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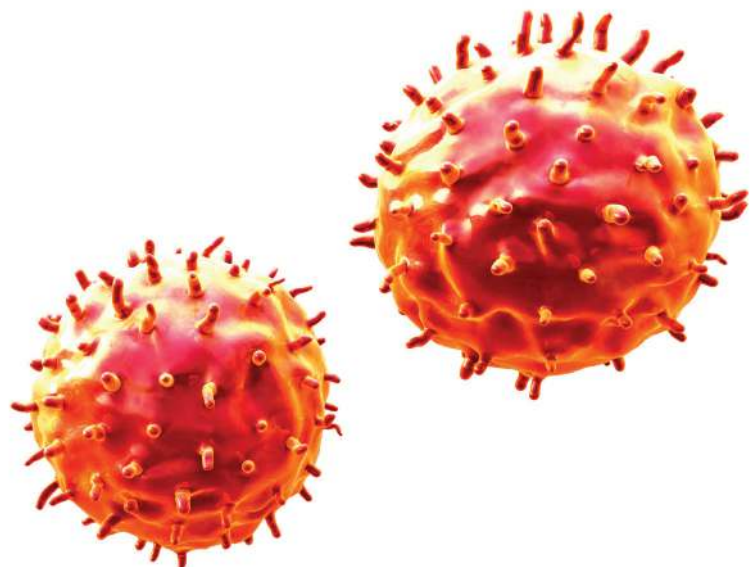
# Example Candidate Responses

## Paper 3

Cambridge IGCSE<sup>®</sup>

Biology 0610

For examination from 2016



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## Introduction

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The main aim of this booklet is to exemplify standards for those teaching Cambridge IGCSE Biology (0610), and to show how different levels of candidates' performance (high, middle and low) relate to the subject's curriculum and assessment objectives.

In this booklet a range of candidate responses has been chosen as far as possible to exemplify High, Middle and Low responses. Each response is accompanied by a brief commentary explaining the strengths and weaknesses of the answers.

For each question, the response is annotated with clear explanation of where and why marks were awarded or omitted. This is followed by examiner comments on how the answer could have been improved. In this way, it is possible for you to understand what candidates have done to gain their marks and what they could do to improve their answers. At the end of the booklet, there is a list of common mistakes candidates made in their answers for each question.

This document provides illustrative examples of candidate work with examiner commentary. These help teachers to assess the standard required to achieve marks beyond the guidance of the mark scheme. Therefore, in some circumstances, such as where exact answers are required, there will not be much comment.


The questions, mark schemes and pre-release material used here are available to download as a zip file from the School Support Hub as the Example Candidate Responses Files. The papers used in this booklet are:

Question Paper 4, June 2016	
Question paper	June 2016 Question Paper 31 (0610_s16_qp_31.pdf)
Mark scheme	June 2016 Paper 31 Mark Scheme (0610_s16_ms_31.pdf)

Other past papers, Examiner Reports and other teacher support materials are available on the School Support Hub [www.cambridgeinternational.org/support](http://www.cambridgeinternational.org/support)

## How to use this booklet

This booklet goes through the paper one question at a time, showing you the high-, middle- and low-level response for each question. The candidate answers are set in a table. In the left-hand column are the candidate answers, and in the right-hand column are the examiner comments.

Example Candidate Response – Question 1, High	Examiner comments
<p>(c) The process of active transport occurs in some cells. </p> <p>Outline <b>one</b> way in which diffusion is different to active transport.</p> <p><i>Diffusion is movement of molecules down concentration gradient while active transport is movement of molecules against concentration gradient.</i> (1)</p>	<p>differences between diffusion and active transport, and so gains the mark.</p> <p><b>Mark awarded for 1(c)</b></p> <p><b>Examiner comments</b> are alongside the answers. These explain where and why marks were awarded. This helps you to interpret the standard of Cambridge exams so you can help your learners to refine their exam technique.</p>

**Answers** are by real candidates in exam conditions. These show you the types of answers for each level.

Discuss and analyse the answers with your learners in the classroom to improve their skills.

## How the candidate could have improved the answer

- (a)(ii) The candidate named the structure that carries DNA, rather than naming the chemical as requested. As this response is from a candidate who gained very high marks overall, it is most likely that they misread the question.

This section explains how the candidate could have improved each answer. This helps you to interpret the standard of Cambridge exams and helps your learners to refine their exam technique.

## Common mistakes candidates made in this question

- (c) *The examiner was expecting a brief description of one difference between the processes of active transport and diffusion. The use of the term 'outline' implies that brevity is required.*

Many candidates gave a definition of diffusion but left the response incomplete as they did not say how active transport was different.

Often candidates lose marks because they misread or misinterpret the questions.

Lists the common mistakes candidates made in answering each question. This will help your learners to avoid these mistakes and give them the best chance of achieving the available marks.

## Assessment at a glance

All candidates take three papers. Candidates who have studied the Core subject content, or who are expected to achieve a grade D or below, should be entered for Paper 1, Paper 3 and either Paper 5 or Paper 6. These candidates will be eligible for grades C to G. Candidates who have studied the Extended subject content (Core and Supplement), and who are expected to achieve a grade C or above, should be entered for Paper 2, Paper 4 and either Paper 5 or Paper 6. These candidates will be eligible for grades A\* to G.

### Core candidates take:

**Paper 1** 45 minutes  
Multiple Choice 30%  
40 marks  
40 four-choice multiple-choice questions  
Questions will be based on the Core subject content  
  
Assessing grades C–G  
Externally assessed

### Extended candidates take:

**Paper 2** 45 minutes  
Multiple Choice 30%  
40 marks  
40 four-choice multiple-choice questions  
Questions will be based on the Extended subject content (Core and Supplement)  
  
Assessing grades A\*–G  
Externally assessed

### and Core candidates take:

**Paper 3** 1 hour 15 minutes  
Theory 50%  
80 marks  
Short-answer and structured questions  
Questions will be based on the Core subject content  
  
Assessing grades C–G  
Externally assessed

### and Extended candidates take:

**Paper 4** 1 hour 15 minutes  
Theory 50%  
80 marks  
Short-answer and structured questions  
Questions will be based on the Extended subject content (Core and Supplement)  
  
Assessing grades A\*–G  
Externally assessed

### All candidates take either:

**Paper 5** 1 hour 15 minutes  
Practical Test 20%  
40 marks  
Questions will be based on the experimental skills in Section 4  
Assessing grades A\*–G  
Externally assessed

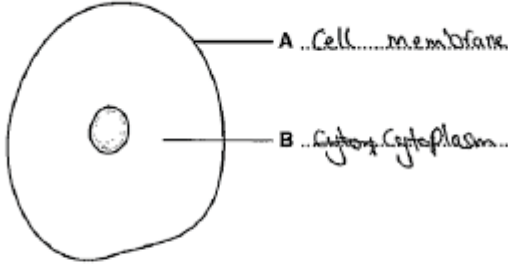
### or:

**Paper 6** 1 hour  
Alternative to Practical 20%  
40 marks  
Questions will be based on the experimental skills in Section 4  
Assessing grades A\*–G  
Externally assessed

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# Paper 3 – Theory (Core)

## Question 1

Example Candidate Response – Question 1, High	Examiner comments
<p>1 Fig. 1.1 shows an animal cell.</p>  <p style="text-align: center;"><b>Fig. 1.1</b></p> <p>(a) (i) Name the features labelled <b>A</b> and <b>B</b>. Write your answers on Fig. 1.1.</p> <p>(ii) The nucleus of living cells contains genetic material. Name the <b>chemical</b> that this genetic material is made from. .....Chromosomes.....[1]</p> <p>(b) The cell in Fig. 1.1 carries out aerobic respiration. Name <b>one</b> chemical that diffuses into an animal cell <b>and</b> one chemical that diffuses out of a cell during aerobic respiration. chemical that diffuses in .....Oxygen..... chemical that diffuses out .....Carbon dioxide.....[2]</p> <p>(c) The process of active transport occurs in some cells. Outline <b>one</b> way in which diffusion is different to active transport. .....Diffusion is movement of molecules &amp; movement of molecules down concentration gradient while active active uptake is movement of molecules against concentration gradient.....[1]</p>	<p>Both parts of the cell are labelled accurately.</p> <p><b>Mark awarded for 1(a)(i) = 2 out of 2</b></p> <p>'DNA' was the required answer here.</p> <p><b>Mark awarded for 1(a)(ii) = 0 out of 1</b></p> <p>Both answers are correct.</p> <p><b>Mark awarded for 1(b) = 2 out of 2</b></p> <p>The candidate clearly states one of the differences between diffusion and active transport, and so gains the mark.</p> <p><b>Mark awarded for 1(c) = 1 out of 1</b></p>



**Example Candidate Response – Question 1, High** **Examiner comments**

Fig. 1.2 shows a cell from the palisade mesophyll layer of a leaf.

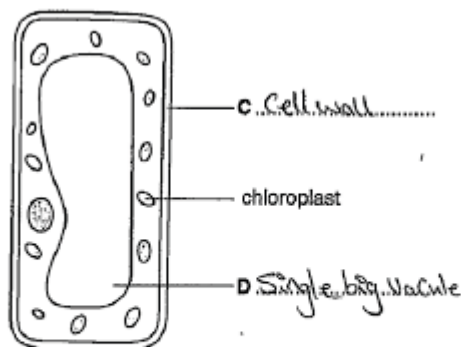


Fig. 1.2

(d) (i) Name the features labelled C and D.

Write your answers on Fig. 1.2.

[2]

(ii) Name the process carried out by the chloroplasts and explain why all animal life depends on this process.

name of process ..... Photosynthesis .....

explanation ..... Chloroplasts contain green pigments which absorb sunlight and change light energy into chemical energy and make photosynthesis to produce glucose for the plant to use and oxygen. all animals depend on plants for nutrition. plants are the producers of all food chains so they are essential. also plants give out oxygen during photosynthesis, oxygen is responsible for respiration of all animals and removal of carbon dioxide .....

[5] **[Total: 13]**

Two correct labels are given. The misspelling of vacuole is allowed.

**Mark awarded for 1(d)(i) = 2 out of 2**

Marks are awarded for the following points:  
 photosynthesis;  
 absorption of sunlight;  
 takes in carbon dioxide;  
 produces glucose; and  
 plants are producers.

**Mark awarded for 1(d)(ii) = 5 out of 5**

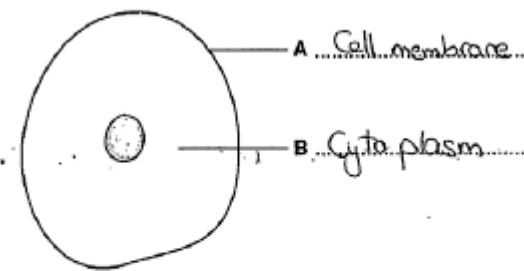
**Total mark awarded = 12 out of 13**

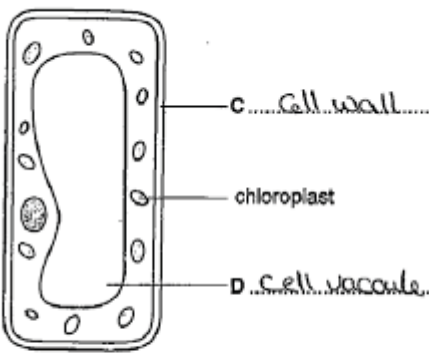
**How the candidate could have improved the answer**

- (a)(ii) The candidate named the structure that carries DNA, rather than naming the chemical as requested. As this response is from a candidate who gained very high marks overall, it is most likely that they misread the question.
- (b) The candidate gave two correct responses and was awarded full marks. However, their response could be improved by writing *carbon dioxide* correctly as two separate words (rather than 'carbondioxide').
- (d)(i) The candidate gave two correct responses and was awarded full marks. However, their answer could have been improved by spelling 'vacuole' correctly.



- (d)(ii) The candidate was awarded full marks but an improvement would be for the candidate to say that animals need oxygen to carry out respiration (rather than oxygen is responsible for respiration).

