



**Cambridge Assessment
International Education**

Example Candidate Responses – Paper 3

Cambridge IGCSE™ / IGCSE (9–1)

Biology 0610 / 0970

For examination from 2021



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Contents

Introduction.....	4
Question 1	6
Example Candidate Response – high	6
Example Candidate Response – middle	7
Question 2	8
Example Candidate Response – high	8
Example Candidate Response – middle	10
Example Candidate Response – low	12
Question 3	14
Example Candidate Response – high	14
Example Candidate Response – low	17
Question 4	20
Example Candidate Response – high	20
Example Candidate Response – middle	22
Example Candidate Response – low	24
Question 5	26
Example Candidate Response – high	26
Example Candidate Response – middle	28
Example Candidate Response – low	30
Question 6	32
Example Candidate Response – high	32
Example Candidate Response – middle	34
Example Candidate Response – low	36
Question 7	38
Example Candidate Response – high	38
Example Candidate Response – middle	40
Example Candidate Response – low	42
Question 8	44
Example Candidate Response – high	44
Example Candidate Response – middle	46
Example Candidate Response – low	48

Introduction

The main aim of this booklet is to exemplify standards for those teaching Cambridge IGCSE / IGCSE (9–1) Biology 0610 / 0970, 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 candidate responses have been chosen from the June 2021 exam series to exemplify a range of answers.

For each question, the response is annotated with a 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. There is also 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 inserts used here are available to download from the School Support Hub. These files are:

0610 June 2021 Question Paper 31

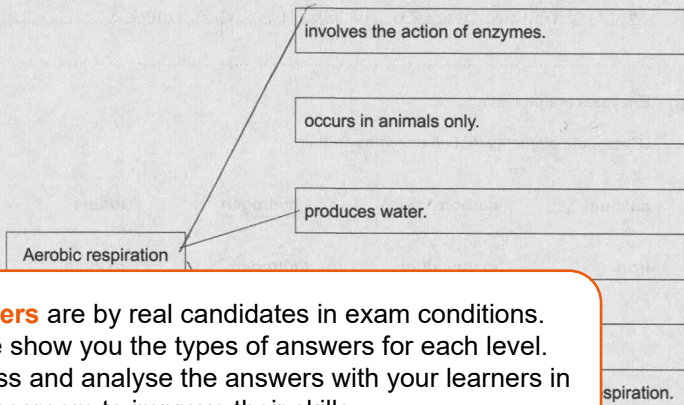
0610 June 2021 Mark Scheme 31

Past exam resources and other teaching and learning resources are available on the School Support Hub:

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 – high	Examiner comments
<p>4 (a) The box on the left contains the words 'Aerobic respiration'.</p> <p>1 The boxes on the right show some sentence endings.</p> <p>Draw lines to make three correct sentences about aerobic respiration.</p>  <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.</p>	<p>1 The candidate is awarded three marks for identifying the three correct sentences. They clearly show their answer using straight lines.</p> <p>Mark for (a) = 3 out of 3</p> <p>Mark for (b)(i) = 2 out of 2</p> <p>Mark for (b)(ii) = 0 out of 1</p> <p>Examiner comments 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>

How the candidate could have improved their answer

(b)(ii) The candidate needed to identify that the adrenal glands release adrenaline.

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

- (a) Some candidates incorrectly identified that aerobic respiration occurred in animals only and some didn't identify that aerobic respiration produces water. Some drew more or less than three lines.
- (b)(i) Some candidates drew more or less than two ticks and many candidates incorrectly identified decreased breathing rate.
- (b)(ii) Some candidates stated pancreas, kidneys or brain. 'Adrenaline gland' was not accepted, the correct answer was the adrenal glands.

Often candidates were not awarded marks because they misread or misinterpreted 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.

Question 1

Example Candidate Response – high

Examiner comments

1 Fig. 1.1 is a dichotomous key. It can be used to identify different types of tree by using their leaves.

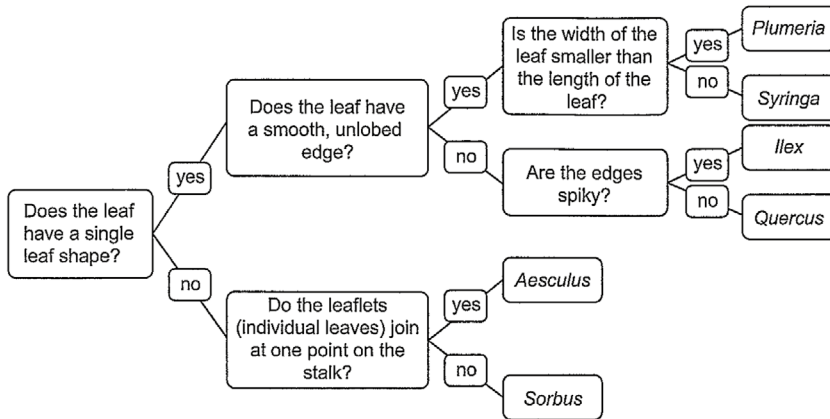


Fig. 1.1

Fig. 1.2 shows leaves from six different trees.

Use the key in Fig. 1.1 to identify the six different types of tree.

Write the name of each tree on the lines in Fig. 1.2.

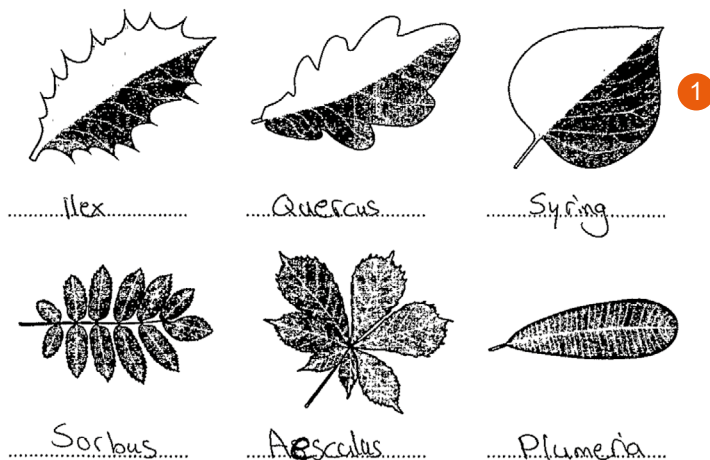


Fig. 1.2

1 The candidate correctly identifies the leaves from all six trees and is awarded all five marks.

Total mark awarded = 5 out of 5

[5]

How the candidate could have improved their answer

The candidate needed to spell the names of the different types of trees correctly.

Example Candidate Response – middle

Examiner comments

1 Fig. 1.1 is a dichotomous key. It can be used to identify different types of tree by using their leaves.

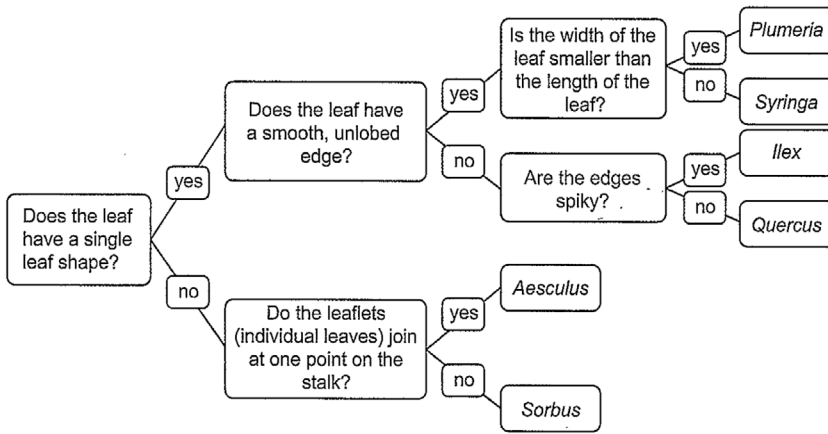


Fig. 1.1

Fig. 1.2 shows leaves from six different trees.

Use the key in Fig. 1.1 to identify the six different types of tree.

Write the name of each tree on the lines in Fig. 1.2.

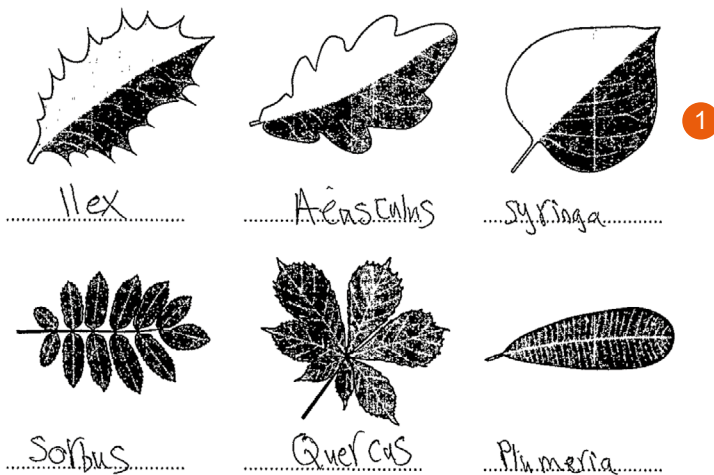


Fig. 1.2

1 This candidate correctly identifies *Ilex*, *Sorbus*, *Syringa* and *Plumeria* and is awarded one mark for each.

Total mark awarded = 4 out of 5

[5]

How the candidate could have improved their answer

The candidate needed to correctly identify the leaves of the *Aesculus* and *Quercus* plants.

Common mistakes candidates made in this question

Some candidates did not look closely enough at the details of each leaf drawing and did not spell the names correctly.

Question 2

Example Candidate Response – high

Examiner comments

2 (a) Fig. 2.1 is a front view diagram of the male reproductive system in humans.

