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Examiners' Report
June 2011

GCE Biology 6BI05 01

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Introduction

This paper offered candidates a wide range of opportunities to showcase their knowledge of unit 5. For example, those items that required extended prose and detail were generally tackled well with candidates delivering logical and considered responses. Many were able to successfully apply their understanding to new and novel situations. Furthermore, the paper effectively allowed candidates to demonstrate their skills with questions relating to the scientific article.

It was most gratifying to see many excellent candidate responses to all questions and much credit should go to both the candidates and those who have taught them.

Whilst interpretation of numerical data, both tabulated and graphical, continues to challenge some, encouragingly, this was less evident than perhaps previously.

Question 1 (b)

This fact-based question set out to link the role of myelin with the conduction of the nerve impulse. Candidates had little difficulty in identifying structure C correctly, enabling access to all marking points. Many demonstrated good knowledge and answered concisely.

This is a detailed answer.

(b) Describe the role of the structure labelled **C** in the conduction of nerve impulses.

(4)

myelin sheam speeds up the conducton of nerve impuise. it acts as an electrical insulator. myelin sheam is made up of schwann cell. inbemeen schwann cells ~~and~~ are tiny patches of bare membrane called nodes of ranvi. here sodium ion channels are concentrated. depolaraisaton occuis at the nodes of ranvir in a myeunated cell. Allows impuises to jump from node to node, this is called saltatory conducton, it is much faster.

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Examiner Comments

It gained all four marks and indeed considered all marking points.

Question 1 (c)

The majority of candidates recognised the importance of channel proteins and the sodium-potassium pump in the axon cell membrane. Few considered the nature of the phospholipid bilayer's role.

In this response, the candidate has identified the channel proteins and has correctly refered to the movement of ions.

(c) Explain how the structure of the axon cell membrane is related to the conduction of nerve impulses.

(3)

The axon cell membrane, is divided into sections, the gaps are called nodes of ranvier. The cell membrane contains sodium channels and potassium channels. This allows the movement of ions in and out of the axon to cause depolarisation when Na^+ channels open, and when K^+ channels open causing repolarisation. From here the impulse can jump from node to the next via saltatory conduction.

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Examiner Comments

This answer gained marking point 4.

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Examiner Tip

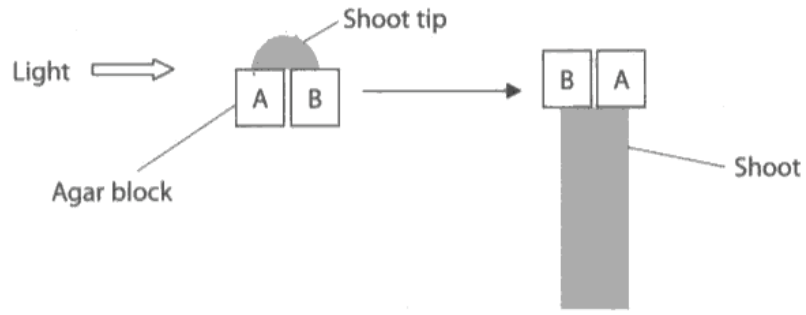
Remember that an explain command is likely to be asking about the biology behind a situation. In this case, it is how the membrane structure enables an impulse to be conducted.

Question 2 (a)

A wide variety of shoot representations were seen as illustrated by the three examples below. Approximately half correctly drew the shoot bending towards the right.

This example incorrectly bends to the left.

2 The tip of a plant shoot was placed on two agar blocks and light was shone from one side. The tip was removed and the agar blocks were then placed on a shoot without a tip, as shown in the diagram below.



(a) In the space below, draw a diagram to show the shoot as it would appear several hours later.

(1)

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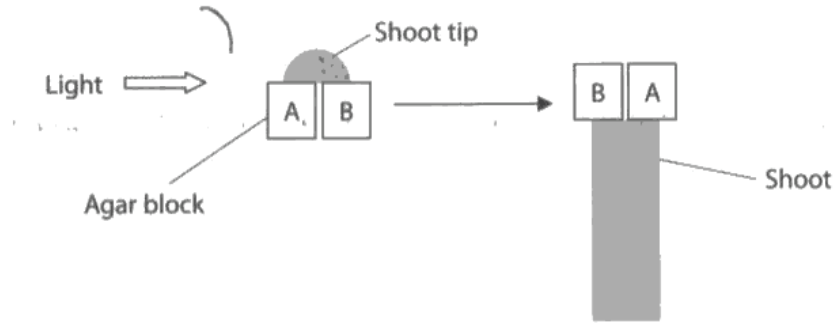
Examiner Comments
Whilst the question did refer to the shoot shown in the diagram, drawings with the tip present and or the agar block absent were acceptable.

