

	net movement of gas		
name of gas	into leaf	out of leaf	no movement
carbon dioxide			
oxygen			
water vapour			

[3]

(c) (i) State **two** substances that are made during photosynthesis.

View solution

1 .....

2 .....

[2]

(ii) State the name of the green pigment needed for photosynthesis.

.....[1]

[Total: 11]

View solution

BLANK PAGE

© UCLES 2017

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 (UCLES) 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 the Cambridge International Examinations Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cie.org.uk after the live examination series.

Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

© UCLES 2017