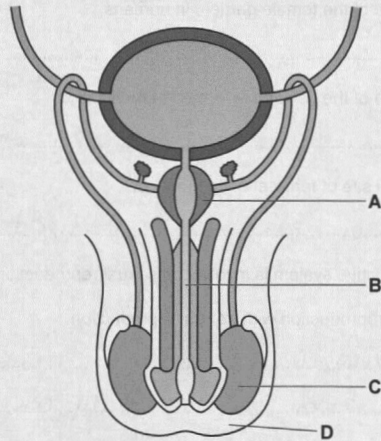


Fig. 2.1

The boxes on the left show the letters identifying the parts in Fig. 2.1.

The boxes on the right show the functions of some of the parts of the male reproductive system.

Draw lines to link each letter to its function. Draw **four** lines.

letter from Fig. 2.1

function

1

A	gland that secretes fluid for sperm to swim in
B	produces sperm
C	sac that holds the testes
D	tube carrying semen and urine
	tube carrying sperm to urethra

[4]

1 The candidate links all four letters and functions correctly and clearly. They realise their mistake and clearly cross out their first wrong answer and replace it with a correct answer.

Mark for (a) = 4 out of 4

Example Candidate Response – high, continued	Examiner comments
<p>(b) Sperm are the male gametes in humans.</p> <p>(i) State the name of the female gamete in humans. egg cell [1]</p> <p>(ii) State the name of the cell that is formed at fertilisation. Diploid cell [1]</p> <p>(iii) State the usual site of fertilisation in humans. oviduct [1]</p> <p>(c) The human reproductive system is involved in sexual reproduction. Compare asexual reproduction with sexual reproduction.</p> <p>② Asexual reproduction occurs by mitosis process and involves only one parent and produce genetically alike cells. Sexual reproduction occurs by meiosis process involves two parents and produce genetically different cells. [3]</p>	<p>Mark for (b)(i) = 1 out of 1</p> <p>Mark for (b)(ii) = 0 out of 1</p> <p>Mark for (b)(iii) = 1 out of 1</p> <p>② The candidate clearly writes three facts about asexual reproduction and then writes how sexual reproduction is different to these three facts.</p> <p>Mark for (c) = 3 out of 3</p> <p>Total mark awarded = 9 out of 10</p>

How the candidate could have improved their answer

- (b)(ii) The candidate needed to state the specific word for this cell, 'zygote', rather than give a description of it.
- (c) The candidate could have divided the answer space into two and made relevant comments on both sides related to asexual and sexual reproduction.

Example Candidate Response – middle

Examiner comments

2 (a) Fig. 2.1 is a front view diagram of the male reproductive system in humans.

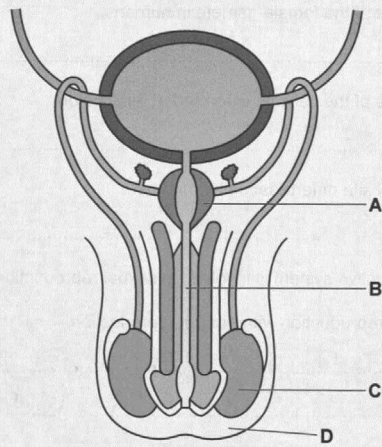


Fig. 2.1

The boxes on the left show the letters identifying the parts in Fig. 2.1.

The boxes on the right show the functions of some of the parts of the male reproductive system.

Draw lines to link each letter to its function. Draw **four** lines.

letter from Fig. 2.1

function

1

A		gland that secretes fluid for sperm to swim in
B		produces sperm
C		sac that holds the testes
D		tube carrying semen and urine
		tube carrying sperm to urethra

[4]

1 The candidate clearly links each letter to the correct function.

Mark for (a) = 4 out of 4

Example Candidate Response – middle, continued	Examiner comments
<p>(b) Sperm are the male gametes in humans.</p> <p>(i) State the name of the female gamete in humans. ovary..... [1]</p> <p>(ii) State the name of the cell that is formed at fertilisation. zygot..... [1]</p> <p>(iii) State the usual site of fertilisation in humans. the uterus..... [1]</p> <p>(c) The human reproductive system is involved in sexual reproduction. Compare asexual reproduction with sexual reproduction.</p> <p>2 sexual reproduction involves reproductive organs while asexual doesn't.</p> <p>sexual reproduction involves sex gametes while asexual doesn't.</p> <p>Asexual reproduction involves mutation while sexual doesn't [13]</p> <p>[Total: 10]</p>	<p>Mark for (b)(i) = 0 out of 1</p> <p>Mark for (b)(ii) = 1 out of 1</p> <p>Mark for (b)(iii) = 0 out of 1</p> <p>2 The candidate compares the two types of reproduction, but only one comparison is correct. They refer to gametes versus no gametes.</p> <p>Mark for (c) = 1 out of 3</p> <p>Total mark awarded = 6 out of 10</p>

How the candidate could have improved their answer

The candidate could have divided the answer space into two and made relevant comments on both sides related to asexual and sexual reproduction.

Example Candidate Response – low

Examiner comments

2 (a) Fig. 2.1 is a front view diagram of the male reproductive system in humans.

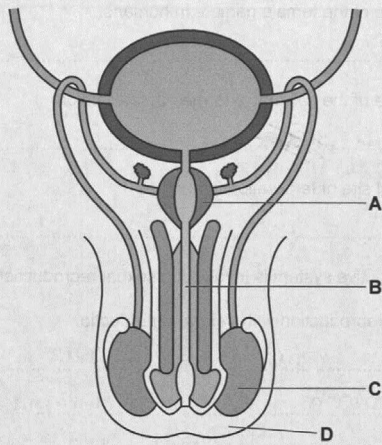


Fig. 2.1

The boxes on the left show the letters identifying the parts in Fig. 2.1.

The boxes on the right show the functions of some of the parts of the male reproductive system.

Draw lines to link each letter to its function. Draw **four** lines.

letter from Fig. 2.1

function

1

A	→	gland that secretes fluid for sperm to swim in
B	→	produces sperm
C	→	sac that holds the testes
D	→	tube carrying semen and urine
		tube carrying sperm to urethra

1 The candidate links all four letters and functions correctly and clearly.

Mark for (a) = 4 out of 4

[4]

Example Candidate Response – low, continued	Examiner comments
<p>(b) Sperm are the male gametes in humans.</p> <p>(i) State the name of the female gamete in humans. alleles [1]</p> <p>(ii) State the name of the cell that is formed at fertilisation. ovary [1]</p> <p>(iii) State the usual site of fertilisation in humans. prevent bacteria [1]</p> <p>(c) The human reproductive system is involved in sexual reproduction. Compare asexual reproduction with sexual reproduction.</p> <p>2 -sexual reproduction can cause kids between man and female - asexual reproduction won't form kids [3]</p>	<p>Mark for (b)(i) = 0 out of 1</p> <p>Mark for (b)(ii) = 0 out of 1</p> <p>Mark for (b)(iii) = 0 out of 1</p> <p>2 The candidate does not compare the two types of reproduction. They do not refer to two parents versus one parent in the single answer they give.</p> <p>Mark for (c) = 0 out of 3</p> <p>Total mark awarded = 4 out of 10</p>

How the candidate could have improved their answer

- (c) The candidate could have divided the answer space into two and made a relevant comment on both sides.

Common mistakes candidates made in this question

- (a) Many candidates assigned 'B' to the wrong tube (carrying sperm). Some candidates drew two lines from some boxes and some drew more than four lines.
- (b)(i) Many candidates incorrectly stated 'ovule' and 'ovary'.
- (b)(ii) Many candidates incorrectly stated embryo and fetus. 'Fertilised egg' was not an accurate answer because candidates needed to give the name of the cell.
- (b)(iii) Some candidates incorrectly stated vagina, uterus and ovary.
- (c) Many candidates did not compare asexual and sexual reproduction and gave information on one type of reproduction. Some did not specify that offspring which result from asexual reproduction would be 'genetically identical' to the parent. Some candidates incorrectly stated that asexual reproduction only happened in plants and bacteria, but sexual reproduction only happened in animals. Few candidates referred to fertilisation, variation, gametes, mitosis and meiosis or speed of process.

Question 3

Example Candidate Response – high

Examiner comments

- 3 (a) Fig. 3.1 shows the number of deaths in one country that were due to excessive alcohol consumption.

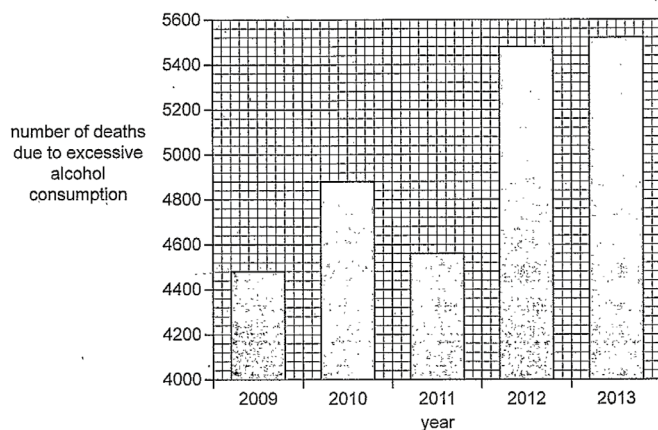


Fig. 3.1

Describe the results shown in Fig. 3.1.

Use the data to support your answer.

1

- ~~2012~~ and 2013 had the highest number of deaths, while 2009 had the lowest number of deaths.
- the death numbers increased in 2010^{then 2009}, then decreased again in 2011, then increased alot more in 2012, then ^{increased} a little more in 2013. [3]
- highest number of deaths 5550 (2013)
- lowest number of deaths 4420 (2009)

1 The candidate gives a lot of correct information and they are awarded full marks. This includes the decrease in 2011, a large increase in 2012 and a small increase in 2013. They also include some inaccurate data; they state the number of deaths in 2013 as 5550 instead of 5520.