Example Candidate Response – Question 1, Middle	Examiner comments
<p>1 Fig. 1.1 shows an animal cell.</p>  <p style="text-align: center;"><b>Fig. 1.1</b></p> <p>(a) (i) Name the features labelled <b>A</b> and <b>B</b>. Write your answers on Fig. 1.1. [2]</p> <p>(ii) The nucleus of living cells contains genetic material. Name the <b>chemical</b> that this genetic material is made from. <del>Genetic</del> <u>DNA</u> [1]</p> <p>(b) The cell in Fig. 1.1 carries out aerobic respiration. Name <b>one</b> chemical that diffuses into an animal cell and one chemical that diffuses out of a cell during aerobic respiration. chemical that diffuses in <u>water</u> chemical that diffuses out <u>glycogen</u> [2]</p> <p>(c) The process of active transport occurs in some cells. Outline <b>one</b> way in which diffusion is different to active transport. <u>diffusion is movement of gas particles from high concentration gradient to low concentration gradient</u> [1]</p>	<p>Both parts of the cell are labelled accurately.</p> <p><b>Mark awarded for 1(a)(i) = 2 out of 2</b></p> <p>An incorrect answer has been crossed out and replaced with the correct answer. It is important that incorrect answers are clearly crossed out. If two conflicting answers are given, no marks are awarded.</p> <p><b>Mark awarded for 1(a)(ii) = 1 out of 1</b></p> <p>Glycogen is an incorrect response. However, water is allowed because the question does not stipulate that the chemicals must be those involved in aerobic respiration (although this is implied). Therefore, any chemical that might diffuse into a cell was accepted.</p> <p><b>Mark awarded for 1(b) = 1 out of 2</b></p> <p>This answer is incorrect for several reasons: it refers only to diffusion and does not state how active transport differs from diffusion; the candidate appears to be unclear about the meaning of a 'diffusion gradient'; and diffusion is not restricted to</p>

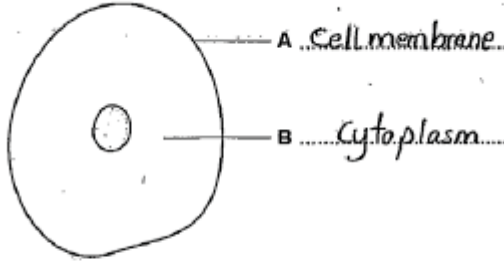
Example Candidate Response – Question 1, Middle	Examiner comments
<p>Fig. 1.2 shows a cell from the palisade mesophyll layer of a leaf.</p>  <p style="text-align: center;">Fig. 1.2</p> <p>(d) (i) Name the features labelled C and D. Write your answers on Fig. 1.2. [2]</p> <p>(ii) Name the process carried out by the chloroplasts and explain why all animal life depends on this process.</p> <p>name of process ... <u>Photo thensis</u> .....</p> <p>explanation ... <u>when photo thensis is produced in plant herbivours eat it and then Carnivours eat the herbivours so it is the main food supply because if it wasn't present herbivours and Omnivours would decrease in number <del>the</del> leading to decrease in number of Carnivours</u> .....</p> <p style="text-align: right;">[5] [Total: 13]</p>	<p>gases as stated in the response.</p> <p><b>Mark awarded for 1(c) = 0 out of 1</b></p> <p>Two correct labels are given. The misspelling of vacuole is allowed.</p> <p><b>Mark awarded for 1(d)(i) = 2 out of 2</b></p> <p>One mark is awarded for correctly naming the process. The other two marks are awarded for: herbivores eat plants, and carnivores eat herbivores.</p> <p><b>Mark awarded for 1(d)(ii) = 3 out of 5</b></p> <p><b>Total mark awarded = 9 out of 13</b></p>

### How the candidate could have improved the answer

- (b) The candidate needed to give a correct example of a chemical that diffuses out of a cell (not necessarily as a result of aerobic respiration). Carbon dioxide would be acceptable, for example.
- (c) The candidate could have improved by answering the question that was asked. When a question such as this asks for a difference between two processes, the difference must be stated in relation to the other process. Also, it appeared as though the candidate did not fully understand the process of diffusion.
- (d)(i) The candidate was awarded full marks but could have improved by spelling 'vacuole' correctly.

- (d)(ii) The answer could have been improved by:
- giving an outline of photosynthesis
  - explaining that oxygen is needed to release energy from the nutrients eaten.

These additions would have given the candidate maximum marks.

Example Candidate Response – Question 1, Low	Examiner comments
<p>1 Fig. 1.1 shows an animal cell.</p>  <p style="text-align: center;">Fig. 1.1</p> <p>(a) (i) Name the features labelled A and B. Write your answers on Fig. 1.1. [2]</p> <p>(ii) The nucleus of living cells contains genetic material. Name the <b>chemical</b> that this genetic material is made from. ..... protein ..... [1]</p> <p>(b) The cell in Fig. 1.1 carries out aerobic respiration. Name <b>one</b> chemical that diffuses into an animal cell and one chemical that diffuses out of a cell during aerobic respiration. chemical that diffuses in ..... glucose + oxygen ..... chemical that diffuses out ..... water + Carbon dioxide ..... [2]</p> <p>(c) The process of active transport occurs in some cells. Outline <b>one</b> way in which diffusion is different to active transport. ..... Diffusion is movement from high concentration to low concentration that is different to active transport. [1]</p>	<p>Both parts of the cell are labelled accurately.</p> <p><b>Mark awarded for 1(a)(i) = 2 out of 2</b></p> <p>The response is incorrect correct, so no mark is awarded.</p> <p><b>Mark awarded for 1(a)(ii) = 0 out of 1</b></p> <p>In each case, the candidate gives two correct answers.</p> <p><b>Mark awarded for 1(b) = 2 out of 2</b></p> <p>Even though the statement about diffusion is correct, the candidate is not awarded the mark because the statement that active transport is different is insufficient; the candidate needed to say that 'active transport is the opposite.'</p> <p><b>Mark awarded for 1(c) = 0 out of 1</b></p>

Example Candidate Response – Question 1, Low

Examiner comments

Fig. 1.2 shows a cell from the palisade mesophyll layer of a leaf.

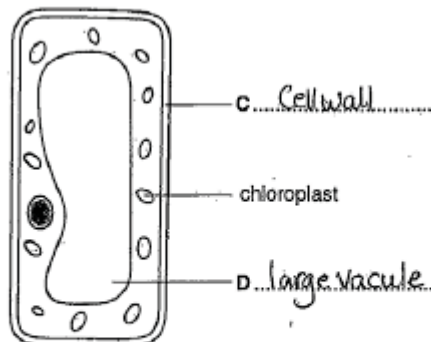


Fig. 1.2

(d) (i) Name the features labelled C and D.

Write your answers on Fig. 1.2.

[2]

(ii) Name the process carried out by the chloroplasts and explain why all animal life depends on this process.

name of process ..... Energy / protein / glucose .....

explanation ..... Animal life take more energy from the chloroplasts and more protein which help in growth and development, take high percentage of glucose .....

[5]

[Total: 13]

Both labels are correct. The misspelling of vacuole is allowed.

**Mark awarded for 1(d)(i) = 2 out of 2**

The candidate does not know that chloroplasts carry out photosynthesis, so is not awarded the mark for naming the process.

In the explanation, the candidate refers to the dependence of animals on photosynthesis, but provides insufficient detail to be awarded any marks.

If the last sentence had referred to animals eating glucose that the plant had produced, then one mark could have been awarded.

**Mark awarded for 1(d)(ii) = 0 out of 5**

**Total mark awarded = 6 out of 13**

## How the candidate could have improved the answer

- (a)(ii) The question asks for the chemical name of the genetic material in the nucleus. DNA was the expected answer. (Note that it is not necessary to give the full chemical name at this level.) The candidate stated 'protein' as the answer and although protein is present in a chromosome, it does not constitute the genetic material.
- (c) The candidate gave a brief definition of diffusion and then said the active transport was different. This was not sufficient. The answer could have been improved by stating specifically that in active transport the movement of the chemical is from high concentration to low concentration (or, at the very least, the chemical movement is in the opposite direction to that found in diffusion).
- (d)(i) The candidate was awarded full marks but the answer could have been improved by spelling 'vacuole' correctly'.
- (d)(ii) The answer could be improved by the candidate knowing that chloroplasts carry out photosynthesis. In the explanation, the candidate refers to animals obtaining glucose and protein from chloroplasts. The answer could have been improved by saying that animals (herbivores) have to eat plants in order to obtain these nutrients and the energy they contain. Another improvement would be to state that the nutrients are obtained from the entire plant, and not solely from the chloroplasts.

## Common mistakes candidates made in Question 1

*For parts (a), (b), (d)(i) and the first part of (d)(ii), the examiner was expecting single word answers. The request to 'name' requires the candidate to provide the correct biological term.*

- (a)(i) This was answered correctly by most candidates. The most common error was to identify the cell membrane as the cell wall.
- (a)(ii) Many candidates of all abilities could not name DNA. The most frequently given answers were protein, chromosome and gene.
- (b) The majority of candidates answered correctly. Some weaker responses stated that carbon dioxide diffused in and oxygen diffused out.
- (c) *The examiner was expecting a brief description of one difference between the processes of active transport and diffusion. The use of the term 'outline' implies that brevity is required.*  
 Many candidates gave a definition of diffusion but left the response incomplete as they did not say how active transport was different.
- (d)(i) The most common error was to label the cell wall as the cell membrane, but more candidates answered correctly here than in part (a)(i). A large number of candidates could not spell vacuole correctly (but were not penalised for this).
- (d)(ii) *In the second part of (d)(ii) the question asks candidates to 'explain'. The examiner is expecting the candidate to give reasons for the fact that all animal life depends on photosynthesis.*

The majority of candidates named photosynthesis as the process. The most common error was the failure to address the question. Many candidates outlined photosynthesis, but then did not explain why animals are dependent on this process. A significant number of candidates who attempted an explanation stated that oxygen was needed for breathing, as opposed to respiration.

## Question 2

### Example Candidate Response – Question 2, High

### Examiner comments

2 Fig. 2.1 shows a gorilla with her baby.



Fig. 2.1

- (a) Gorillas are mammals and have characteristics that are **only** found in mammals, and not any other vertebrate group.

State:

- (i) **one** mammalian characteristic visible in Fig. 2.1

Fur

- (ii) **two** mammalian characteristics **not** visible in Fig. 2.1

1 Suckle the babies

2 External ears

[2]

The answer give is correct.

**Mark awarded for 2(a)(i)  
= 1 out of 1**

The first answer the candidate gives is correct. The question stipulates that the characteristics must **not** be visible in Fig. 2.1 and external ears are visible on the baby, so the second mark is not awarded.

**Mark awarded for 2(a)(ii)  
= 1 out of 2**



Example Candidate Response – Question 2, High

Examiner comments

(b) Fig. 2.2 shows the average body mass and Table 2.1 shows the average lifespan of males in six species of mammal.

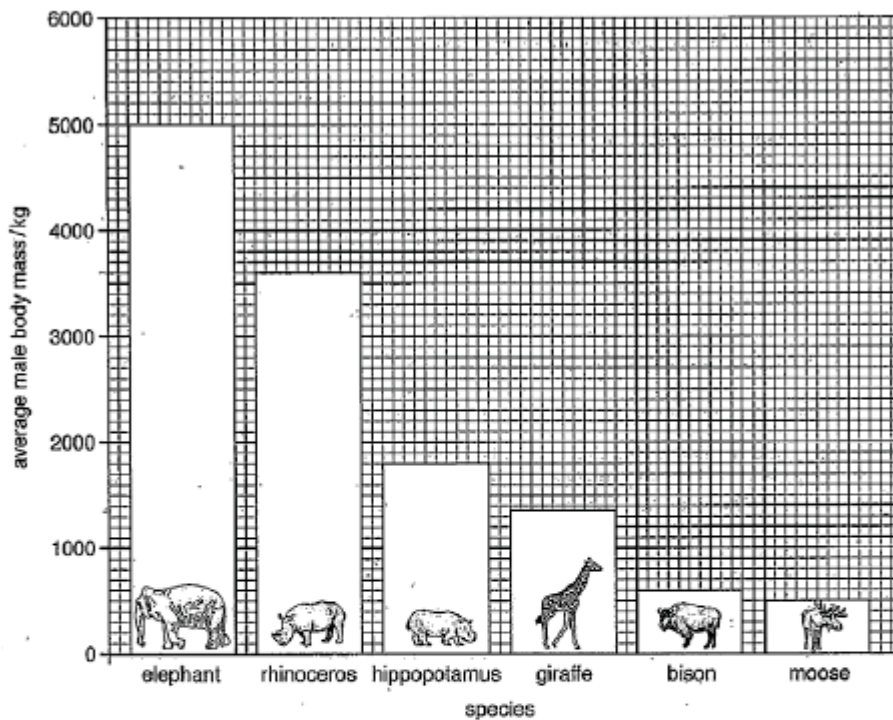


Fig. 2.2

Table 2.1

species	average male lifespan / years
elephant	70
rhinoceros	48
hippopotamus	42
giraffe	25
bison	23
moose	21

Bison is correctly identified.

**Mark awarded for 2(b)(i) = 1 out of 1**

(i) Name the mammal that has an average lifespan of 23 years.

Bison.....[1]

The correct figure is extracted from the graph.

**Mark awarded for 2(b)(ii) = 1 out of 1**

(ii) State the average body mass of a male rhinoceros.

3600..... kg [1]

The candidate gives a body mass within the accepted range.

**Mark awarded for 2(b)(iii) = 1 out of 1**

(iii) State the average body mass of the mammal that has an average lifespan of 25 years.