ResultsPlus
Examiner Tip
Check the mark allocation. In this case, it is only one mark so a detailed diagram was not required.

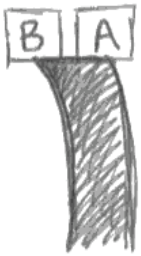
This example also bends slightly to the left.

2 The tip of a plant shoot was placed on two agar blocks and light was shone from one side. The tip was removed and the agar blocks were then placed on a shoot without a tip, as shown in the diagram below.



(a) In the space below, draw a diagram to show the shoot as it would appear several hours later.

(1)



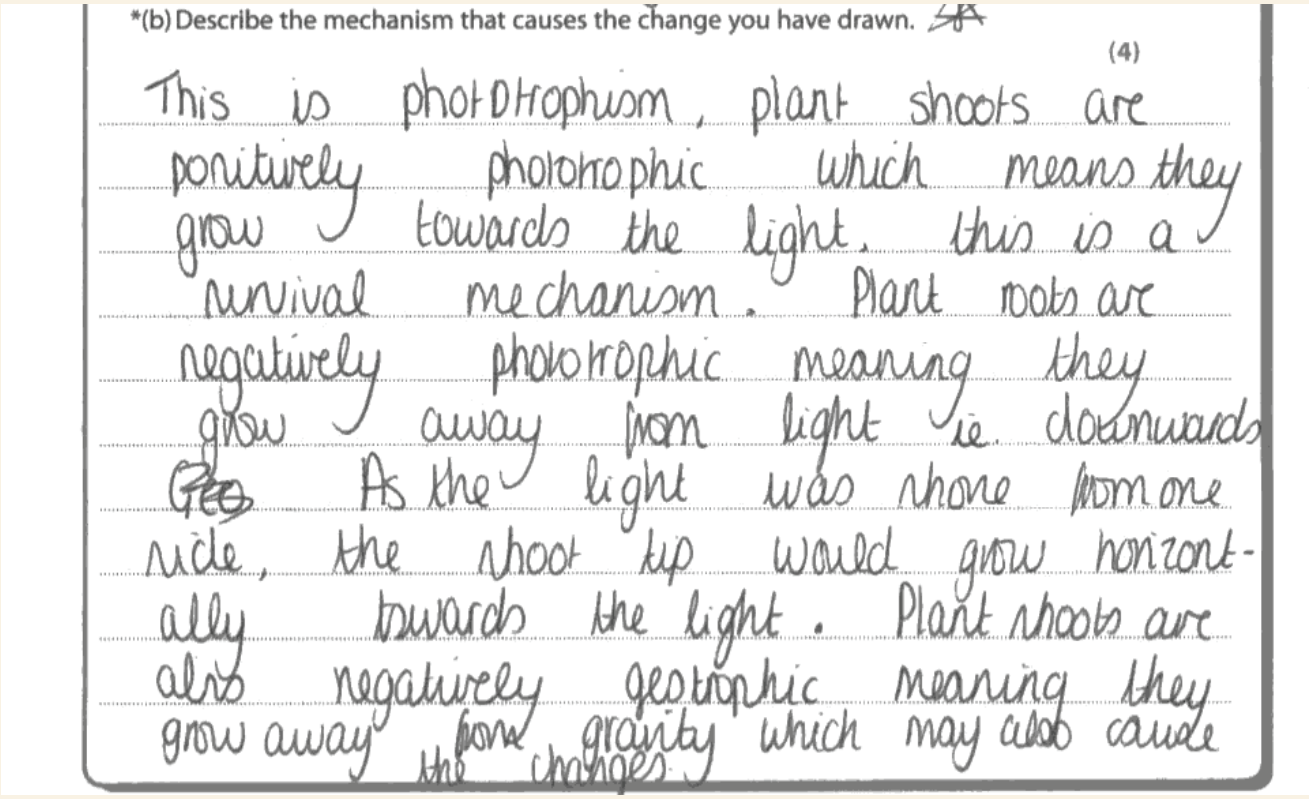
ResultsPlus
Examiner Comments

No mark awarded.

Question 2 (b)

This item required candidates to give details about the mechanism that caused the shoot to bend. There were a number of most impressive responses, but answers were seen that spanned the mark range.

This example illustrates the most commonly awarded marking point (point 1).



*(b) Describe the mechanism that causes the change you have drawn.

(4)

This is photOtrophism, plant shoots are ponitively photorophic which means they grow towards the light. this is a survival mechanism. Plant roots are negatively photrophic meaning they grow away from light ie. dowmwards As the light was shone from one side, the shoot tip would grow horizontally towards the light. Plant shoots are also negatively geotrophic meaning they grow away from gravity which may also cause the changes.