Mark for (a) = 3 out of 3

Example Candidate Response – high, continued

Examiner comments

(b) Describe **two** short-term effects of excessive alcohol consumption on the nervous system.

- 1 very slow reaction time
- 2 reduces self control } → cause accidents
- [2]

Mark for (b) = 2 out of 2

Mark for (c) = 1 out of 1

Mark for (d)(i) = 1 out of 1

Mark for (d)(ii) = 1 out of 1

Mark for (d)(iii) = 1 out of 1

(c) State the name of one organ damaged by long-term excessive alcohol consumption.

..... liver [1]

(d) Alcohol dehydrogenase is an enzyme that breaks down alcohol in the body.

Fig. 3.2 shows the activity of alcohol dehydrogenase at different pH values.

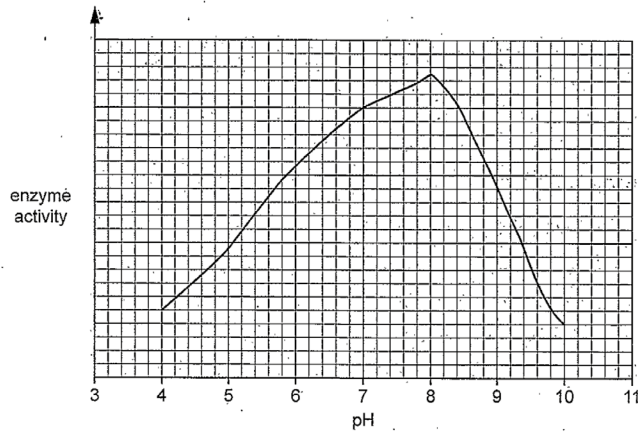


Fig. 3.2

(i) State the pH value with the highest enzyme activity in Fig. 3.2.

..... pH = 8 [1]

(ii) State the pH value with the lowest enzyme activity in Fig. 3.2.

..... pH = 10 [1]

(iii) Suggest **one other** factor that could affect the activity of the enzyme alcohol dehydrogenase.

..... The temperature [1]

Example Candidate Response – high, continued	Examiner comments
<p>(e) Enzymes are biological catalysts. Define the term catalyst.</p> <p>2 Substances used to speed up the reaction without being used up. (protein in nature.) [2]</p> <p>(f) Enzymes are <u>proteins</u>. → C(HO(N)). Circle the elements that all enzymes contain.</p> <p>3 calcium carbon hydrogen iodine iron magnesium nitrogen oxygen</p> <p>[2] [Total: 13]</p>	<p>2 The candidate is awarded one mark for some correct information about catalysts. Mark for (e) = 1 out of 2</p> <p>3 The candidate is awarded one mark for circling 'carbon', 'hydrogen' and 'oxygen' and one mark for 'nitrogen'. Mark for (f) = 2 out of 2</p> <p>Total mark awarded = 12 out of 13</p>

How the candidate could have improved their answer

(a) The candidate could have provided a description of the overall trend of the graph.

Example Candidate Response – low

Examiner comments

- 3 (a) Fig. 3.1 shows the number of deaths in one country that were due to excessive alcohol consumption.

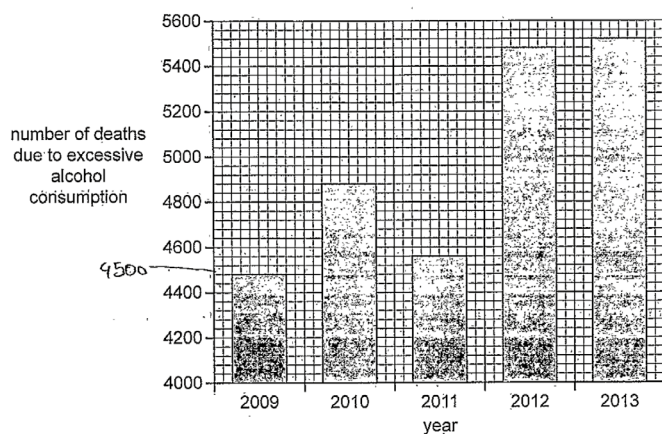


Fig. 3.1

Describe the results shown in Fig. 3.1.

Use the data to support your answer.

- 1 - In 2009 it was the less year of alcohol death and ~~the~~ ~~year~~ in 2011 there was less ~~people~~ people how is died causes of alcohol.
 - In 2010 there was 4840 ~~the~~ who is died because of alcohol.
 - In 2012 and 2013 there was alot of people died because of alcohol. [3]

1 The data the candidate refers to is not precise or accurate enough. In 2010, 4880 people died, not 4840. The candidate refers to 2009 and 2011 and writes about 'less', but does not qualify what the 'less' means. The candidate is awarded one mark for 'in 2012 a lot of people died'.

Mark for (a) = 1 out of 3

Example Candidate Response – low, continued

Examiner comments

(b) Describe **two** short-term effects of excessive alcohol consumption on the nervous system.

- 2 1. In crease heart beats.

 2. And less oxygen goes to the blood.

 [2]

(c) State the name of **one** organ damaged by long-term excessive alcohol consumption.

liver. [1]

(d) Alcohol dehydrogenase is an enzyme that breaks down alcohol in the body.

Fig. 3.2 shows the activity of alcohol dehydrogenase at different pH values.

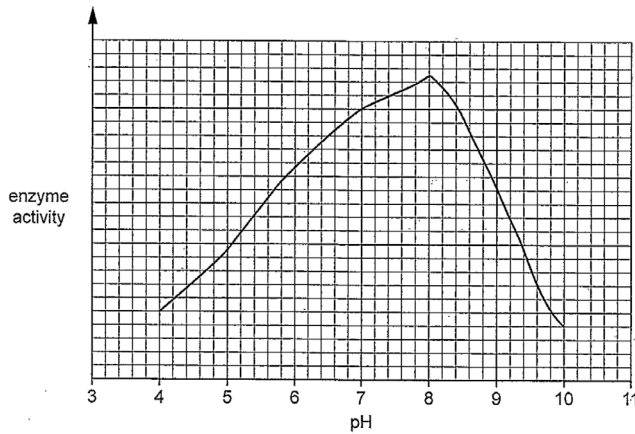


Fig. 3.2

(i) State the pH value with the highest enzyme activity in Fig. 3.2.

3 pH 8 [1]

(ii) State the pH value with the lowest enzyme activity in Fig. 3.2.

pH 10 [1]

(iii) Suggest **one other** factor that could affect the activity of the enzyme alcohol dehydrogenase.

Smoking. [1]

2 The candidate provides no information that answers the question. The answers they give are not the effects of excessive alcohol consumption.

Mark for (b) = 0 out of 2

Mark for (c) = 1 out of 1

3 The candidate correctly and clearly answers (b)(i) and (b)(ii), but (b)(iii) is incorrect. Any factor that affects enzyme activity would be correct, for example 'temperature'.

Mark for (d)(i) = 1 out of 1

Mark for (d)(ii) = 1 out of 1

Mark for (d)(iii) = 0 out of 1

Example Candidate Response – low, continued

Examiner comments

(e) Enzymes are biological catalysts.
Define the term catalyst.

4 It is the breaking down of enzyme into Amalyse into maltose. [2]

(f) Enzymes are proteins.
5 Circle the elements that all enzymes contain.

calcium	carbon	hydrogen	iodine
iron	magnesium	nitrogen	oxygen

[2]

[Total: 13]

4 The candidate gives an incorrect answer.

Mark for (e) = 0 out of 2

5 'Nitrogen' on its own is correct and the candidate is awarded the first mark, however, 'calcium' is an incorrect answer.

Mark for (f) = 1 out of 2

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

How the candidate could have improved their answer

- (a) The candidate needed to give a description of the overall trend of the graph. They also needed to use data from the graph to support their answer, take accurate readings and read the scale carefully.
- (b) The candidate needed to distinguish between the reaction time taking longer and the reaction time being reduced.

Common mistakes candidates made in this question

- Some candidates did not use data from the graph to support their answer although this was required in the question. Some candidates took inaccurate readings from the graph, read the scale of the graph incorrectly or referred to the rate of change as 'sharp, fast or sudden'; terminology which was not appropriate for the data displayed. Some candidates just described the impact of alcohol on the health of a population.
- Some candidates overlooked the expression 'short-term' in the question and instead gave the long-term effects of alcohol. There was some confusion over the term 'reaction time' as some candidates incorrectly stated that the reaction time would be reduced when they meant that it would take longer to react. Some candidates ignored the effects on the nervous system and commonly gave vomiting as an answer.
- Many candidates incorrectly identified the lungs as an organ affected by long-term excessive alcohol consumption.
- Some candidates incorrectly suggested that a catalyst was a cell or organism that increased the rate of reaction.
- Some candidates did not circle four elements.

Question 4

Example Candidate Response – high

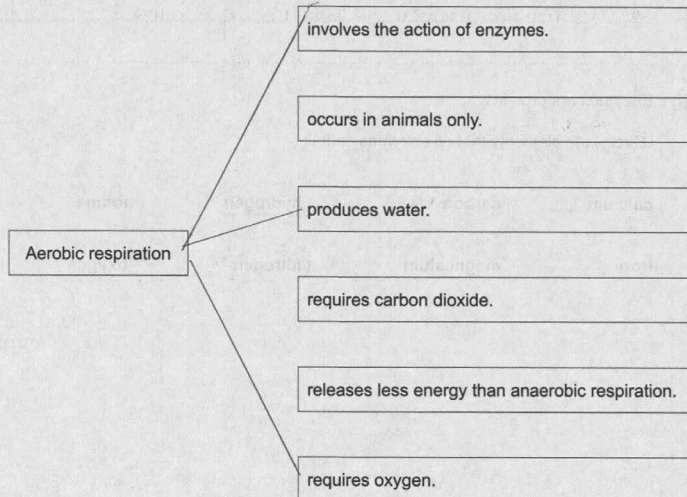
Examiner comments

4 (a) The box on the left contains the words 'Aerobic respiration'.