1350..... kg [1]

The candidate identifies the correct relationship



Example Candidate Response – Question 2, High	Examiner comments
<p>(iv) Describe the relationship between average body mass and average lifespan shown in Fig. 2.2 and Table 2.1.</p> <p>As the average body mass increases, the average lifespan increases.</p> <p>[1]</p> <p>(c) The average lifespan of a human male can vary from 40 years to 85 years. The lifespan partly depends on the things available in the country where the man lives. Suggest <b>three</b> things that would increase the chance of a man having a longer lifespan.</p> <p>1 Increased food supply</p> <p>2 Less diseases</p> <p>3 Increased health care</p> <p>[3]</p> <p>[Total: 10]</p>	<p>between the two sets of figures.</p> <p><b>Mark awarded for 2(b)(iv) = 1 out of 1</b></p> <p>The first and last answers are worth of one mark each. The candidate does not gain a mark for 'less diseases.' The response requires a method of achieving this, such as increased availability of immunisations.</p> <p><b>Mark awarded for 2(c) = 2 out of 3</b></p> <p><b>Total mark awarded = 8 out of 10</b></p>

### How the candidate could have improved the answer

- (a)(ii) A more detailed study of the photograph would have shown that external ears are visible on the baby and so another mammalian characteristic could have been given, such as giving birth to live young.
- (c) The response could have been improved by a more precise answer to number 2. The answer 'less disease' by itself is insufficient. The candidate needed to say how this could be achieved. The increased availability of immunisations, for example, would have been acceptable.

Example Candidate Response – Question 2, Middle

Examiner comments

2 Fig. 2.1 shows a gorilla with her baby.



Fig. 2.1

(a) Gorillas are mammals and have characteristics that are **only** found in mammals, and not in any other vertebrate group.

State:

(i) **one** mammalian characteristic visible in Fig. 2.1

..... FUR ..... [1]

(ii) **two** mammalian characteristics **not** visible in Fig. 2.1

1 ..... 1 pair of legs

2 ..... [2]

The candidate gives a correct answer.

**Mark awarded for 2(a)(i) = 1 out of 1**

The candidate gives one answer only, and the one given is not a mammalian characteristic.

**Mark awarded for 2(a)(ii) = 0 out of 2**

Example Candidate Response – Question 2, Middle

Examiner comments

(b) Fig. 2.2 shows the average body mass and Table 2.1 shows the average lifespan of males in six species of mammal.

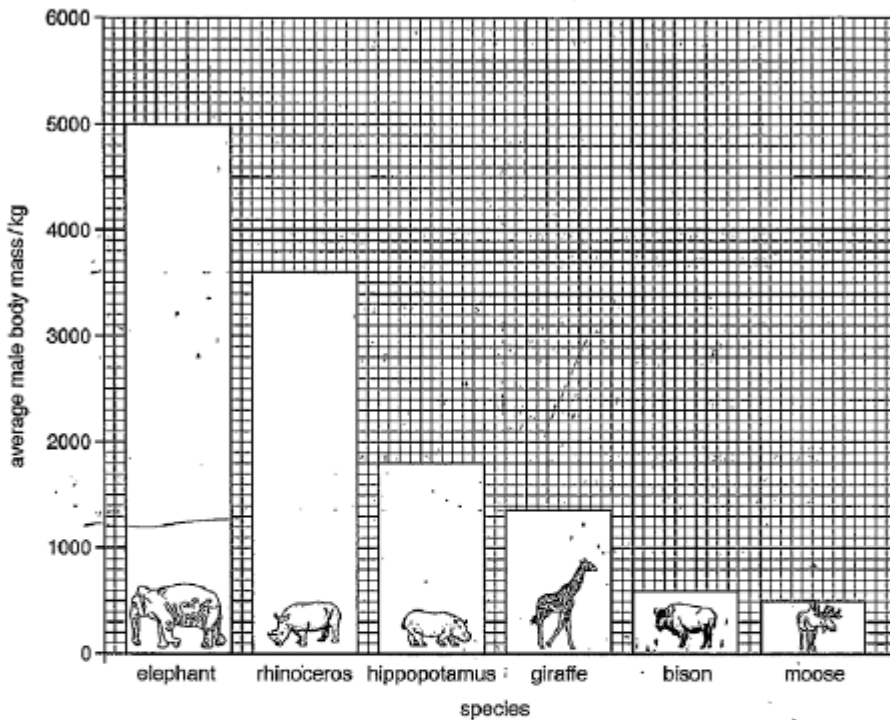


Fig. 2.2

Table 2.1

species	average male lifespan / years
elephant	70
rhinoceros	48
hippopotamus	42
giraffe	25
bison	23
moose	21

(i) Name the mammal that has an average lifespan of 23 years.

..... bison ..... [1]

(ii) State the average body mass of a male rhinoceros.

..... 3600 ..... kg [1]

(iii) State the average body mass of the mammal that has an average lifespan of 25 years.

..... 1350 ..... kg [1]

The correct animal is identified.

**Mark awarded for 2(b)(i) = 1 out of 1**

The candidate extracts the right information from the graph.

**Mark awarded for 2(b)(ii) = 1 out of 1**

The candidate gives an answer within the acceptable range.

**Mark awarded for 2(b)(iii) = 1 out of 1**

Example Candidate Response – Question 2, Middle	Examiner comments
<p>(iv) Describe the relationship between average body mass and average lifespan shown in Fig. 2.2 and Table 2.1.</p> <p>..... as average body mass decreases.....  average life span decrease..... They are.....  indirectly proportional..... [1]</p> <p>(c) The average lifespan of a human male can vary from 40 years to 85 years.  The lifespan partly depends on the things available in the country where the man lives.  Suggest <b>three</b> things that would increase the chance of a man having a longer lifespan.</p> <p>1 ..... No Pollution.....  .....  .....</p> <p>2 ..... balanced diet.....  .....  .....</p> <p>3 .....  .....  ..... [3]</p> <p>[Total: 10]</p>	<p>The candidate is correct in stating that as the average body mass decreases, so does the average life-span, but the relationship is not directly proportional. The latter statement negates the first one, and so no mark is awarded.</p> <p><b>Mark awarded for 2(b)(iv) = 0 out of 1</b></p> <p>The two suggestions given are acceptable.</p> <p><b>Mark awarded for 2(c) = 2 out of 3</b></p> <p><b>Total mark awarded = 6 out of 10</b></p>

### How the candidate could have improved the answer

- (a)(ii) The candidate could have improved their answer by stating two mammalian characteristics that are not visible in the photograph.
- (b)(iv) The candidate could have improved their answer by not including the statement that the body mass and the average lifespan are directly proportional. This is incorrect. They have a positive correlation.
- (c) The candidate should have given a third suggestion. Additionally, the first suggestion of 'no pollution' could have been improved by including more detail by adding a way in which pollution might be reduced, such as restrictions on the burning of fossil fuels or organised collections of household rubbish.

Example Candidate Response, Question 2, Low

Examiner comments

2 Fig. 2.1 shows a gorilla with her baby.



Fig. 2.1

(a) Gorillas are mammals and have characteristics that are **only** found in mammals, and not in any other vertebrate group.

State:

(i) **one** mammalian characteristic visible in Fig. 2.1

..... *Have hair* ..... [1]

(ii) **two** mammalian characteristics **not** visible in Fig. 2.1

1 ..... *Finger toes* .....  
 2 ..... *flappy ears* ..... [2]

Correct response.

**Mark awarded for 2(a)(i) = 1 out of 1**

The possession of fingers and toes is not a mammalian characteristic. The candidate might have written 'flappy ears' to indicate external ears, but this cannot be awarded a mark as external ears are visible on the baby in Fig. 2.1.

**Mark awarded for 2(a)(ii) = 0 out of 2**



Example Candidate Response, Question 2, Low

Examiner comments

(b) Fig. 2.2 shows the average body mass and Table 2.1 shows the average lifespan of males in six species of mammal.

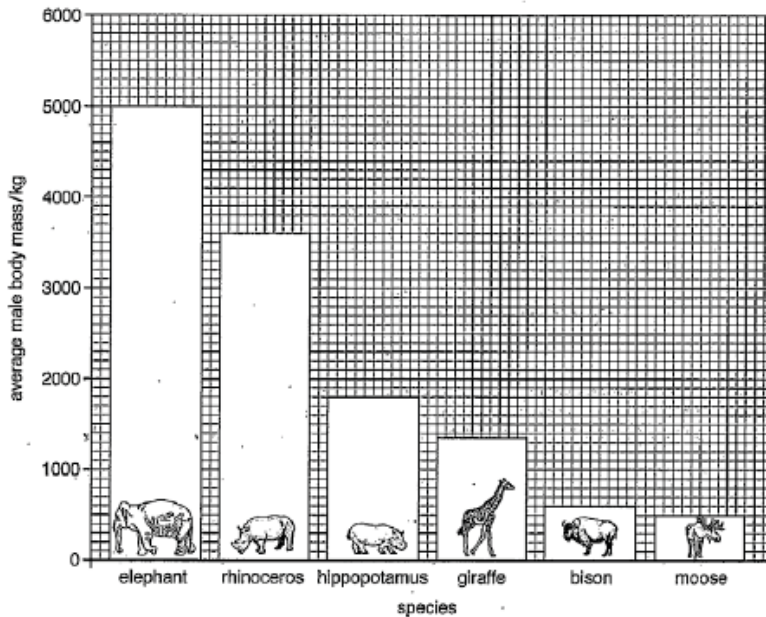


Fig. 2.2

Table 2.1

species	average male lifespan/years
elephant	70
rhinoceros	48
hippopotamus	42
giraffe	25
bison	23
moose	21

(i) Name the mammal that has an average lifespan of 23 years.

..... Bison ..... [1]

The candidate correctly identifies the animal.

**Mark awarded for 2(b)(i) = 1 out of 1**

(ii) State the average body mass of a male rhinoceros.

..... 3060 ..... kg [1]

Incorrect information is extracted from the graph.

**Mark awarded for 2(b)(ii) = 0 out of 1**

(iii) State the average body mass of the mammal that has an average lifespan of 25 years.

..... 1035 ..... kg [1]

This is incorrect.

**Mark awarded for 2(a)(iii) = 0 out of 1**

The answers to parts (ii) and (iii) indicates that the candidate experienced difficulties working with the scale on the y-axis.

Example Candidate Response, Question 2, Low	Examiner comments
<p>(iv) Describe the relationship between average body mass and average lifespan shown in Fig. 2.2 and Table 2.1.</p> <p>Directly proportional as by increasing the average life span of years the average body mass increases [1]</p> <p>(c) The average lifespan of a human male can vary from 40 years to 85 years. The lifespan partly depends on the things available in the country where the man lives. Suggest three things that would increase the chance of a man having a longer lifespan.</p> <p>1. NO disease spread</p> <p>2. <del>no predators</del> Having clean water and food and eating healthy food</p> <p>3. Exercising</p> <p>[3]</p> <p>[Total: 10]</p>	<p>The candidate is not awarded a mark for this response as the relationship is not directly proportional.</p> <p><b>Mark awarded for 2(b)(iv) = 0 out of 1</b></p> <p>The candidate is awarded a mark for identifying the importance of clean water. 'Eating healthy food' cannot be considered as it is the second response in this space. 'Exercising' is also awarded a mark. The first answer is not credited with a mark as the candidate does not state how spread of disease is to be reduced.</p> <p><b>Mark awarded for 2(c) = 2 out of 3</b></p> <p><b>Total mark awarded = 4 out of 10</b></p>

### How the candidate could have improved the answer

- (a)(ii) The answer could have been improved by stating two mammalian characteristics that are not visible in the photograph. 'Floppy ears' would be an acceptable description of external ears, but this feature was not allowed as the external ears are visible on the baby.
- (b)(ii)(iii)
  - The answers could have been improved by reading the figures from the axes accurately. It seemed that the candidate had trouble interpreting the scale on the y-axis.
- (c) The first suggestion needed to be expanded to suggest a way in which the spread of disease might be reduced, such as increase availability of vaccinations. Note that the second suggestion made by the candidate contained two answers; the protocol for this situation is that the first suggestion is marked and subsequent one is ignored.



## Common mistakes candidates made in Question 2

- (a) *The examiner was expecting candidates to state some characteristics of mammals: one which was visible in the photograph, and two which were not visible.*

Candidates of all abilities had very little knowledge of mammalian characteristics, apart from the possession of fur.

- (b) *The examiner was expecting candidates to extract some answers directly from the information provided, and then to describe the general relationship between body mass and average life span shown in the graph.*

A common mistake made in weaker responses was a statement such as 'the more you weigh the longer you live.' This was not awarded marks because individual age has been confused with average life span of a species. Other candidates stated that the relationship between average age and life span was directly proportional, which is not accurate.

- (c) *The examiner was expecting the candidate to make three suggestions that would contribute towards an increased human lifespan.*

Frequently, insufficient detail was given.

Question 3

Example Candidate Response – Question 3, High

Examiner comments

3 Fig. 3.1 shows a section through the skin.

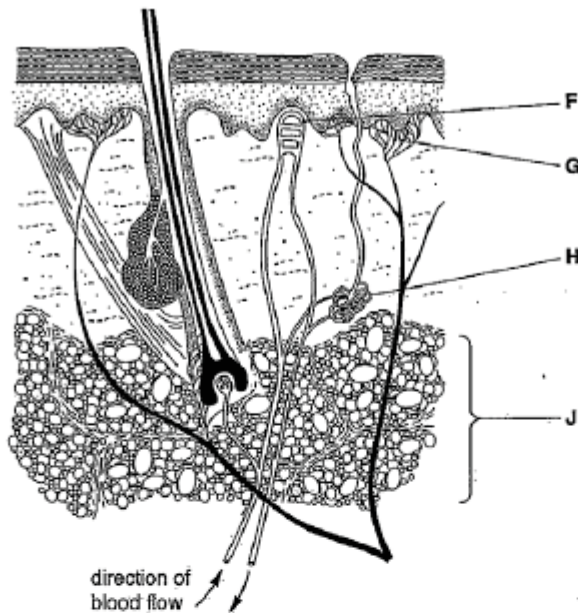


Fig. 3.1

(a) Name the structures labelled in Fig. 3.1 and outline a function in the skin for each one.

Write your answers in Table 3.1.

An example has been done for you.

Table 3.1

structure	name of structure	function in the skin
F	Capillary loop	dilates and constricts to control the blood flow
G	sensory neurones	detects stimulus
H	sweat gland	produces sweat for cooling the body
J	fatty tissue	insulation for the skin

The candidate identifies all three structures and correctly states the functions for two of them. The function for the capillary is incorrect as it is the arteriole leading to the capillary that can regulate the blood flow.

The role of the arteriole in vaso-constriction and vaso-dilation is understood by very few candidates and is obviously an area of understanding that needs reinforcing.

Mark awarded for 3(a)  
= 5 out of 6

Example Candidate Response – Question 3, High

Examiner comments

(b) In an investigation the volume of sweat produced by a student was measured when running while carrying different masses in a back-pack.



The results are shown in Fig. 3.2.

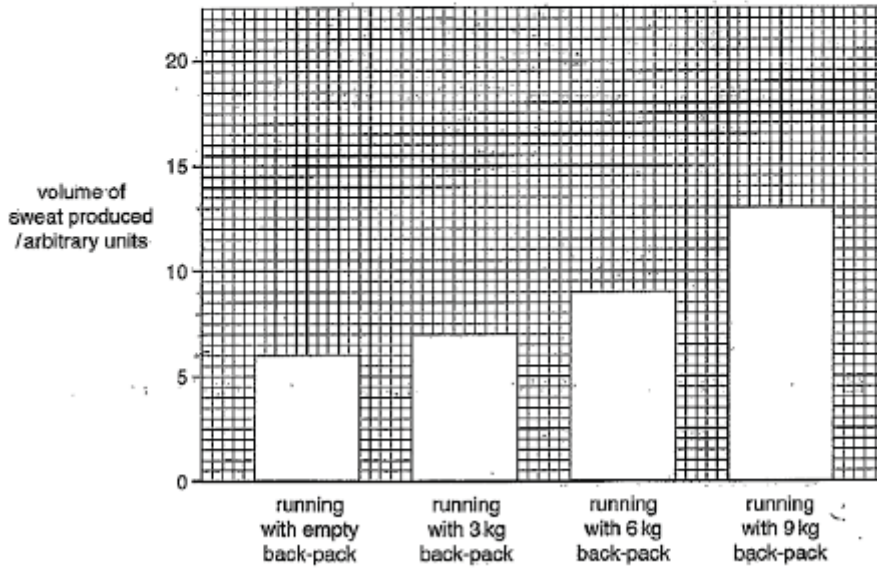


Fig. 3.2

(i) Use Fig. 3.2 to state:

the volume of sweat produced when running with an empty back-pack

..... 6 ..... arbitrary units

the volume of sweat produced when running with a 9 kg back-pack

..... 13 ..... arbitrary units

Use these two volumes to calculate the percentage increase in sweat production when running with a 9 kg back-pack.

Give your answer to the nearest whole number.

Show your working.

$$\text{Percentage increase} = \frac{\text{increase}}{\text{original}} \times 100$$

$$\text{Percentage increase} = \frac{(13-6) \times 100}{6} = 53.846 \dots \rightarrow \approx 54\%$$

..... 54 ..... %  
[3]

The candidate gives the correct figures for the volumes of sweat produced, and gains two marks. The formula for working out the percentage is given correctly but the candidate has substituted the incorrect figures into the formula.

**Mark awarded for 3(b)(ii) = 2 out of 3**

Example Candidate Response – Question 3, High	Examiner comments
<p>(ii) This investigation was carried out when the air temperature was 10°C.                      Predict the effect of carrying out the same investigation if the air temperature was 15°C.                      The volume of sweat produced will increase. [1]</p> <p>(c) When the student was at rest the volume of sweat produced was 2 arbitrary units.                      The volume increases during exercise as the body needs to keep cool.                      Explain how this cooling takes place.                      Sweat is released at the top of the skin, the water in the sweat evaporates, evaporation needs heat energy from the body, so heat energy is removed from the body so the body cools. [3]</p> <p>[Total: 13]</p>	<p>The candidate gives an accurate prediction.  <b>Mark awarded for 3(b)(ii) = 1 out of 1</b></p> <p>A coherent explanation is provided. The candidate is awarded marks for: water in sweat evaporates and (this) takes heat energy from the body.  <b>Mark awarded for 3(c) = 3 out of 3</b>  <b>Total mark awarded = 11 out of 13</b></p>

### How the candidate could have improved the answer

- (a) The candidate should have given a function of a blood capillary, such as it being the place where oxygen diffuses out to the cells. It is the arterioles that have the ability to constrict or relax.
- (b)(i) The candidate could have improved their answer by using the correct numbers for calculating the percentage.

Example Candidate Response – Question 3, Middle

Examiner comments

3 Fig. 3.1 shows a section through the skin.

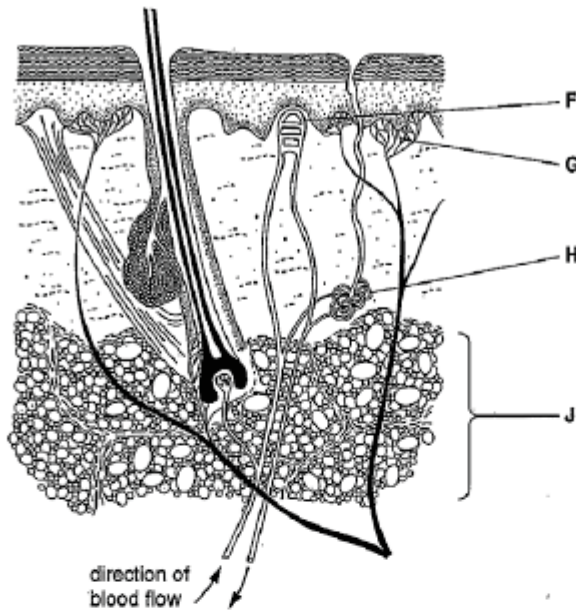


Fig. 3.1

(a) Name the structures labelled in Fig. 3.1 and outline a function in the skin for each one.

Write your answers in Table 3.1.

An example has been done for you.

Table 3.1

structure	name of structure	function in the skin
F	blood capillaries	take in and <del>is</del> out blood.
G	receptors	transport signals.
H	sweat gland	produces sweat for cooling the body
J	Spongy mesophyll	for gas exchange

[6]

The candidate gains marks for identifying the capillaries and stating their function. The receptors are also named correctly, but their function is to detect changes and not to transmit impulses, so there is no mark awarded for the function. They incorrectly identify the adipose layer as spongy mesophyll, so no marks are awarded for either structure or function.

**Mark awarded for 3(a) = 3 out of 6**

Example Candidate Response – Question 3, Middle

Examiner comments

(b) In an investigation the volume of sweat produced by a student was measured when running while carrying different masses in a back-pack.



The results are shown in Fig. 3.2.

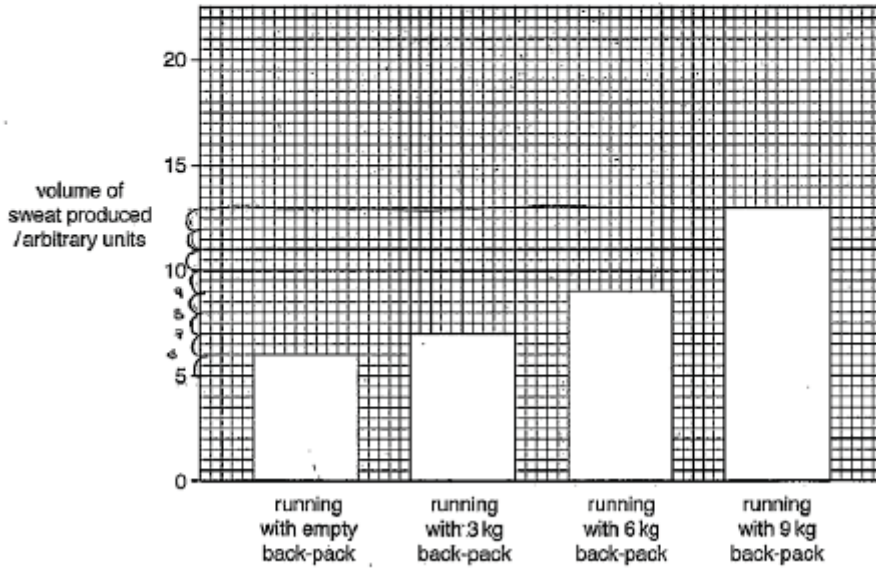


Fig. 3.2

(i) Use Fig. 3.2 to state:

the volume of sweat produced when running with an empty back-pack

..... 6 ..... arbitrary units

the volume of sweat produced when running with a 9kg back-pack

..... 13 ..... arbitrary units

Use these two volumes to calculate the percentage increase in sweat production when running with a 9 kg back-pack.

Give your answer to the nearest whole number.

Show your working.

$$\frac{6}{9} \times 100$$

..... 66 ..... %  
[3]

The candidate states the two volumes of sweat accurately. The percentage formula is incorrect and it is unclear where the figure '9' originated.

Mark awarded for 3(b)(ii) = 2 out of 3



Example Candidate Response – Question 3, Middle	Examiner comments
<p>(ii) This investigation was carried out when the air temperature was 10 °C. Predict the effect of carrying out the same investigation if the air temperature was 15 °C. ..... ..... .....[1]</p> <p>(c) When the student was at rest the volume of sweat produced was 2 arbitrary units. The volume increases during exercise as the body needs to keep cool. Explain how this cooling takes place. ..... ..... ..... ..... .....[3]</p> <p>[Total: 13]</p>	<p>It is insufficient to state that the volumes of sweat would be different. The candidate needs to say that the volume would be greater at a higher temperature.</p> <p><b>Mark awarded for 3(b)(ii) = 0 out of 1</b></p> <p>The candidate is awarded two marks for identifying that water evaporates. The explanation is incomplete as there is no reference to the energy for evaporation being provided by the body.</p> <p><b>Mark awarded for 3(c) = 2 out of 3</b></p> <p><b>Total mark awarded = 7 out 13</b></p>

### How the candidate could have improved the answer

- (a) The candidate could have improved their response by stating the function of the blood capillary more clearly. The receptors detect changes in the external environment; they do not transmit impulses, as the candidate indicated. The candidate needed to interpret the skin diagram more effectively and be able to give functions for each part.
- (b)(i) The candidate could have improved their answer by using the correct numbers for calculating the percentage.
- (b)(ii) The response needed to be more specific and state that the volumes of sweat would be larger.
- (c) The candidate could have improved their answer by explaining that the energy for evaporation is provided by the body.



Example Candidate Response – Question 3, Low

Examiner comments

3 Fig. 3.1 shows a section through the skin.

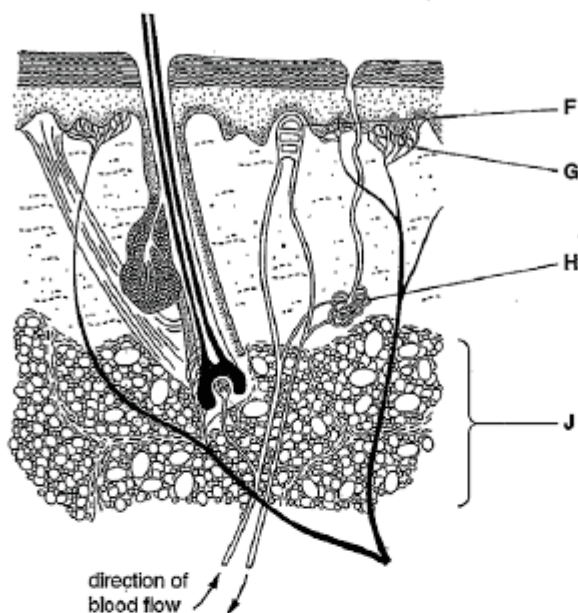


Fig. 3.1

(a) Name the structures labelled in Fig. 3.1 and outline a function in the skin for each one.

Write your answers in Table 3.1.

An example has been done for you.