1

The boxes on the right show some sentence endings.

Draw lines to make **three** correct sentences about aerobic respiration.



[3]

(b) One effect of the release of the hormone adrenaline is to increase blood glucose concentration. This allows more aerobic respiration to occur.

(i) Place ticks (✓) in the correct boxes to show other effects of the release of adrenaline on the body.

change in the genotype	
decreased breathing rate	
development of lung cancer	
increased pulse rate	✓
widened pupils	✓

[2]

(ii) State the name of the gland that releases adrenaline.

..... thyroid gland..... [1]

1 The candidate is awarded three marks for identifying the three correct sentences. They clearly show their answer using straight lines.

Mark for (a) = 3 out of 3

Mark for (b)(i) = 2 out of 2

Mark for (b)(ii) = 0 out of 1

Example Candidate Response – high, continued **Examiner comments**

(iii) State how adrenaline is transported to its target organs.

2 it is excreted in the blood and it is then transported to all its target organs through blood vessels. example: eye, pit

(c) State the names of two hormones involved in the development of secondary sexual characteristics in humans.

3 1 progesterone, oestrogen, estradiol
2 testis, testosterone [2]

(d) State the name of the organ that secretes the hormone insulin.

pancreas - Pancrease [1]

(e) Organs, tissues and specialised cells are structures in the body that perform a particular function.

4 Write these parts of the body in order of size from smallest to largest.

	cell	DNA molecule	organ	organ system	tissue
smallest		DNA molecule			
		cell			
		tissue			
		organ			
largest				organ system	

[2]

2 The candidate is awarded one mark for their answer despite using the word 'excretion', because the question requires 'blood', 'blood vessels', 'plasma' or a named blood vessel to be awarded a mark.

Mark for (b)(iii) = 1 out of 1

3 Although the candidate does not spell the answers correctly, they are recognisable and the candidate knows that these are the two hormones involved.

Mark for (c) = 2 out of 2

4 The candidate is awarded the first mark because they indicate that the DNA molecule is the smallest and the organ system is the largest. They are awarded the second mark because they write the other three parts ('cell', 'tissue' and 'organ') in the correct order.

Mark for (d) = 1 out of 1

Mark for (e) = 2 out of 2

Total mark awarded = 11 out of 12

How the candidate could have improved their answer

(b)(ii) The candidate needed to identify that the adrenal glands release adrenaline.

Example Candidate Response – middle

Examiner comments

4 (a) The box on the left contains the words 'Aerobic respiration'.
The boxes on the right show some sentence endings.
Draw lines to make **three** correct sentences about aerobic respiration.

1

Aerobic respiration

- involves the action of enzymes.
- occurs in animals only.
- produces water.
- requires carbon dioxide.
- releases less energy than anaerobic respiration.
- requires oxygen.

[3]

(b) One effect of the release of the hormone adrenaline is to increase blood glucose concentration. This allows more aerobic respiration to occur.

(i) Place ticks (✓) in the correct boxes to show other effects of the release of adrenaline on the body.

2

change in the genotype	
decreased breathing rate	
development of lung cancer	✓
increased pulse rate	✓
widened pupils	✓

[2]

(ii) State the name of the gland that releases adrenaline.

3 *pancreas* [1]

1 The candidate identifies one correct sentence and is awarded one mark. Their answer is not clear because the lines are not straight. The answer that the candidate thinks is wrong is clearly crossed out.

Mark for (a) = 1 out of 3

2 There are two marks available for this question. On a core paper, this would usually indicate that two answers are required. Here, the candidate places three ticks. Two are correct and one is incorrect, which negates one of the correct ticks, so they are awarded one mark.

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

3 The candidate's answer is not clear so they are not awarded any marks.

Mark for (b)(ii) = 0 out of 1

Example Candidate Response – middle, continued	Examiner comments																																				
<p>(iii) State how adrenaline is transported to its target organs.</p> <p>4 In blood In blood through the vein [1]</p> <p>(c) State the names of two hormones involved in the development of secondary sexual characteristics in humans.</p> <p>5 1 Testosterone 2 oestrogen [2]</p> <p>(d) State the name of the organ that secretes the hormone insulin.</p> <p>Heart [1]</p> <p>(e) Organs, tissues and specialised cells are structures in the body that perform a particular function.</p> <p>6 Write these parts of the body in order of size from smallest to largest.</p> <table border="0"> <thead> <tr> <th></th> <th>cell</th> <th>DNA molecule</th> <th>organ</th> <th>organ system</th> <th>tissue</th> </tr> </thead> <tbody> <tr> <td>smallest</td> <td></td> <td>cell</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>the DNA molecule</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>tissue</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>organ</td> <td></td> <td></td> <td></td> </tr> <tr> <td>largest</td> <td></td> <td>organ system</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>[2]</p>		cell	DNA molecule	organ	organ system	tissue	smallest		cell						the DNA molecule						tissue						organ				largest		organ system				<p>4 The correct answer here is 'blood', 'blood vessels', 'plasma' or a named blood vessel, so the candidate is awarded one mark.</p> <p>Mark for (b)(iii) = 1 out of 1</p> <p>5 Although the candidate does not spell their answers correctly, they are recognisable and the candidate knows that these are the two hormones involved.</p> <p>Mark for (c) = 2 out of 2</p> <p>Mark for (d) = 0 out of 1</p> <p>6 The candidate gives two correct answers. They identify that the DNA molecule is smaller than the organ system and they are awarded one mark. They are awarded their second mark for getting the other three parts in the correct order.</p> <p>Mark for (e) = 2 out of 2</p> <p>Total mark awarded = 7 out of 12</p>
	cell	DNA molecule	organ	organ system	tissue																																
smallest		cell																																			
		the DNA molecule																																			
		tissue																																			
		organ																																			
largest		organ system																																			

How the candidate could have improved their answer

- (a) The candidate needed to draw straight lines to three boxes and clearly cross out the lines that lead to an incorrect box.
- (b)(i) The question was worth two marks and the candidate needed to only give two ticks for this answer.
- (c) The candidate needed to spell the names of the two hormones correctly.

Example Candidate Response – low

Examiner comments

4 (a) The box on the left contains the words 'Aerobic respiration'.
The boxes on the right show some sentence endings.
Draw lines to make **three** correct sentences about aerobic respiration.

1

Aerobic respiration

- involves the action of enzymes.
- occurs in animals only.
- produces water.
- requires carbon dioxide.
- releases less energy than anaerobic respiration.
- requires oxygen.

[3]

(b) One effect of the release of the hormone adrenaline is to increase blood glucose concentration. This allows more aerobic respiration to occur.

(i) Place ticks (✓) in the correct boxes to show other effects of the release of adrenaline on the body.

2

change in the genotype	
decreased breathing rate	✓
development of lung cancer	
increased pulse rate	✓
widened pupils	✓

[2]

(ii) State the name of the gland that releases adrenaline.

.....Capelary gland..... [1]

1 The candidate chooses two correct sentences and is awarded two marks. They show their answer clearly and use straight lines.

Mark for (a) = 2 out of 3

2 There are two marks available for this question. On a core paper, this would usually indicate that two answers are required. Here the candidate places three ticks. Two are correct and one is incorrect, which negates a correct tick, so they are awarded one mark.

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

Mark for (b)(ii) = 0 out of 1

Example Candidate Response – low, continued	Examiner comments																														
<p>(iii) State how adrenaline is transported to its target organs.</p> <p>3 By red blood cells..... [1]</p> <p>(c) State the names of two hormones involved in the development of secondary sexual characteristics in humans.</p> <p>4 1 Sperm..... [2] 2 egg.....</p> <p>(d) State the name of the organ that secretes the hormone insulin.</p> <p>5 pancreas..... [1]</p> <p>(e) Organs, tissues and specialised cells are structures in the body that perform a particular function.</p> <p>Write these parts of the body in order of size from smallest to largest.</p> <table border="0"> <thead> <tr> <th>cell</th> <th>DNA molecule</th> <th>organ</th> <th>organ system</th> <th>tissue</th> </tr> </thead> <tbody> <tr> <td>smallest</td> <td>DNA molecule.....</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>tissue.....</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>cell.....</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>organ.....</td> <td></td> <td></td> <td></td> </tr> <tr> <td>largest</td> <td>organ system.....</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>[2]</p>	cell	DNA molecule	organ	organ system	tissue	smallest	DNA molecule.....					tissue.....					cell.....					organ.....				largest	organ system.....				<p>3 The correct answer here is 'blood', 'blood vessels', 'plasma' or a named blood vessel. 'Red blood cells' is incorrect so the candidate is not awarded any marks for this.</p> <p>Mark for (b)(iii) = 0 out of 1</p> <p>4 The candidate does not give any hormones in their answer, so they are not awarded any marks.</p> <p>Mark for (c) = 0 out of 2</p> <p>5 The candidate's answer is not clearly recognisable as the correct answer so they are not awarded the mark for it.</p> <p>Mark for (d) = 0 out of 1</p> <p>6 The candidate correctly identifies the DNA molecule as the smallest part and the organ system as the largest part for one mark. The second mark should be awarded for the other three parts being in the correct order, but the candidate lists cell and tissue the wrong way around.</p> <p>Mark for (e) = 1 out of 2</p> <p>Total mark awarded = 4 out of 12</p>
cell	DNA molecule	organ	organ system	tissue																											
smallest	DNA molecule.....																														
	tissue.....																														
	cell.....																														
	organ.....																														
largest	organ system.....																														