Table 3.1

structure	name of structure	function in the skin
F	Vein	Support skin with blood Blood supply
G	Nerve	Control movement
H	sweat gland	produces sweat for cooling the body
J	Tissue (group of cells)	Respiration in skin

[6]

Mark awarded for 3(a)  
= 0 out of 6

The candidate has not identified any of the structures correctly. The mark scheme stipulates that the mark for the function cannot be awarded if the structure itself is not correctly identified.

Example Candidate Response – Question 3, Low

Examiner comments

(b) In an investigation the volume of sweat produced by a student was measured when running while carrying different masses in a back-pack.



The results are shown in Fig. 3.2.

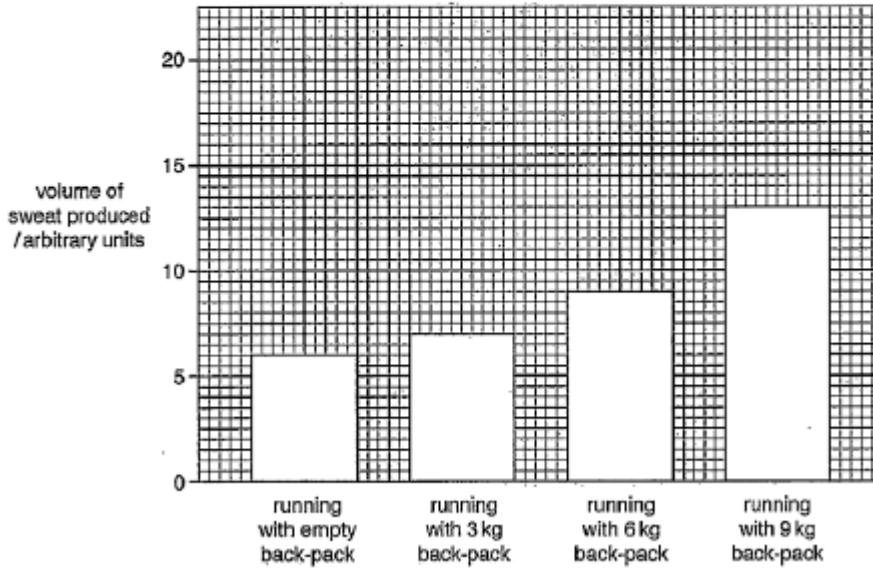


Fig. 3.2

(i) Use Fig. 3.2 to state:

the volume of sweat produced when running with an empty back-pack

.....6..... arbitrary units

the volume of sweat produced when running with a 9 kg back-pack

.....13..... arbitrary units

Use these two volumes to calculate the percentage increase in sweat production when running with a 9 kg back-pack.

Give your answer to the nearest whole number.

Show your working.

$$\frac{\text{Number}}{\text{Total}} \times 100 \quad \frac{6}{13} \times 100$$

.....46..... %  
[3]

The candidate correctly extracts the two figures required from the graph. The word formula for the percentage is not clear and the incorrect figures have been substituted, so the third mark is not awarded.

**Mark awarded for 3(b)(i) = 2 out of 3**

Example Candidate Response – Question 3, Low	Examiner comments
<p>(ii) This investigation was carried out when the air temperature was 10°C.                      Predict the effect of carrying out the same investigation if the air temperature was 15°C.                      ..... <i>volume of sweat produced increase</i> .....                      ..... [1]</p> <p>(c) When the student was at rest the volume of sweat produced was 2 arbitrary units.                      The volume increases during exercise as the body needs to keep cool.                      Explain how this cooling takes place.                      ..... <i>By sweating more as when sweat</i> .....                      ..... <i>volume increases that means that the</i> .....                      ..... <i>body is working on maintaining a</i> .....                      ..... <i>certain temperature.</i> .....                      ..... [3]</p> <p style="text-align: right;">[Total: 13]</p>	<p>An increase in sweat production is predicted accurately.</p> <p><b>Mark awarded for 3(b)(ii) = 1 out of 1</b></p> <p>The candidate has not answered the question and so is not awarded any marks.</p> <p><b>Mark awarded for 3(c) = 0 out of 3</b></p> <p><b>Total mark awarded = 3 out of 13</b></p>

### How the candidate could have improved the answer

- (a) The candidate could have improved their answer by having a better understanding of the structure and function of the skin; they clearly did not know the structure or function of the skin and were unable to answer the question. The structure and function had to match, therefore, the candidate could not be given credit for the poorly expressed function for J as the structure was not identified correctly.
- (b)(i) The candidate could have improved their answer by using the correct numbers for calculating the percentage. The word formula for the percentage was not clear, so it might be that they did not understand how to calculate the percentage increase.
- (c) The candidate did not answer the question asked, so could not be awarded any marks. It is necessary for the candidate to learn how sweat lowers the body temperature.

## Common mistakes candidates made in Question 3

- (a) *The examiner was expecting the candidate to name the three structures in the skin and to state briefly a function for each one.*

Most candidates were unable to identify skin structures and give the functions; it is clear that the structure of the skin was not well known. There were frequent instances of the adipose tissue being identified as a structure that is not found in the skin. In some cases, plant structures were named.

- (b) *The examiner expected the candidate to extract some figures from a graph and to use these in a simple calculation. The candidate was also asked in (b)(ii) to give a prediction based on the information in the graph.*

Many candidates were not capable of calculating the required percentage. It appeared that incorrect numbers were used in their calculations.

- (c) *The examiner expected the candidate to explain how sweat cools the body.*

The majority of candidates could not explain how sweat lowers the body temperature; most candidates find the explanation of how sweat cools the body very difficult.

## Question 4

Example Candidate Response – Question 4, High	Examiner comments
<p>4 Choose words from the list to complete the sentences about hormones.</p> <p>Each word may be used once, more than once, or not at all.</p> <p><b>adrenaline    blood    decrease    glands</b></p> <p><b>increase    insulin    nerves    main</b></p> <p><b>saliva    system    target    urine</b></p> <p>Hormones are chemicals produced by <del>adrenaline</del> glands</p> <p>Hormones are carried round the body by the <u>blood</u>.</p> <p>A hormone affects the activity of one part of the body called the <u>target</u> organ.</p> <p>After a person has eaten a meal the pancreas releases the hormone <u>insulin</u>.</p> <p>One of the effects of this hormone is to lower the glucose level in the <u>blood</u>. [5]</p> <p>[Total: 5]</p>	<p>The candidate selects four of the required words. Hormones are produced by glands not by the adrenal glands, so one mark is not awarded here.</p> <p><b>Mark awarded for 4 = 4 out of 5</b></p> <p><b>Total mark awarded = 4 out of 5</b></p>

### How the candidate could have improved the answer

The candidate could have improved their answer by appreciating that there are many glands that produce hormones. One such gland is the adrenal gland, which secretes adrenaline. Other glands secrete the other hormones.

Example Candidate Response – Question 4, Middle	Examiner comments
<p>4 Choose words from the list to complete the sentences about hormones.</p> <p>Each word may be used once, more than once, or not at all.</p> <p>adrenaline    <del>blood</del>    decrease    <del>glands</del>  increase    <del>insulin</del>    nerves    <del>main</del>  saliva    system    target    <del>urine</del></p> <p>Hormones are chemicals produced by ..... <u>glands</u> .....</p> <p>Hormones are carried round the body by the ..... <u>Blood</u> .....</p> <p>A hormone affects the activity of one part of the body called the ..... <u>main</u> ..... organ.</p> <p>After a person has eaten a meal the pancreas releases the hormone ..... <u>insulin</u> .....</p> <p>One of the effects of this hormone is to lower the glucose level in the ..... <u>urine</u> ..... [5]</p> <p>[Total: 5]</p>	<p>The candidate selects the words 'glands', 'blood' and 'insulin' accurately and so is awarded three marks.</p> <p><b>Mark awarded for 4 = 3 out of 5</b></p> <p><b>Total mark awarded = 3 out of 5</b></p>

### How the candidate could have improved the answer

Firstly the candidate needed to appreciate that insulin lowers the glucose level in the blood. Secondly, that the general term for any organ that is affected by the action of a hormone is the *target organ*. This is the term stated in the syllabus.

Example Candidate Response – Question 4, Low	Examiner comments
<p><b>4</b> Choose words from the list to complete the sentences about hormones.</p> <p>Each word may be used once, more than once, or not at all.</p> <p><b>adrenaline      blood      decrease      glands</b>  <b>increase      insulin      nerves      main</b>  <b>saliva      system      target      urine</b></p> <p>Hormones are chemicals produced by .....<u>blood</u>.....</p> <p>Hormones are carried round the body by the .....<u>glands</u>.....</p> <p>A hormone affects the activity of one part of the body called the .....<u>main</u>..... organ.</p> <p>After a person has eaten a meal the pancreas releases the hormone .....<u>insulin</u>.....</p> <p>One of the effects of this hormone is to lower the glucose level in the .....<u>urine</u>..... [5]</p> <p>[Total: 5]</p>	<p>The candidate is awarded one mark for selecting insulin for the fourth response. All the other words selected are inaccurate.</p> <p><b>Mark awarded for 4 = 1 out of 5</b></p> <p><b>Total mark awarded = 1 out of 5</b></p>

### How the candidate could have improved the answer

The candidate needed to know the material more thoroughly as most of the answers given appear to be chosen at random. The only fact given correctly by the candidate was that after a meal the pancreas releases insulin.

### Common mistakes candidates made in Question 4

Many candidates did not appear to be familiar with the term 'target organ'.



Question 5

Example Candidate Response – Question 5, High

Examiner comments

5 Fig. 5.1 shows some apparatus used to investigate transpiration.

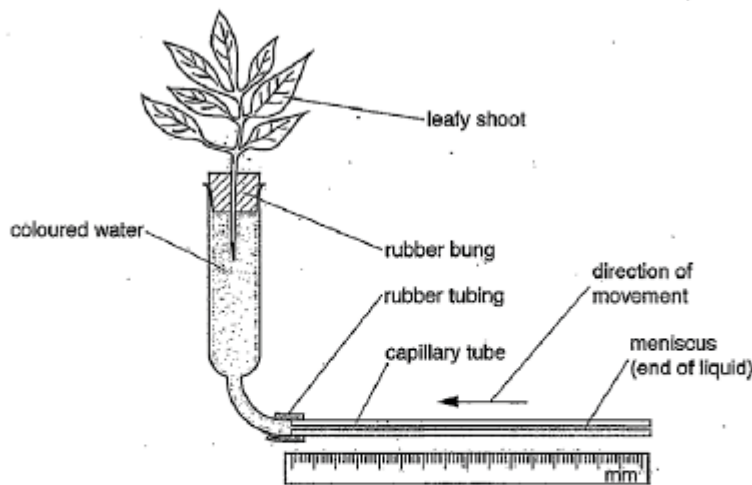


Fig. 5.1

The rate of transpiration can be calculated by measuring how far the meniscus moves five minutes.

The tissue is correctly named. The incorrect spelling is allowed.

(a) Name the tissue that transports water from the roots to the leaves in a plant.

..... xylem .....

Mark awarded for 5(a)  
= 1 out of 1

(b) The investigation was carried out at five different temperatures. All other conditions were kept constant.

Table 5.1 shows the results recorded using the apparatus shown in Fig. 5.1.

Table 5.1

temperature/°C	distance moved by meniscus in five minutes/mm
10	28
20	32
30	37
40	44
50	53

(i) State one conclusion that can be drawn from the results in Table 5.1 about the effect of temperature on the rate of transpiration.

The candidate draws the correct conclusion from the results.

..... when the temperature increase, the  
rate of transpiration increases ..... [1]

Mark awarded for 5(b)(i)  
= 1 out of 1

Example Candidate Response – Question 5, High

Examiner comments

(ii) Suggest why the investigation was not continued at temperatures above 50°C.

because the enzymes in the plant can be denatured from high temperature.

There are two marks for this response and a sufficient number of lines have been supplied. The candidate gains one mark for stating that the enzymes would denature, but the second mark is not awarded as the response is incomplete. A second statement saying that the plant would die would have gained the second mark available.

**Mark awarded for 5(b)(ii) = 1 out of 2**

(c) The investigation was repeated using the leafy shoot shown in Fig. 5.2.



Fig. 5.2

The candidate is not awarded the mark for stating that the results would be less as this is imprecise. A statement relating to *this* experiment is required, such as, there would be less water loss or that the meniscus would move more slowly.

**Mark awarded for 5(c)(i) = 0 out of 1**

(i) Predict how these results would be different to the results shown in Table 5.1.

The results will be less than the results in Table 5.1

Two marks are awarded for two correct reasons. An improvement would be to clarify whether 'less leaves' means smaller leaves or a lower number of leaves.

**Mark awarded for 5(c)(ii) = 2 out of 2**

(ii) Give two reasons why the results would be different.

because this leafy shoot is smaller than the other and has less leaves than the other, so the amount of water moved will be less.

One mark is awarded for a correct response.