How the candidate could have improved their answer

- (b)(i) The question was worth two marks and the candidate needed to only give two ticks for this answer.
- (d) The candidate needed to spell the names of the two hormones correctly.

Common mistakes candidates made in this question

- (a) Some candidates incorrectly identified that aerobic respiration occurred in animals only. Some didn't identify that aerobic respiration produces water. Some candidates drew more or less than three lines.
- (b)(i) Some candidates gave more or less than two ticks and many candidates incorrectly identified decreased breathing rate.
- (b)(ii) Some candidates stated pancreas, kidneys or brain. 'Adrenaline gland' was not accepted, the correct answer was the adrenal glands.
- (b)(iii) Candidates incorrectly named the nervous system or red blood cells as a way for hormones being transported around the body.
- (c) Some candidates incorrectly stated progesterone, which is not a hormone that is responsible for the development of secondary sexual characteristics and the spelling of both 'oestrogen' and 'testosterone' generally required improvement.
- (d) The most common incorrect answer was the liver.
- (e) Some candidates incorrectly identified a tissue as smaller than a cell.

Question 5

Example Candidate Response – high

Examiner comments

5 (a) Fig. 5.1 is a diagram of a human heart.

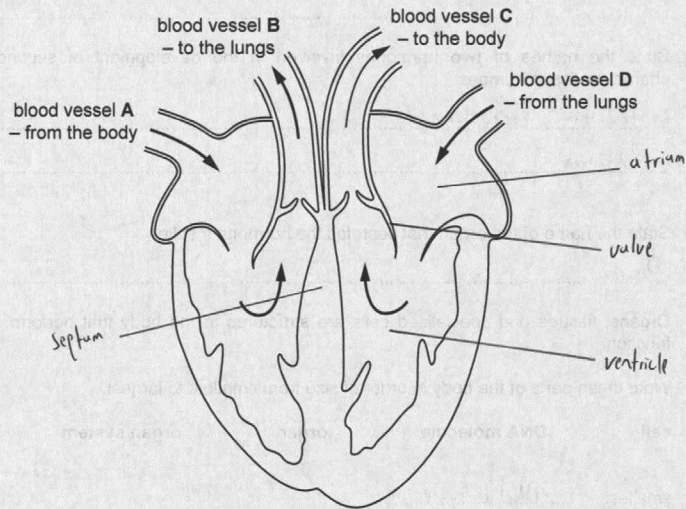


Fig. 5.1

(i) Use label lines and labels to identify these structures on Fig. 5.1:

- 1
- atrium
 - septum
 - ventricle
 - valve

[4]

(ii) Identify the letter or letters of all the blood vessels from Fig. 5.1, that:

- 2
- are arteries... D, B, C.....
- is the pulmonary vein... B.....

[2]

(b) The activity of the heart can be monitored by measuring the pulse rate.

State **two other** ways of monitoring the activity of the heart.

- 3
- 1 measuring breathing rate.....
 - 2 using heart rate monitor.....

[2]

1 The candidate completes the question correctly and clearly.

Mark for (a)(i) = 4 out of 4

2 The candidate gives no correct answers so they are not awarded any marks. The question asks for the letter or letters, so there may be one letter or two required. The correct answer for the arteries is 'B' and 'C'. The correct answer for the pulmonary vein is 'D', so 'B' is incorrect.

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

3 The candidate is awarded one mark for the heart rate monitor, but measuring the breathing rate is not a way of monitoring the activity of the heart.

Mark for (b) = 1 out of 2

Example Candidate Response – high, continued	Examiner comments
<p>(c) Coronary heart disease (CHD) is caused by a blockage of blood vessels in the heart.</p> <p>(i) State the name of the blood vessels that become blocked.</p> <p>4 <u>Coronary artery</u> [1]</p> <p>(ii) State three risk factors for developing CHD.</p> <p>1 <u>Lack of exercise</u></p> <p>5 2 <u>Lack of vitamin D</u></p> <p>3 <u>Smoking</u> [3]</p>	<p>4 The candidate correctly names the coronary artery and is awarded one mark. Their spelling is close enough to know which blood vessel they refer to in their answer.</p> <p>Mark for (b)(i) = 1 out of 1</p> <p>5 The candidate provides two correct answers, but 'lack of vitamin D' is incorrect. The candidate correctly gives some risk factors and not how to prevent coronary heart disease.</p> <p>Mark for (b)(ii) = 2 out of 3</p> <p>Total mark awarded = 8 out of 12</p>

How the candidate could have improved their answer

(a)(ii) The candidate needed to give enough letters to answer this question. The question provided an indication of how many letters were required with the use of 'are' and 'is'.

Example Candidate Response – middle

Examiner comments

5 (a) Fig. 5.1 is a diagram of a human heart.

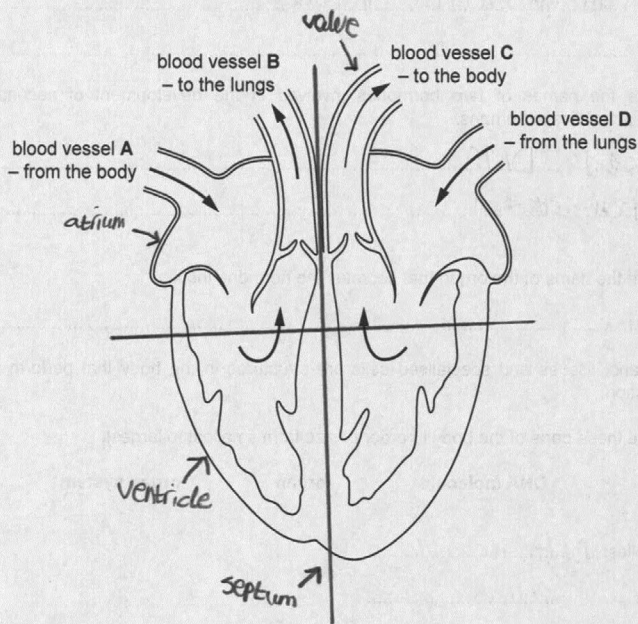


Fig. 5.1

(i) Use label lines and labels to identify these structures on Fig. 5.1:

- 1 • atrium
- septum
- ventricle
- valve

[4]

(ii) Identify the letter or letters of all the blood vessels from Fig. 5.1, that:

- 2 are arteries... C, B.....
- is the pulmonary vein... A, D.....

[2]

(b) The activity of the heart can be monitored by measuring the pulse rate.

State **two other** ways of monitoring the activity of the heart.

- 3 1. measuring the blood flow.....
- 2. measuring sugar.....

[2]

1 The candidate completes the question by labelling the four parts. They label the atrium and ventricle walls which is acceptable and they show the septum as a line between the left and right side of the heart. They label the valve incorrectly.

Mark for (a)(i) = 3 out of 4

2 The candidate provides one correct answer. The question asks for the letter or letters so there may be one letter or two required. The correct answer for the arteries is 'B' and 'C'. The correct answer for the pulmonary vein is 'D', but 'A' is incorrect.

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

3 Measuring the blood flow or sugar is not a way of monitoring the activity of the heart.

Mark for (b) = 0 out of 2

Example Candidate Response – middle, continued	Examiner comments
<p>(c) Coronary heart disease (CHD) is caused by a blockage of blood vessels in the heart.</p> <p>(i) State the name of the blood vessels that become blocked.</p> <p>4 Block arteries veins..... [1]</p> <p>(ii) State three risk factors for developing CHD.</p> <p>5 1 Heart stop beating.....</p> <p>2 blocking blood clotting.....</p> <p>3 No blood is flowing to the heart..... [3]</p>	<p>4 The candidate's answer of 'veins' is incorrect. They need to name the coronary artery to be awarded one mark.</p> <p>Mark for (c)(i) = 0 out of 1</p> <p>5 The candidate does not give any risk factors for developing coronary heart disease.</p> <p>Mark for (c)(ii) = 0 out of 3</p> <p>Total mark awarded = 4 out of 12</p>

How the candidate could have improved their answer

- (a)(i) The candidate needed to use a straight line with no arrow head to label the diagram and the end of each line needed to touch the structure, not stop in a space.
- (c)(i) The candidate needed to give the full name of the artery, rather than just state 'artery'.

Example Candidate Response – low

Examiner comments

5 (a) Fig. 5.1 is a diagram of a human heart.

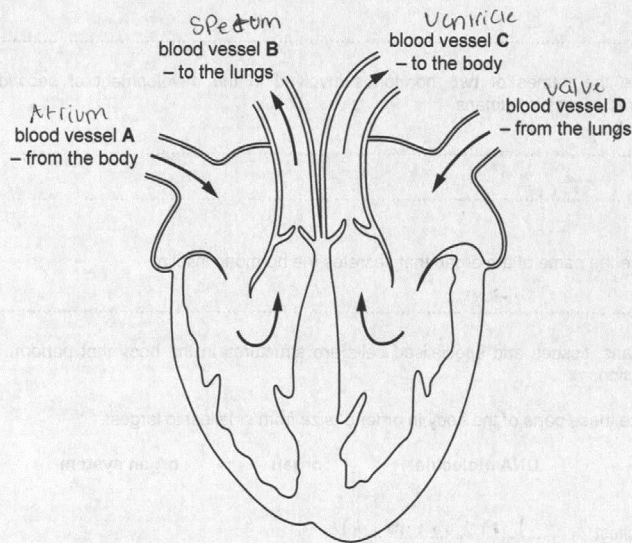


Fig. 5.1

(i) Use label lines and labels to identify these structures on Fig. 5.1:

- 1 • atrium
- septum
- ventricle
- valve

[4]

(ii) Identify the letter or letters of all the blood vessels from Fig. 5.1, that:

- 2 are arteries ... A, C
- is the pulmonary vein ... B, D

[2]

(b) The activity of the heart can be monitored by measuring the pulse rate.

State **two other** ways of monitoring the activity of the heart.

- 3 1 Breathing rate
- 2 Put your hand on chest

[2]

1 The candidate does not follow the rubric in the question. They do not draw any label lines. The labels they write are all incorrect, so the candidate is awarded no marks.

Mark for (a)(i) = 0 out of 4

2 The candidate gives no correct answers so they are not awarded any marks. The question asks for the letter or letters, so there may be one letter or two required. The correct answer for the arteries is 'B' and 'C'. The correct answer for the pulmonary vein is 'D', but 'B' is incorrect.

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

3 Measuring the breathing rate or putting your hand on the chest are not ways of monitoring the activity of the heart.

Mark for (b) = 0 out of 2

Example Candidate Response – low, continued	Examiner comments
<p>(c) Coronary heart disease (CHD) is caused by a blockage of blood vessels in the heart.</p> <p>(i) State the name of the blood vessels that become blocked.</p> <p>4 Arteries [1]</p> <p>(ii) State three risk factors for developing CHD.</p> <p>5</p> <p>1 Smoking 2 Drinking alcohol 3 too much food [3]</p>	<p>4 The candidate's answer of 'arteries' is not specific. They need to name the coronary artery to be awarded one mark.</p> <p>Mark for (c)(i) = 0 out of 1</p> <p>5 'Too much food' is incorrect, but the candidate correctly gives two risk factors for coronary heart disease and not how to prevent it in their other two answers.</p> <p>Mark for (c)(ii) = 2 out of 3</p> <p>Total mark awarded = 2 out of 12</p>

How the candidate could have improved their answer

- (a)(i) The candidate needed to label the structures with label lines.
- (a)(ii) The candidate needed to give enough letters in their answer. The question provided an indication of how many letters were required with the use of 'are' and 'is'.
- (c)(i) The candidate needed to give the full name of the artery, rather than just state 'artery'.

Common mistakes candidates made in this question

- (a)(i) Some candidates used the arrows and labelled blood vessels at the top of the diagram to answer the question. Many candidates did not manage to correctly label the valve because their label line ended in a space and not on the valve. Others labelled the top section of the ventricle as the atrium or confused the relative positions of the two chambers. Some candidates missed this question out.
- (b) Several candidates misinterpreted the question and described positions where a pulse could be taken, how to take it or how to measure breathing rate and blood pressure.
- (c)(i) Many candidates stated 'artery', 'coronary veins' or 'vessels' rather than naming them. Some candidates incorrectly named the blood vessels to or from the heart.
- (c)(ii) Many candidates misunderstood the term 'risk factor' and instead described symptoms of coronary heart disease. Some candidates gave factors that would prevent coronary heart disease like avoiding alcohol or smoking, or taking more exercising for example. Some candidates gave two unhealthy components of diet.

Question 6

Example Candidate Response – high

Examiner comments

- 6 (a) Dimples are an indentation of the cheek visible when smiling.
 Fig. 6.1 is a photograph showing a person with dimples.



Fig. 6.1

The number of male and female students in a class that had dimples was recorded.
 The results are shown in Table 6.1.

Table 6.1

characteristic	sex	number of students
with dimples	male	4
	female	5
without dimples	male	13
	female	12

- 1 (i) Calculate the total number of male students in the class.
 17 [1]
- 2 (ii) Calculate the difference in number between male and female students **with** dimples.
 1 [1]

1 The candidate correctly calculates the total number of males by adding 4 to 13.

Mark for (a)(i) = 1 out of 1

2 The candidate correctly calculates the difference between male and female students with dimples, by subtracting 4 from 5.

Mark for (a)(ii) = 1 out of 1

Example Candidate Response – high, continued	Examiner comments
<p>(iii) Describe the evidence from Table 6.1 that shows that dimples are a type of discontinuous variation.</p> <p>3 because there no intermediate between the phenotypes and no gradual difference between the two extremes either have dimples or don't have dimples. [2]</p> <p>(iv) State one other example of discontinuous variation in humans.</p> <p>4 tongue rolling [1]</p> <p>(v) State one example of continuous variation in humans.</p> <p>5 height eye colour body mass [1]</p> <p>(b) Variation can be caused by a mutation.</p> <p>Complete the sentences about mutation using words from the list.</p> <p>Each word can be used once, more than once or not at all.</p> <p>6 alleles decrease genetic impulses increase ionising maintain physical stimuli</p> <p>A mutation is a genetic change.</p> <p>Mutations form new alleles.</p> <p>Some chemicals and ionising radiation can increase the rate of mutation. [4]</p>	<p>3 This candidate demonstrates a clear understanding of what discontinuous variation is and how to describe it.</p> <p>Mark for (a)(iii) = 2 out of 2</p> <p>4 The candidate correctly gives 'tongue rolling' as an example of discontinuous variation.</p> <p>Mark for (a)(iv) = 1 out of 1</p> <p>5 The candidate correctly gives 'body mass' as an example of continuous variation.</p> <p>Mark for (a)(v) = 1 out of 1</p> <p>6 The candidate completes all four of the sentences correctly and is awarded full marks.</p> <p>Mark for (b) = 4 out of 4</p> <p>Total mark awarded = 10 out of 10</p>

How the candidate could have improved their answer

(a)(i) The candidate could have shown their working for the calculations.

Example Candidate Response – middle

Examiner comments

6 (a) Dimples are an indentation of the cheek visible when smiling.

Fig. 6.1 is a photograph showing a person with dimples.



Fig. 6.1

The number of male and female students in a class that had dimples was recorded.

The results are shown in Table 6.1.

Table 6.1

characteristic	sex	number of students
with dimples	male	4
	female	5
without dimples	male	13
	female	12

(i) Calculate the total number of male students in the class.

1 34 [1]

(ii) Calculate the difference in number between male and female students **with** dimples.

2 1 [1]

1 The candidate does not correctly calculate the total number of males. Instead they calculate the total number of students in the class by adding up all the numbers.

Mark for (a)(i) = 0 out of 1

2 The candidate correctly calculates the difference between male and female students with dimples by subtracting 4 from 5.

Mark for (a)(ii) = 1 out of 1

Example Candidate Response – middle, continued	Examiner comments
<p>(iii) Describe the evidence from Table 6.1 that shows that dimples are a type of discontinuous variation.</p> <p>3 The number of people who had dimples is smaller than the number of people who have do not have dimples by 25 people. [2]</p> <p>(iv) State one other example of discontinuous variation in humans.</p> <p>4 Finger shape. [1]</p> <p>(v) State one example of continuous variation in humans.</p> <p>5 weight. [1]</p> <p>(b) Variation can be caused by a mutation.</p> <p>6 Complete the sentences about mutation using words from the list. Each word can be used once, more than once or not at all.</p> <p>alleles decrease genetic impulses increase ionising maintain physical stimuli</p> <p>A mutation is a <u>genetic</u> change. Mutations form new <u>alleles</u>. Some chemicals and <u>ionising</u> radiation can <u>increase</u> the rate of mutation. [4]</p>	<p>3 The candidate does not demonstrate a clear understanding of what discontinuous variation is and cannot describe it. They comment on the number of people with and without dimples. Mark for (a)(iii) = 0 out of 2</p> <p>4 The candidate's answer of 'finger shape' is not an example of discontinuous variation. Mark for (a)(iv) = 0 out of 1</p> <p>5 The candidate's answer of 'weight' is an example of continuous variation. Mark for (a)(v) = 1 out of 1</p> <p>6 The candidate completes all four of the sentences correctly. Mark for (b) = 4 out of 4</p> <p>Total mark awarded = 6 out of 10</p>

How the candidate could have improved their answer

- **(a)(iii)** The candidate needed to describe discontinuous variation related to the example given in the question.
- **(a)(v)** The candidate needed to give a clear example of continuous variation.

Example Candidate Response – low

Examiner comments

6 (a) Dimples are an indentation of the cheek visible when smiling.

Fig. 6.1 is a photograph showing a person with dimples.



Fig. 6.1

The number of male and female students in a class that had dimples was recorded.

The results are shown in Table 6.1.

Table 6.1

characteristic	sex	number of students
with dimples	male	4
	female	5
without dimples	male	13
	female	12

(i) Calculate the total number of male students in the class.

1 17 [1]

(ii) Calculate the difference in number between male and female students **with** dimples.

2 1 [1]

1 The candidate correctly calculates the total number of males by adding 4 to 13.

Mark for (a)(i) = 1 out of 1

2 The candidate correctly calculates the difference between male and female students with dimples by subtracting 4 from 5.

Mark for (a)(ii) = 1 out of 1

Example Candidate Response – low, continued	Examiner comments
<p>(iii) Describe the evidence from Table 6.1 that shows that dimples are a type of discontinuous variation.</p> <p>3 The amount of female with is 5 while without is 12 and male with 4 while without is 13 [2]</p> <p>(iv) State one other example of discontinuous variation in humans.</p> <p>4 eye colour [1]</p> <p>(v) State one example of continuous variation in humans.</p> <p>5 hand [1]</p> <p>(b) Variation can be caused by a mutation.</p> <p>6 Complete the sentences about mutation using words from the list. Each word can be used once, more than once or not at all.</p> <p>alleles decrease genetic impulses increase ionising maintain physical stimuli</p> <p>A mutation is a genetic change. Mutations form new alleles. Some chemicals and physical radiation can increase the rate of mutation. [4]</p>	<p>3 The candidate does not demonstrate a clear understanding of what discontinuous variation is and cannot describe it. They comment on the number of people with and without dimples. Mark for (a)(iii) = 0 out of 2</p> <p>4 The candidate's answer 'eye colour' is not an example of discontinuous variation. Mark for (a)(iv) = 0 out of 1</p> <p>5 The candidate's answer 'hand' is not an example of continuous variation. Mark for (a)(v) = 0 out of 1</p> <p>6 The candidate completes three of the sentences correctly. They write 'physical' instead of 'ionising' in the third sentence. Mark for (b) = 3 out of 4</p> <p>Total mark awarded = 5 out of 10</p>

How the candidate could have improved their answer

- (a)(iii) The candidate needed to describe discontinuous variation related to the example given in the question.
- (a)(iv) The candidate needed to give a clear example of discontinuous variation.
- (a)(v) The candidate needed to give a clear example of continuous variation.