**Mark awarded for 5(d) = 1 out of 1**

**Total mark awarded = 6 out of 8**

Example Candidate Response – Question 5, High	Examiner comments
<p>(d) State one factor, other than temperature, that can affect the rate of transpiration.</p> <p>..... humidity .....</p> <p>.....[1]</p> <p>[Total: 8]</p>	

### How the candidate could have improved the answer

- (a) The candidate could have improved the answer by spelling xylem correctly.
- (b)(ii) The answer could have been improved by including a second statement saying that the plant would die; or that water loss would be greater than water intake; or that there would be difficulty in achieving this temperature in a laboratory, to be awarded the second mark. The candidate needed to realise that where two marks are available, it is necessary to make two distinct points in the answer.
- (c)(i) A statement needed to be made relating to the experiment described. Saying that the results would be 'less', is imprecise. The candidate needed to say that the rate of transpiration would be less, or that there would be less water loss, or that the meniscus would move more slowly.
- (c)(ii) An improvement would be to clarify whether 'less leaves' means smaller leaves or fewer leaves. The candidate had already been credited with saying that the entire shoot was smaller, so was given the benefit-of-the-doubt over the meaning of 'less leaves'.

Example Candidate Response – Question 5, Middle

Examiner comments

5 Fig. 5.1 shows some apparatus used to investigate transpiration.

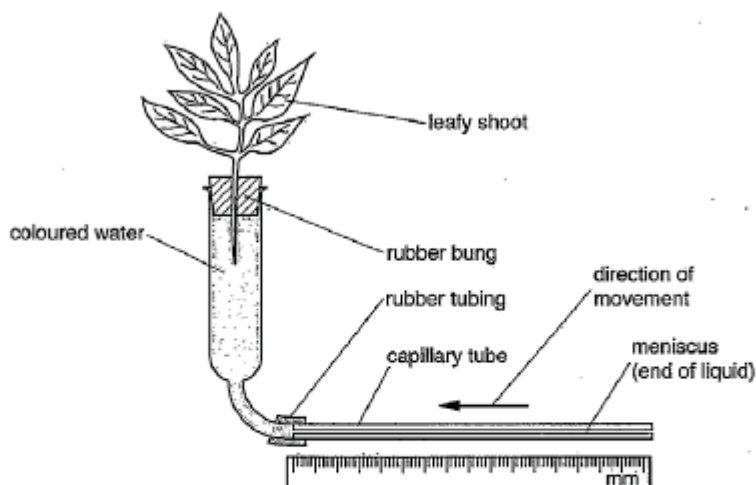


Fig. 5.1

The rate of transpiration can be calculated by measuring how far the meniscus moves in five minutes.

(a) Name the tissue that transports water from the roots to the leaves in a plant.

Xylem tissue.....[1]

(b) The investigation was carried out at five different temperatures. All other conditions were kept constant.

Table 5.1 shows the results recorded using the apparatus shown in Fig. 5.1.

Table 5.1

temperature/°C	distance moved by meniscus in five minutes/mm
10	28
20	32
30	37
40	44
50	53

(i) State one conclusion that can be drawn from the results in Table 5.1 about the effect of temperature on the rate of transpiration.

As temperature increase, the rate of transpiration increase......[1]

(ii) Suggest why the investigation was not continued at temperatures above 50°C.

Because above 50°C causes the air to be saturated with water vapour (humidity) the rate of transpiration will decrease......[2]

One mark is awarded for a correct response.


Mark awarded for 5(a) = 1 out of 1

The candidate is awarded mark for stating the correct relationship.

Mark awarded for 5(b)(i) = 1 out of 1

A high ambient temperature does not mean that the humidity will increase. If the candidate had thought about the answer to the previous question, then a different response may have been elicited here.

Mark awarded for 5(b)(ii) = 0 out of 2

Example Candidate Response – Question 5, Middle	Examiner comments
<p>(c) The investigation was repeated using the leafy shoot shown in Fig. 5.2.</p>  <p>Fig. 5.2</p> <p>(i) Predict how these results would be different to the results shown in Table 5.1.</p> <p>...The distance moved by the meniscus in 5 minute will decrease.....[1]</p> <p>(ii) Give two reasons why the results would be different.</p> <p>① Because few leaves are used.....</p> <p>② Because the rate of transpiration will decrease.....[2]</p> <p>(d) State one factor, other than temperature, that can affect the rate of transpiration.</p> <p>...humidity.....[1]</p> <p>[Total: 8]</p>	<p>The candidate makes the correct prediction.</p> <p><b>Mark awarded for 5(c)(i) = 1 out of 1</b></p> <p>One mark is awarded for the fact that the plant possesses fewer leaves. The decrease in the rate of transpiration is merely a restatement of the answer to part(c)(i) and so does not merit a mark.</p> <p><b>Mark awarded for 5(c)(ii) = 1 out of 2</b></p> <p>One mark is awarded for a correct response.</p> <p><b>Mark awarded for 5(d) = 1 out of 1</b></p> <p><b>Total mark awarded = 5 out of 8</b></p>

### How the candidate could have improved the answer

- (b)(ii) The answer given is not logical. The candidate could have improved their answer by considering the results of the investigation in part (i) as a starting point.
- (c)(i) The candidate could have improved their response by giving a second reason for the difference in the results (as decrease in transpiration has already been stated in (c)(i)). This could have been that the leaves were smaller, or that the total surface area of the leaves was smaller.

Example Candidate Response – Question 5, Low

Examiner comments

5 Fig. 5.1 shows some apparatus used to investigate transpiration.

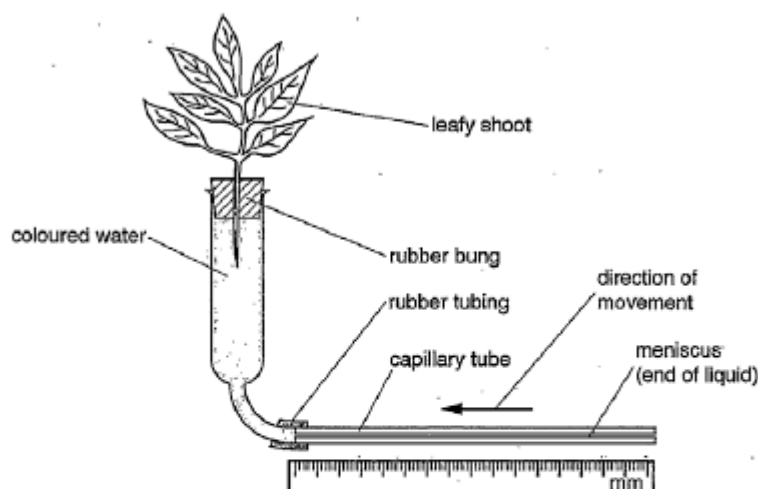


Fig. 5.1

The rate of transpiration can be calculated by measuring how far the meniscus moves in five minutes.

(a) Name the tissue that transports water from the roots to the leaves in a plant.

..... xylem ..... [1]

(b) The investigation was carried out at five different temperatures. All other conditions were kept constant.

Table 5.1 shows the results recorded using the apparatus shown in Fig. 5.1.

Table 5.1

temperature / °C	distance moved by meniscus in five minutes / mm
10	28
20	32
30	37
40	44
50	53

(i) State **one** conclusion that can be drawn from the results in Table 5.1 about the effect of temperature on the rate of transpiration.

..... As ~~temp~~ temperature increases the distance moved by meniscus ~~is~~ increases ..... [1]

(ii) Suggest why the investigation was not continued at temperatures above 50 °C.

..... because it would have been too hot for the meniscus to move and the thermometer wouldn't record because it has reached the end of its scale ..... [2]

One mark is awarded for a correct response.

Mark awarded for 5(a) = 1 out of 1


The candidate is awarded a mark for stating the correct relationship.

Mark awarded for 5(b)(i) = 1 out of 1

Neither suggestion is correct.

Mark awarded for 5(b)(ii) = 0 out of 2



Example Candidate Response – Question 5, Low	Examiner comments
<p>(c) The investigation was repeated using the leafy shoot shown in Fig. 5.2.</p> <div style="text-align: center;">  <p>Fig. 5.2</p> </div> <p>(i) Predict how these results would be different to the results shown in Table 5.1.</p> <p><del>The results</del> <del>are</del> <del>different</del> it would be less accurate. [1]</p> <p>(ii) Give two reasons why the results would be different.</p> <p>different conditions. different apparatus used. [2]</p> <p>(d) State one factor, other than temperature, that can affect the rate of transpiration.</p> <p>humidity and amount of rain fall. [1]</p> <p style="text-align: right;">[Total: 8]</p>	<p>No mark is awarded for this response.</p> <p><b>Mark awarded for 5(c)(i) = 0 out of 1</b></p> <p>The candidate does not appear to understand the difference between the two investigations.</p> <p><b>Mark awarded for 5(c)(ii) = 0 out of 2</b></p> <p>The candidate is awarded one mark for a correct answer.</p> <p><b>Mark awarded for 5(d) = 1 out of 1</b></p> <p><b>Total mark awarded = 3 out of 8</b></p>

### How the candidate could have improved the answer

- (b)(ii) Both of the suggestions made by the candidate are illogical. The candidate could improve their answer by considering the results of the investigation in part (i) as a starting point.
- (c)(i) The candidate could have improved their answer by being specific and stating that either the rate of transpiration would be less, or give a result from the experiment that would support this, such as the meniscus would move more slowly.
- (c)(ii) The candidate should have compared the shoots in Figs. 5.1 and 5.2 and considered what effect the differences would have on transpiration rates.

## Common mistakes candidates made in Question 5

*(b)(ii) The examiner was expecting a suggestion to be made about a continuation of the investigation.*

Many candidates gave an answer containing only one point. There are two marks available, which should indicate to candidates that they must expand their first response or think of a second factor to suggest.

*(c) The examiner was expecting a prediction made about a modification of the previous investigation and two reasons stated to support this prediction.*

(c)(ii) Many candidates gave only one reason for the difference in results. They were specifically asked for two reasons, and two marks were available. Candidates must follow instructions if they are to access all of the available marks.

## Question 6

## Example Candidate Response – Question 6, High

## Examiner comments

6 (a) Define the term *genetic engineering*.

removal of ~~insert~~ of a certain ~~gene~~ gene from chromosomes of a species and ~~inserting~~ inserting it into another different species to obtain desirable characteristic.

The candidate is awarded two marks for a sound definition.

**Mark awarded for 6(a)**  
= 2 out of 2

(b) State two examples of genetic engineering.

For each example, outline how it benefits humans.

Write your answers in Table 6.1.

Table 6.1

example	benefit to humans
taking genes of production of insulin from humans and <del>adding</del> inserting it to bacteria	insulin produced by bacteria will be taken and prescribed to people who have problems with secretion of insulin in body
taking genes from a micro-organism that is not affected by insecticides and adding it to plants	plant crops will not be harmed by insecticides to have healthier crops if insecticide affect soil.

[4]

[Total: 6]

All four marks are awarded. The second example involving the insecticides is more theoretical, but perfectly feasible.

**Mark awarded for 6(b)**  
= 4 out of 4

**Total mark awarded =**  
6 out of 6

## How the candidate could have improved the answer

The candidate gained full marks for all parts and there are no specific ways that the responses could have been improved.

Example Candidate Response – Question 6, Middle	Examiner comments						
<p>6 (a) Define the term <i>genetic engineering</i>.</p> <p>take a gene from a species and put it in another species by bacteria as it produce rapidly to develop it's characteristics.</p> <p>[2]</p> <p>(b) State two examples of genetic engineering.</p> <p>For each example, outline how it benefits humans.</p> <p>Write your answers in Table 6.1.</p> <p style="text-align: center;">Table 6.1</p> <table border="1"> <thead> <tr> <th>example</th> <th>benefit to humans</th> </tr> </thead> <tbody> <tr> <td>Selective breeding</td> <td>having Cattles with more meat and milke</td> </tr> <tr> <td>insulin</td> <td>taking insulin and put with Bacteria where bacteria divide and insulin increase.</td> </tr> </tbody> </table> <p>[4]</p> <p style="text-align: right;">[Total: 6]</p>	example	benefit to humans	Selective breeding	having Cattles with more meat and milke	insulin	taking insulin and put with Bacteria where bacteria divide and insulin increase.	<p>Two marks are awarded for an acceptable description, although the last clause is rather muddled.</p> <p><b>Mark awarded for 6(a) = 2 out of 2</b></p> <p>Selective breeding is not an example of genetic engineering, so the candidate cannot be awarded any marks for the first response. The candidate is not awarded marks for the second example as it is incorrectly described.</p> <p><b>Mark awarded for 6(b) = 0 out of 4</b></p> <p><b>Total mark awarded = 2 out of 6</b></p>
example	benefit to humans						
Selective breeding	having Cattles with more meat and milke						
insulin	taking insulin and put with Bacteria where bacteria divide and insulin increase.						

### How the candidate could have improved the answer

- (a) The candidate gained the two marks here, but the definition could have been improved. The last clause is muddled and what the candidate seems to be saying does not constitute part of the definition. It is advisable for candidates to learn some definitions by rote. When candidates try to express a definition in their own words it is not usually successful.
- (b) The candidate needed to learn the examples of genetic engineering given in the syllabus. Genetic engineering is involved in insulin production, but the candidate does not demonstrate an understanding of the process.