Common mistakes candidates made in this question

- (a)(i) The question asked for the total number of males in the class, but many candidates calculated the total number of dimples in males and females.
- (a)(iii) Many candidates simply described the data, rather than discussed what type of data it was. Some candidates did not understand that discontinuous data is in discrete categories with no intermediate values. Many candidates referred to environmental influences in their answers and some gave relative numbers, for example, 'more males than females have dimples'. A lot of candidates missed this question out.
- (a)(iv) Many candidates confused examples of continuous and discontinuous variation and gave eye colour as a wrong answer.
- (a)(v) Many candidates confused examples of continuous and discontinuous variation. Some stated 'hair' but with no reference to colour.
- (b) Some candidates wrote 'physical' rather than 'genetic' or 'ionizing'.

Question 7

Example Candidate Response – high

Examiner comments

7 (a) Modern technology has improved food production.

Table 7.1 shows some of the ways that food production has been improved.

1 Complete Table 7.1 by writing an example for each description.

Table 7.1

example of technology	description of how it has improved food production
Agricultural machinery	used to farm larger areas of land
Chemical fertilizers	used to improve growth in plants by providing nutrients
pesticides	used to improve yield by removing animal pests
herbicides	used to remove competition by weeds

[4]

(b) Intensive livestock production is used to improve food production.

Describe the negative effects of intensive livestock production.

2

① if 1 of ^{the} animals in the livestock caught a disease the rest of them will all get the disease

② increases pollution because of the large number of animal waste produced

~~③ in crops can be used to produce biofuels~~

~~④ in crops can be used to produce biofuels~~

③ giving animals regular doses of anti-biotics causes the bacteria to become resistant to it [3]

1 The candidate correctly and clearly completes all four boxes and is awarded full marks.

Mark for (a) = 4 out of 4

2 The candidate sets out their answer as points which make it very clear. As there are three marks available, they sensibly give three points. They clearly give the negative effect and explain why it is negative.

Mark for (b) = 3 out of 3

Example Candidate Response – high, continued

Examiner comments

(c) Selective breeding can be used to improve the yield of meat from livestock.
 Sentences A to E in Table 7.2 describe the selective breeding of chickens to improve meat quantity.
 The sentences are **not** in the correct order.

Table 7.2

Breed the chickens together.	A
Observe the chickens to identify those that will yield the most meat.	B
Observe the offspring and select the offspring that will yield the most meat.	C
Repeat the process over many generations.	D
Select one male and one female chicken.	E

Put the letters from Table 7.2 into the correct order.

One has been done for you.

B	E	A	C	D
---	---	---	---	---

[2]

(d) Lack of food can affect the population size of animals in ecosystems.

State **two other** factors that could decrease population size.

4
 1 increase in diseases
 2 ~~increase in death rate and decrease in birth rate~~
~~many animals migrate to other populations~~ increase in predators for this species. [2]
 [Total: 11]

3 Selective breeding can be a difficult topic for candidates to write about. The format of this question suits the candidate and their answer is completely correct.

Mark for (c) = 2 out of 2

4 This candidate answers the question in a sensible way by writing one answer on each of the lines provided. On line two, the candidate realises that the first answer they give is inaccurate so clearly cross it out and write another answer. When this happens, the new answer is marked. Both of the candidate's answers are correct.

Mark for (d) = 2 out of 2

Total mark awarded = 11 out of 11

How the candidate could have improved their answer

The candidate answered this question correctly.

Example Candidate Response – middle

Examiner comments

7 (a) Modern technology has improved food production.

- 1 Table 7.1 shows some of the ways that food production has been improved. Complete Table 7.1 by writing an example for each description.

Table 7.1

example of technology	description of how it has improved food production
mono-culture herbicides	used to farm larger areas of land
Fertilizers	used to improve growth in plants by providing nutrients
insecticides	used to improve yield by removing animal pests
herbicides	used to remove competition by weeds

[4]

(b) Intensive livestock production is used to improve food production.

- 2 Describe the negative effects of intensive livestock production.

a lot of money is spent on water and fertilisers.
 produces crops more than needed.
 wasting of fertilisers.

[3]

- 1 The candidate correctly completes three of the four boxes, but 'mono culture' is an incorrect answer and they need to give some form of (named) agricultural machinery.

Mark for (a) = 3 out of 4

- 2 The question asks for the negative effects of intensive livestock production. The candidate does not write about livestock. Instead, their answer includes facts about fertilisers which are not relevant because the emphasis in the question is on livestock.

Mark for (b) = 0 out of 3

Example Candidate Response – middle, continued **Examiner comments**

(c) Selective breeding can be used to improve the yield of meat from livestock.
 Sentences A to E in Table 7.2 describe the selective breeding of chickens to improve meat quantity.
 The sentences are **not** in the correct order.

Table 7.2

Breed the chickens together.	A
Observe the chickens to identify those that will yield the most meat.	B
Observe the offspring and select the offspring that will yield the most meat.	C
Repeat the process over many generations.	D
Select one male and one female chicken.	E

Put the letters from Table 7.2 into the correct order.
 One has been done for you.

E	B A	A	B C	D
---	---------------------------	---	----------------	---

[2]

(d) Lack of food can affect the population size of animals in ecosystems.
 State **two other** factors that could decrease population size.
 1. ~~the~~ Predation
 2. ~~habitat~~ damaged habitats
[2]

3 Candidates find this format in questions easier to answer than having to write from scratch. The candidate's answer is partly correct and they are awarded one mark out of two. The first two letters are the wrong way round and the last two letters are correct.

Mark for (c) = 1 out of 2

4 The candidate answers the question in a sensible way and writes one answer on each of the lines provided. On line two, the candidate realises that the answer they write first is inaccurate and therefore clearly cross it out and writes another answer. When this happens, the new answer is marked.

Mark for (d) = 2 out of 2

Total mark awarded = 6 out of 11

How the candidate could have improved their answer

- **(a)** The candidate needed to choose an item of farm machinery.
- **(b)** The candidate needed to read the stem of each question so that they answered it appropriately. They needed to write about livestock production rather than crop production.

Example Candidate Response – low

Examiner comments

7 (a) Modern technology has improved food production.

- 1 Table 7.1 shows some of the ways that food production has been improved.
Complete Table 7.1 by writing an example for each description.

Table 7.1

example of technology	description of how it has improved food production
Farming machine	used to farm larger areas of land
Gravating seeds	used to improve growth in plants by providing nutrients
Animal Pests animal Pests removed	used to improve yield by removing animal pests
Weeds removed removed	used to remove competition by weeds

[4]

(b) Intensive livestock production is used to improve food production.

- 2 Describe the negative effects of intensive livestock production.
- ~~Intensive livestock production is used to improve food production.~~
- ~~Intensive livestock production is used to improve food production.~~
- ~~Intensive livestock production is used to improve food production.~~
- may get new animal that is not from same species
 - will get less animals as not all are intensive
 - may change some of their genes
- [3]

1 The candidate correctly completes one of the four boxes so is awarded one of four marks. The first word in the second answer is not legible and the third and fourth answers repeat the information given in the table, so they are awarded no marks for the rest.

Mark for (a) = 1 out of 4

2 The question asks for the negative effects of intensive livestock production but the candidate does not address this question. Instead, they write about producing an animal of a different species, or changing the genes, which is irrelevant.

Mark for (b) = 0 out of 3

Example Candidate Response – low, continued **Examiner comments**

- (c) Selective breeding can be used to improve the yield of meat from livestock.
- 3 Sentences A to E in Table 7.2 describe the selective breeding of chickens to improve meat quantity.

The sentences are **not** in the correct order.

Table 7.2

Breed the chickens together.	A
Observe the chickens to identify those that will yield the most meat.	B
Observe the offspring and select the offspring that will yield the most meat.	C
Repeat the process over many generations.	D
Select one male and one female chicken.	E

Put the letters from Table 7.2 into the correct order.

One has been done for you.

B	E	A	C	D
---	---	---	---	---

[2]

- (d) Lack of food can affect the population size of animals in ecosystems.
- 4 State **two other** factors that could decrease population size.
1. No habitat
2. animals get moved from different species
- [2]

3 Selective breeding can be a difficult topic for candidates to write about. The format in this question suits the candidate and their answer is completely correct.

Mark for (c) = 2 out of 2

4 The candidate answers the question in a sensible way by writing one answer on each of the lines provided. Their first answer is correct and is awarded a mark but their second answer does not answer the question.

Mark for (d) = 1 out of 2

Total mark awarded = 4 out of 11

How the candidate could have improved their answer

- (a) The candidate needed to ensure their writing was legible to be awarded marks for their answer and not repeat the information given in the question.
- (b) The candidate needed to read the stem of the question so they could answer it appropriately. They needed to write about how livestock production is used to improve food production.
- (d) The candidate needed to read the stem of the question carefully.

Common mistakes candidates made in this question

- (a) While many candidates chose an item of farm machinery used to farm larger areas of land, some incorrectly described how the land was cleared or farmed, for example deforestation or monoculture. Some candidates confused 'fertiliser' with 'fertilisation'.
- (b) Some candidates did not read the stem of each question so they couldn't answer it appropriately. Some gave references to crop production rather than livestock production.
- (c) Some candidates placed 'B' and 'E' the wrong way round.
- (d) Many candidates overlooked the stem of the question and gave answers about food. Some confused the terms 'predator' and 'prey'.

Question 8

Example Candidate Response – high

Examiner comments

8 (a) A student investigated the conditions needed for germination of seeds.

Fig. 8.1 shows the apparatus and conditions used.

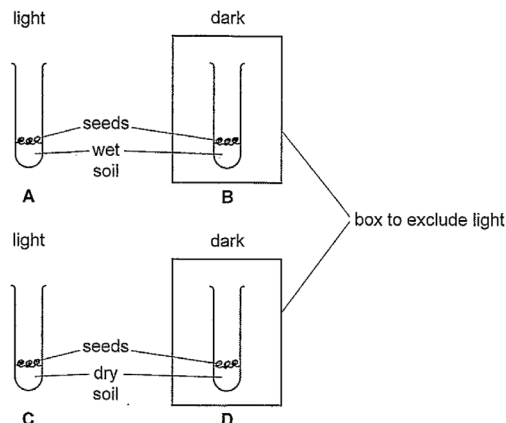


Fig. 8.1

The seeds in test-tubes A and B germinated but the seeds in test-tubes C and D did not germinate.

(i) Use the information in Fig. 8.1 to state **one** condition required for germination.

1 water [1]

(ii) Use the information in Fig. 8.1 to state **one** condition **not** required for germination.

2 light [1]

(iii) The investigation was repeated with seeds that had been boiled for 10 minutes and then cooled.

Predict and explain the effect of boiling on the results.

3 they won't germinate because when they were
 boiled ~~enzymes~~ all enzymes denatured so they
 can't work again so no germination will
 happen again and germination need enzymes to
 happen [2]

1 The candidate's answer 'water' is correct.

Mark for (a)(i) = 1 out of 1

2 The candidate's answer 'light' is correct.

Mark for (a)(ii) = 1 out of 1

3 There are two parts to this question, so there is one mark available for each part of the answer. The candidate's prediction (no germination) and their explanation of the effect (reference to seeds being killed or enzymes damaged) are correct answers.

Mark for (a)(iii) = 2 out of 2

Example Candidate Response – high, continued	Examiner comments
<p>(b) Photosynthesis and germination have different requirements.</p> <p>(i) State the word equation for photosynthesis.</p> <p>4 <u>water + Carbon dioxide</u> ^{light} → <u>glucose + Oxygen</u> [2]</p> <p>(ii) State the name of one condition needed for both photosynthesis and germination.</p> <p>5 <u>water</u> [1]</p>	<p>4 The question asks for the word equation for photosynthesis. The two marks awarded are usually (but not always) for the left hand side and the right hand side of the equation. The components of each side can be in either order. If the candidate writes a symbol equation, it must be totally correct and balanced. The candidate's word equation is completely correct.</p> <p>Mark for (b)(i) = 2 out of 2</p> <p>5 The candidate's answer 'water' is acceptable.</p> <p>Mark for (b)(ii) = 1 out of 1</p> <p>Total mark awarded = 7 out of 7</p>

How the candidate could have improved their answer

This candidate answered this question correctly.

Example Candidate Response – middle

Examiner comments

8 (a) A student investigated the conditions needed for germination of seeds.

Fig. 8.1 shows the apparatus and conditions used.

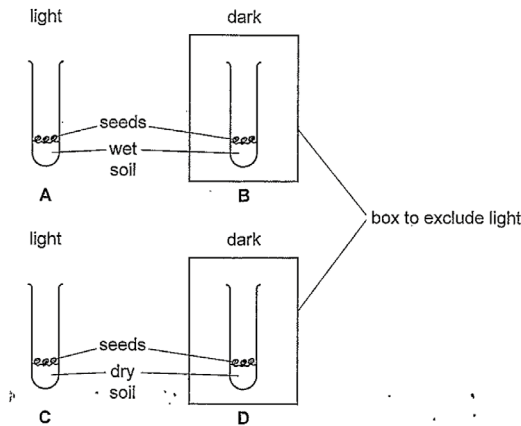


Fig. 8.1

The seeds in test-tubes A and B germinated but the seeds in test-tubes C and D did not germinate.

(i) Use the information in Fig. 8.1 to state **one** condition required for germination.

1 water [1]

(ii) Use the information in Fig. 8.1 to state **one** condition **not** required for germination.

2 light [1]

(iii) The investigation was repeated with seeds that had been boiled for 10 minutes and then cooled.

Predict and explain the effect of boiling on the results.

3 it will denature the enzymes of the seeds so they couldn't be able to germinate due to the high temperature they were under. [2]

1 The candidate's answer, 'water', is correct.

Mark for (a)(i) = 1 out of 1

2 The candidate's answer, 'light', is correct.

Mark for (a)(ii) = 1 out of 1

3 The candidate makes a correct prediction (no germination) and explains the effect (enzymes damaged) so is awarded full marks.

Mark for (a)(iii) = 2 out of 2

Example Candidate Response – middle, continued	Examiner comments
<p>(b) Photosynthesis and germination have different requirements.</p> <p>(i) State the word equation for photosynthesis.</p> <p>4 Carbon dioxide + glucose \rightarrow oxygen + water [2]</p> <p>(ii) State the name of one condition needed for both photosynthesis and germination.</p> <p>5 light temperature oxygen [1]</p>	<p>4 Neither the left or right sides of the candidate's equation are correct, so they are not awarded any marks.</p> <p>Mark for (b)(i) = 0 out of 2</p> <p>5 The candidate's answer 'oxygen' is not acceptable so they are not awarded any marks.</p> <p>Mark for (b)(ii) = 0 out of 1</p> <p>Total mark awarded = 4 out of 7</p>

How the candidate could have improved their answer

- **(a)(i)** The candidate needed to relate the experiment to the question rather than answer with a general requirement for germination.
- **(a)(iii)** This question had two parts; 'predict' and 'explain'. The candidate should have tackled each part separately.
- **(b)(i)** The candidate needed to write a correct word equation.

Example Candidate Response – low

Examiner comments

8 (a) A student investigated the conditions needed for germination of seeds.

Fig. 8.1 shows the apparatus and conditions used.

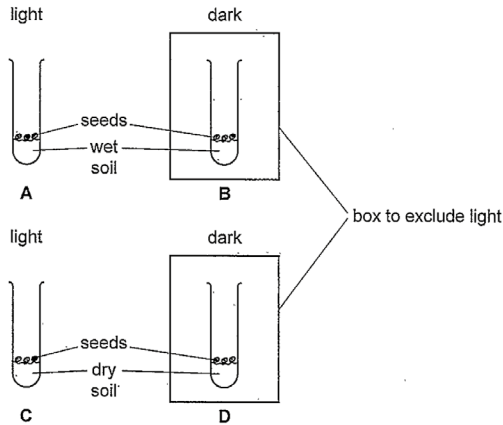


Fig. 8.1

The seeds in test-tubes A and B germinated but the seeds in test-tubes C and D did not germinate.

(i) Use the information in Fig. 8.1 to state **one** condition required for germination.

1 ~~light~~ A [1]

(ii) Use the information in Fig. 8.1 to state **one** condition **not** required for germination.

2 C [1]

(iii) The investigation was repeated with seeds that had been boiled for 10 minutes and then cooled.

Predict **and** explain the effect of boiling on the results.

3 ~~the seed will not germinate as~~ the seed will not germinate as
~~it was boiled and then cooled~~ it was boiled and then cooled

 [2]

1 The candidate writes one answer but it is not a condition (as required by the question), so they are not awarded any marks.

Mark for (a)(i) = 0 out of 1

2 The candidate's answer is not a condition so they are not awarded any marks.

Mark for (a)(ii) = 0 out of 1

3 The candidate's prediction is correct. However, the second part of their answer is a repeat of the question and does not explain why the seeds will not germinate.

Mark for (a)(iii) = 0 out of 2

Example Candidate Response – low, continued	Examiner comments
<p>(b) Photosynthesis and germination have different requirements.</p> <p>(i) State the word equation for photosynthesis.</p> <p>4 water + oxygen = carbon dioxide [2]</p> <p>(ii) State the name of one condition needed for both photosynthesis and germination.</p> <p>5 light warmth [1]</p>	<p>4 Neither the left or right sides of the candidate's equation are correct, so they are not awarded any marks.</p> <p>Mark for (b)(i) = 0 out of 2</p> <p>5 The candidate's answer of 'warmth' is not acceptable.</p> <p>Mark for (b)(ii) = 0 out of 1</p> <p>Total mark awarded = 0 out of 7</p>

How the candidate could have improved their answer

- (a)(i) The candidate needed to relate the experiment to the question rather than answer with a general requirement for germination.
- (a)(iii) This question had two parts; 'predict' and 'explain'. The candidate should have tackled each part separately.
- (b)(i) The candidate needed to write a correct word equation and not mix words with symbols.

Common mistakes candidates made in this question

- (a)(i) Some candidates ignored the experiment and gave a general requirement of germination.
- (a)(ii) Many candidates incorrectly gave 'dry soil'.
- (a)(iii) Many candidates stated that the boiling temperatures would increase germination. Their justification was that it would increase the warmth and that boiling would give kinetic energy and allow reactions to happen faster. Some candidates stated that seeds would absorb water and so germinate faster, or that boiling would soften the outer coat and make it easier for them to germinate. Some candidates incorrectly referred to temperature killing enzymes and some stated that boiling would evaporate the water and not leave enough for germination.
- (b)(i) Some candidates gave the respiration equation. Other common mistakes included: water and / or carbon dioxide on the wrong side or on both sides of the equation, a mixture of words and symbols or just symbol equations.
- (b)(ii) Some candidates gave 'oxygen' or 'light' as a requirement for both germination and photosynthesis. Those who gave a temperature answer wrote about warmth rather than a suitable temperature.

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