## Common mistakes candidates made in Question 6

- (a) *The examiner was expecting a clear definition of 'genetic engineering'.*

Many candidates could not give a definition of genetic engineering. A substantial number had an idea, but trying to explain this in their own words was not successful.

- (b) *The examiner was expecting candidates to state two examples of genetic engineering, and an outline of the benefits to humans of each example stated.*

A large number of candidates gave an example of selective breeding as their response to this question. Obviously, selective breeding is not an example of genetic engineering. The other frequently stated example was some type of fertility treatment in humans. Genetic engineering is an area of the syllabus that needs to be reinforced.



### Question 7

Example Candidate Response – Question 7, High	Examiner comments														
<p>7 The boxes on the left contain the names of some processes taking place in living organisms.</p> <p>The boxes on the right contain descriptions of these processes.</p> <p>Draw <b>one</b> straight line from each box on the left to a box on the right to link the name of the process with its description.</p> <p>An example has been done for you.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">name of process</th> <th style="text-align: left;">description of process</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">pollination</td> <td style="text-align: center;">the diffusion of water through a partially permeable membrane</td> </tr> <tr> <td style="text-align: center;">osmosis</td> <td style="text-align: center;">a response in which parts of a plant grow towards or away from gravity</td> </tr> <tr> <td style="text-align: center;">gravitropism</td> <td style="text-align: center;">transfer of pollen grains from the anther to the stigma</td> </tr> <tr> <td style="text-align: center;">phagocytosis</td> <td style="text-align: center;">the maintenance of a constant internal environment</td> </tr> <tr> <td style="text-align: center;">assimilation</td> <td style="text-align: center;">the movement of digested food molecules into the cells of the body where they are used, becoming part of the cells</td> </tr> <tr> <td style="text-align: center;">homeostasis</td> <td style="text-align: center;">the engulfing and killing of pathogens by white blood cells</td> </tr> </tbody> </table> <p style="text-align: right;">[4] [Total: 4]</p>	name of process	description of process	pollination	the diffusion of water through a partially permeable membrane	osmosis	a response in which parts of a plant grow towards or away from gravity	gravitropism	transfer of pollen grains from the anther to the stigma	phagocytosis	the maintenance of a constant internal environment	assimilation	the movement of digested food molecules into the cells of the body where they are used, becoming part of the cells	homeostasis	the engulfing and killing of pathogens by white blood cells	<p>All answers are correct.</p> <p>Note that even though five lines have to be drawn, the maximum mark awarded is 4. This is because if a candidate makes four correct connections, the fifth one must also be correct.</p> <p><b>Mark awarded for 7 = 4 out of 4</b></p> <p><b>Total mark awarded = 4 out of 4</b></p>
name of process	description of process														
pollination	the diffusion of water through a partially permeable membrane														
osmosis	a response in which parts of a plant grow towards or away from gravity														
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phagocytosis	the maintenance of a constant internal environment														
assimilation	the movement of digested food molecules into the cells of the body where they are used, becoming part of the cells														
homeostasis	the engulfing and killing of pathogens by white blood cells														

### How the candidate could have improved the answer

The candidate gained full marks and there are no specific ways that the responses could have been improved.

Example Candidate Response – Question 7, Middle / Low	Examiner comments														
<p>7 The boxes on the left contain the names of some processes taking place in living organisms.</p> <p>The boxes on the right contain descriptions of these processes.</p> <p>Draw <b>one</b> straight line from each box on the left to a box on the right to link the name of the process with its description.</p> <p>An example has been done for you.</p> <table border="1" data-bbox="207 425 1013 1153"> <thead> <tr> <th data-bbox="215 436 391 459">name of process</th> <th data-bbox="710 436 917 459">description of process</th> </tr> </thead> <tbody> <tr> <td data-bbox="215 470 391 537">pollination</td> <td data-bbox="622 470 1005 537">the diffusion of water through a partially permeable membrane</td> </tr> <tr> <td data-bbox="215 593 391 660">osmosis</td> <td data-bbox="622 593 1005 660">a response in which parts of a plant grow towards or away from gravity</td> </tr> <tr> <td data-bbox="215 716 391 784">gravitropism</td> <td data-bbox="622 716 1005 784">transfer of pollen grains from the anther to the stigma</td> </tr> <tr> <td data-bbox="215 840 391 907">phagocytosis</td> <td data-bbox="622 840 1005 907">the maintenance of a constant internal environment</td> </tr> <tr> <td data-bbox="215 963 391 1030">assimilation</td> <td data-bbox="622 963 1005 1030">the movement of digested food molecules into the cells of the body where they are used, becoming part of the cells</td> </tr> <tr> <td data-bbox="215 1086 391 1153">homeostasis</td> <td data-bbox="622 1086 1005 1153">the engulfing and killing of pathogens by white blood cells</td> </tr> </tbody> </table> <p style="text-align: right;">[4] [Total: 4]</p>	name of process	description of process	pollination	the diffusion of water through a partially permeable membrane	osmosis	a response in which parts of a plant grow towards or away from gravity	gravitropism	transfer of pollen grains from the anther to the stigma	phagocytosis	the maintenance of a constant internal environment	assimilation	the movement of digested food molecules into the cells of the body where they are used, becoming part of the cells	homeostasis	the engulfing and killing of pathogens by white blood cells	<p>The candidate does not know the meaning of homeostasis and assimilation, as these have been linked to the wrong definitions.</p> <p><b>Mark awarded for 7 = 3 out of 4</b></p> <p><b>Total mark awarded = 3 out of 4</b></p>
name of process	description of process														
pollination	the diffusion of water through a partially permeable membrane														
osmosis	a response in which parts of a plant grow towards or away from gravity														
gravitropism	transfer of pollen grains from the anther to the stigma														
phagocytosis	the maintenance of a constant internal environment														
assimilation	the movement of digested food molecules into the cells of the body where they are used, becoming part of the cells														
homeostasis	the engulfing and killing of pathogens by white blood cells														

Most candidates performed well on this question, even those who did not perform well overall. Therefore, there isn't really a 'low' response.

### How the candidate could have improved the answer

The candidate could improve by learning the descriptions of homeostasis and assimilation.

### Common mistakes candidates made in Question 7

*The examiner was expecting 5 straight lines to be drawn between the boxes to link each process to its definition. Note that even though five lines have to be drawn, the maximum mark awarded is 4. This is because if a candidate makes four correct connections, the fifth one must also be correct.*

This question was answered correctly by almost all candidates. The few who did not achieve full marks tended to link assimilation to the description of homeostasis and vice versa.

Question 8

Example Candidate Response – Question 8, High

Examiner comments

8 Fig. 8.1 shows the structures that produce urine and excrete it from the body.

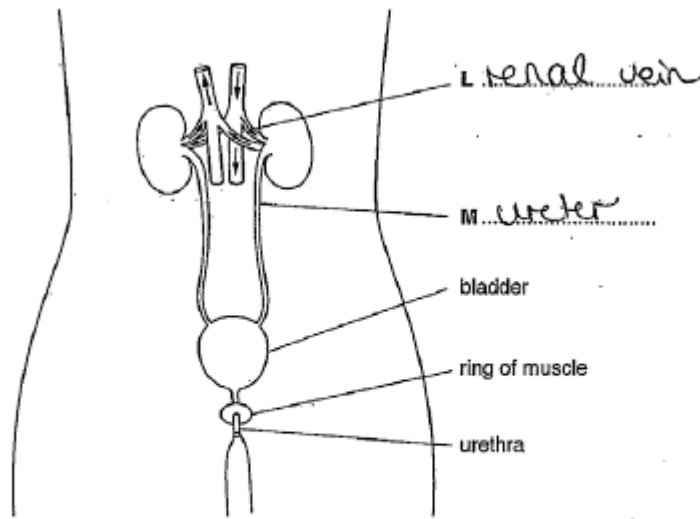


Fig. 8.1

(a) (i) Name the structures labelled L and M.

Write your answers on Fig. 8.1.

(ii) Urea is excreted in the urine.

Name the organ that produces urea and suggest how urea is transferred to the kidneys.

Urea is made in the liver  
 Urea is ~~transferred~~ transferred to the  
 kidneys by ~~it~~ in the blood [2]

The candidate is awarded one mark for labelling the ureter (spelt correctly). The blood vessel has been identified as the renal vein instead of the renal artery, so is not credited with a mark.

Mark awarded for 8(a)(i)  
 = 1 out of 2

Both statements are correct.

Mark awarded for 8(a)(ii)  
 = 2 out of 2

**Example Candidate Response – Question 8, High** **Examiner comments**

(b) In an investigation, the volume of urine produced by a student each day is measured.

The results are shown in Table 8.1.

**Table 8.1**

day	volume of urine /cm <sup>3</sup> per day
1	1440
2	1510
3	1410
4	1445
5	910
6	1445
7	1500

Suggest **three** possible reasons for the lower volume of urine produced by the student on day 5.

1. Low water intake
2. High temperature
3. Large amount of sweat produced.

[3]

(c) Outline **three** processes used in the treatment of sewage to make the water it contains safe for human use.

1. Filtering for removal of insoluble particles
2. Adding chlorine to kill bacteria and pathogens (chlorination)
3. Distillation

[3]

[Total: 10]

The candidate is awarded three marks. The answer could be improved by stating if the high temperature referred to, applied to the ambient temperature or the student's body temperature. As both these alternatives would result in a lower urine output, the candidate was awarded the mark.

**Mark awarded for 8(b) = 3 out of 3**

The candidate has outlined the filtration process and chlorination, so achieves two marks. The third mark is not awarded as sewage is never distilled.

**Mark awarded for 8(c) = 2 out of 3**

**Total mark awarded = 8 out of 10**

**How the candidate could have improved the answer**

- (a)(i) The candidate named the renal artery as the renal vein. There is an arrow on the diagram denoting the direction of blood flow.
- (b) The answer could be improved by stating whether the 'high temperature' applied to the ambient temperature or the student's body temperature. Since both these alternatives would result in a lower urine output, the candidate was awarded the mark.

**Example Candidate Response – Question 8, Middle**

**Examiner comments**

8 Fig. 8.1 shows the structures that produce urine and excrete it from the body.

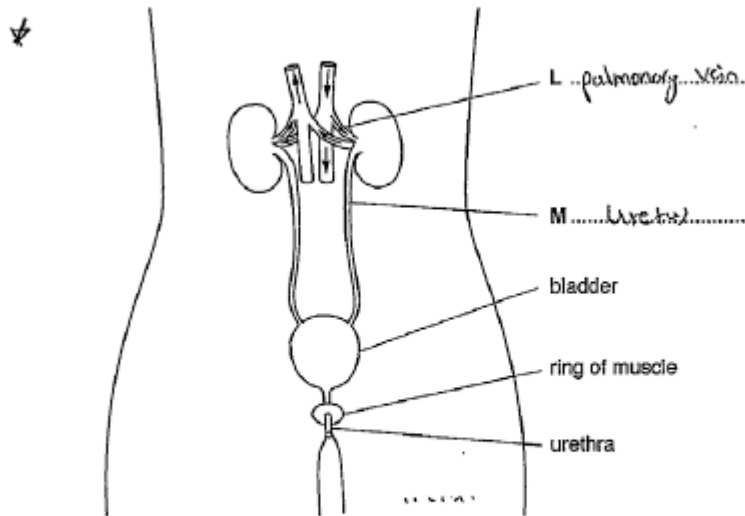


Fig. 8.1

(a) (i) Name the structures labelled L and M.

Write your answers on Fig. 8.1.

[2]

(ii) Urea is excreted in the urine.

Name the organ that produces urea and suggest how urea is transferred to the kidneys.

Urea is produced in the liver and the urea is transferred to the kidney by the

[2]

The candidate identifies the blood vessel as a vein, but does not state its correct name. The ureter has to be spelt accurately to be awarded the mark, and the word used seems to be a cross between ureter and uterus, so is not awarded a mark.

**Mark awarded for 8(a)(i) = 0 out of 2**

The candidate achieves a mark for knowing where urea is produced, but clearly does not know how urea travels from the liver to the kidney.

**Mark awarded for 8(a)(ii) = 1 out of 2**

**Example Candidate Response – Question 8, Middle**

**Examiner comments**

(b) In an investigation, the volume of urine produced by a student each day is measured.

The results are shown in Table 8.1.

Table 8.1

day	volume of urine /cm <sup>3</sup> per day
1	1440
2	1510
3	1410
4	1445
5	910
6	1445
7	1500

Suggest three possible reasons for the lower volume of urine produced by the student on day 5.

- 1 The student ~~exercised~~ ~~exercised~~ exercised very hard on that day.
- 2 The student got a problem in his kidney on that day.
- 3 The day was very hot.  
temperature in that

[3]

The first and last suggestions are acceptable and so two marks are awarded. The suggestion that the student had a kidney problem for one day only is not acceptable.

**Mark awarded for 8(b) = 2 out of 3**

(c) Outline three processes used in the treatment of sewage to make the water it contains safe for human use.

- 1 bacteriocides are used to remove any bacteria found in water.
- 2 Chlorine is used for the chlorination of water which removes impurities and microbes to produce pure water.
- 3

[3]

[Total: 10]

The candidate is awarded one mark for chlorination (even though removal of impurities is assigned to the process as well as removal of microbes). There is no mark for addition of bacteriocides as it would be the same marking point as chlorination; moreover it is inaccurate, as general bacteriocides are not used in sewage treatment as they would probably be harmful.

**Mark awarded for 8(c) = 1 out of 3**

**Total mark awarded = 4 out of 10**



## How the candidate could have improved the answer

- (a)(i) The candidate needed to know that the blood vessel is the renal artery. The label for the ureter was not allowed as ureter is one of the words that has to be spelt correctly because there are other similar words. Here, it is not clear if the candidate meant to write ureter or uterus.
- (a)(ii) The candidate needed to state that urea is transferred from the liver to the kidney in the blood stream.
- (b) It is not plausible that the student concerned suffered from a kidney problem on one day only. The candidate needed to consider other possible reasons for the decrease, such as a lower than normal water intake.
- (c) The candidate needed to learn how sewage is treated in more detail.

Example Candidate Response – Question 8, Low

Examiner comments

8 Fig. 8.1 shows the structures that produce urine and excrete it from the body.

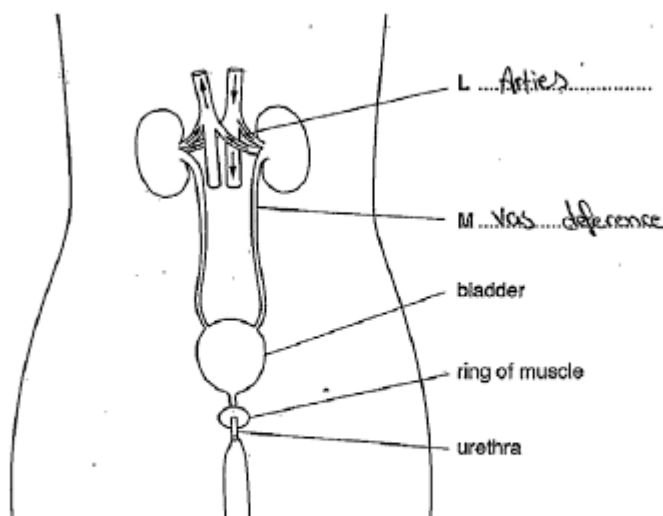


Fig. 8.1

(a) (i) Name the structures labelled L and M.

Write your answers on Fig. 8.1.

[2]

(ii) Urea is excreted in the urine.

Name the organ that produces urea and suggest how urea is transferred to the kidneys.

Liver, the bile (with ~~the urea~~) from liver will deliver the urea to the pancreas and the pancreatic juice deliver it to the kidney [2]

(c) Outline three processes used in the treatment of sewage to make the water it contains safe for human use.

1 put chlorine in water

2 pass it through pipes to filter it

3

[3]

[Total: 10]

Neither label is correct so the candidate is not awarded any marks.

Mark awarded for 8(a)(i) = 0 out of 2

The candidate identifies the liver as being the organ producing urea, but does not know how the urea reaches the kidneys.

Mark awarded for 8(a)(ii) = 1 out of 2

**Example Candidate Response – Question 8, Low**

**Examiner comments**

(b) In an investigation, the volume of urine produced by a student each day is measured.

The results are shown in Table 8.1.

**Table 8.1**

day	volume of urine /cm <sup>3</sup> per day
1	1440
2	1510
3	1410
4	1445
5	910
6	1445
7	1500

Suggest **three** possible reasons for the lower volume of urine produced by the student on day 5.

- 1 Due to the low amount of water in the body
  - 2 Slight
  - 3
- [3]

(c) Outline **three** processes used in the treatment of sewage to make the water it contains safe for human use.

- 1 put chlorine in water
  - 2 pass it through pipes to filter it
  - 3
- [3]  
[Total: 10]

The candidate identifies that if the body has a reduced water content, the volume of urine produced will be smaller. However, this idea needs to be taken further and suggestions made about the causes of the lowered water content.

**Mark awarded for 8(b) = 0 out of 3**

The candidate is awarded two marks here, but both are responses are very weak. Each answer could be improved by further detail.

**Mark awarded for 6(c) = 2 out of 3**

**Total mark awarded = 3 out of 10**

## How the candidate could have improved the answer

- (a)(i) The candidate needed to know the names of structures in the renal system.
- (a)(ii) The candidate could have improved their answer by knowing that urea is transported in the blood.
- (b) The candidate should have thought about the reasons for reduced urine production more carefully. The answers given also needed contain more detail.
- (c) The candidate needed to know more about sewage treatment and, as before, the answers given should have contained more detail.

## Common mistakes candidates made in Question 8

*(a)(i) The examiner was expecting two structures in the renal system to be named.*

The names of structures in the renal system were not well known.

*(c) The examiner was expecting three processes in sewage treatment.*

Many candidates knew relatively little about sewage treatment. Filtration and chlorination appeared fairly frequently, but often no third process was outlined. Candidates were asked to outline each process and this means that a brief description is required. Many candidates gave one-word answers.

## Question 9

## Example Candidate Response – Question 9, High

## Examiner comments

- 9 (a) (i) Table 9.1 contains examples of components of a balanced diet and foods that contain a high proportion of the component.

Complete Table 9.1 by filling in the blank spaces.

Table 9.1

component of balanced diet	food containing a high proportion of the component
fat	olive oil
protein	meat
carbohydrat	pasta
fibre (roughage)	unpolished rice

- (ii) Name **two** other components of a balanced diet that are not listed in Table 9.1.

..... vitamin c .....

..... calcium .....

..... iron .....

[2]

Three marks are awarded for three correct answers.

**Mark awarded for 9(a)(i) = 3 out of 3**

[3]

Examples of the dietary components are accepted, so the candidate is awarded two marks. The answer could be improved by stating the components as being vitamins and minerals.

**Mark awarded for 9(a)(ii) = 2 out of 2**

Example Candidate Response – Question 9, High

Examiner comments

(b) Fig. 9.1 shows a picture of food production on a modern farm.



Fig. 9.1

The use of modern technology has increased the amount of food produced.

State **two** examples of modern technology and explain how each has contributed to the amount of **plants** grown for food.

example	explanation of technology
watering by dropping droplets of water	small pipes in the a pipe over the crops that, water plants with out a lot of water and this the saves water and money
Chemical Fertiliser	substances containing potassium, nitrogen, phosphorus that increase crop yield and size. Make soil more fertile

[4]

(c) On modern farms crop plants can be grown as large-scale monocultures.

Suggest **two** negative impacts on an ecosystem for this method of food production.

- 1 ..... animal habitats which was there with it and plants food chains and webs will be <sup>distracted</sup>
- 2 ..... <sup>animals</sup> they could die as lack of food and for the effect of pesticides on them

[2]

[Total: 11]

Two marks are awarded for the example of fertiliser and its explanation. The first answer is awarded only one mark as there is no explanation of how this method of watering will increase crop yields.

**Mark awarded for 9(b) = 3 out of 4**

The candidate is awarded two marks as both suggestions are correct.

**Mark awarded for 9(c) = 2 out of 2**

**Total mark awarded = 10 out of 11**



## How the candidate could have improved the answer

- (a)(i) The answer was awarded full marks but the answer could have been improved by spelling carbohydrate accurately.
- (a)(ii) Although full marks were awarded, it would be preferable to state 'minerals' as a group rather than give two examples of minerals.
- (b) The candidate could have improved their answer by giving an explanation for why watering a crop in the manner stated would increase the yield.

**Example Candidate Response – Question 9, Middle**

**Examiner comments**

9 (a) (i) Table 9.1 contains examples of components of a balanced diet and foods that contain a high proportion of the component.

Complete Table 9.1 by filling in the blank spaces.

**Table 9.1**

component of balanced diet	food containing a high proportion of the component
fat	olive oil
protein	meat
Carbohydrates <del>Starch</del>	pasta
fibre (roughage)	Carrot

[3]

All three answers are correct.

**Mark awarded for 9(a)(i) = 3 out of 3**

(ii) Name two other components of a balanced diet that are not listed in Table 9.1.

..... ~~water~~ water .....

..... minerals .....

[2]

Two correct answers are stated.

**Mark awarded for 9(a)(ii) = 2 out of 2**

(b) Fig. 9.1 shows a picture of food production on a modern farm.



**Fig. 9.1**

The use of modern technology has increased the amount of food produced.

State two examples of modern technology and explain how each has contributed to the amount of plants grown for food.

example	explanation of technology
fertilisers	It increased the amount of <del>food</del> food production.
herbicides	<del>It is poured</del> The herbicides are poured over the farm which increase the food production and kill insects.

[4]

Both of the examples listed are correct, so the candidate is awarded two marks. In both cases, the explanations are insufficient as the candidate does not say how they contribute to the amount of food produced. Also, the candidate incorrectly states that herbicides kill insects.

**Mark awarded for 9(b) = 2 out of 4**

Example Candidate Response – Question 9, Middle	Examiner comments
<p>(c) On modern farms crop plants can be grown as large-scale monocultures.</p> <p>Suggest <b>two</b> negative impacts on an ecosystem for this method of food production.</p> <p>1 <del>It is very hard to control a large scale</del>  <del>farm</del> <sup>croppants</sup> <del>crop plants on large areas don't grow well.</del></p> <p>2 <del>the soil</del> <sup>may</sup> <del>get</del> <sup>harmd</sup> <del>by insects and</del>  <del>other animals.</del></p> <p style="text-align: right;">[2] [Total: 11]</p>	<p>No marks are awarded as the candidate is not addressing the question asked.</p> <p><b>Mark awarded for 9(c) = 0 out of 2</b></p> <p><b>Total mark awarded = 7 out of 11</b></p>

### How the candidate could have improved the answer

- (b) The candidate could have improved their answer by giving explanations of how the two examples stated contribute towards increased yields.
- (c) The candidate could have improved their response by reading the question more carefully and answering the question asked. The candidate has not suggested how the wider ecosystem would be affected by a monoculture.

**Example Candidate Response – Question 9, Low**

**Examiner comments**

9 (a) (i) Table 9.1 contains examples of components of a balanced diet and foods that contain a high proportion of the component.

Complete Table 9.1 by filling in the blank spaces.

Table 9.1

component of balanced diet	food containing a high proportion of the component
fat	olive oil
protein	meat
carbohydrate	pasta
fibre (roughage)	fruits

[3]

(ii) Name two other components of a balanced diet that are not listed in Table 9.1.

\*calcium and vitamins

[2]

(b) Fig. 9.1 shows a picture of food production on a modern farm.



Fig. 9.1

The use of modern technology has increased the amount of food produced.

State two examples of modern technology and explain how each has contributed to the amount of plants grown for food.

example	explanation of technology
Truck machine	It throws seeds and fertilizers & m the whole farm

[4]

Three marks are awarded for three correct answers.

**Mark awarded for 9(a)(i) = 3 out of 3**

Vitamins is correct and calcium is accepted as an example of the dietary component minerals.

**Mark awarded for 9(a)(ii) = 2 out of 2**

The candidate is awarded one mark for the example, but no mark for the explanation as it does not state how machinery contributes to an increased crop yield. The candidate does not attempt a second response.

**Mark awarded for 9(b) = 1 out of 4**

Example Candidate Response – Question 9, Low	Examiner comments
<p>(c) On modern farms crop plants can be grown as large-scale monocultures.</p> <p>Suggest two negative impacts on an ecosystem for this method of food production.</p> <p>1 Many grasshoppers will feed on it</p> <p>2 some poisonous substances are shown to kill insects which also makes the seed produced containing poisonous substance. [2]</p> <p>[Total: 11]</p>	<p>The responses do not address the question, so no marks are awarded.</p> <p><b>Mark awarded for 9(c) = 0 out of 2</b></p> <p><b>Total mark awarded = 6 out of 11</b></p>

### How the candidate could have improved the answer

- (a)(i) The candidate was awarded full marks but could have improved their answer by spelling 'protein' correctly.
- (a)(ii) The candidate was awarded full marks but could have improved their answer by giving the group name 'minerals' rather than an example of a mineral.
- (b) The candidate could have improved their answer by providing a second example, and better explaining how machinery can improve crop yields.
- (c) The candidate did not answer the question asked. They needed to suggest how monocultures can impact the wider ecosystem.

### Common mistakes candidates made in Question 9

- (b) *The examiner was expecting two examples of modern farming technology to be stated, with a brief explanation of how each has contributed to the increase in the amount of plants grown for food.*

Many candidates did not explain how the example they had chosen would improve the crop yield. Also, many candidates did not appear to appreciate the difference between fertilisers, insecticides and herbicides.

- (c) *The examiner was expecting a suggestion of two negative impacts of monocultures on the surrounding ecosystem.*

The majority of candidates did not answer the question fully. Some did not attempt an answer at all.

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