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Examiner Comments

To achieve more marks the mechanism of action would need to be discussed in detail.

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Examiner Tip

Note that this is a QWC question. It would be good practice to carefully consider the answer so that it can be written in a logical sequence, such as auxin moves across the tip before diffusing down and then cells elongate.

This response supplies more detail than the previous example.

*(b) Describe the mechanism that causes the change you have drawn.

(4)

This is due to phototropism. The ~~auxin~~ shoot will grow toward the light due to cell elongation caused by auxins. Auxins are hormones which promote cell elongation. They will build up on the side opposite of the side exposed to the light and will cause the cells to elongate resulting in the growth of the shoot toward the light.

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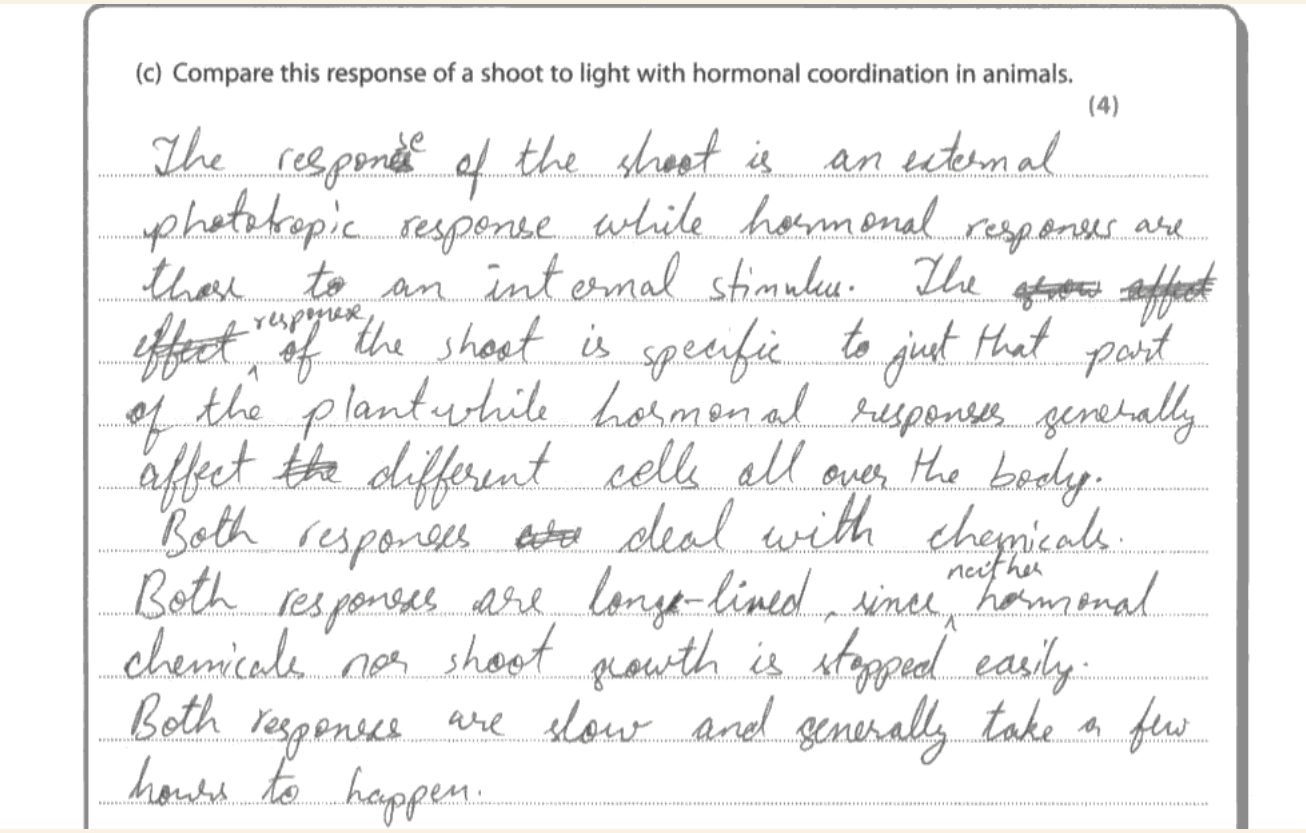
Examiner Comments

The response gained 3 marks, marking points 1, 5 and 3.

Question 2 (c)

Whilst the stem of the question identifies that a comparison needs to be made between this phototrophic response and hormonal coordination in animals, a number of candidates tried to compare the latter with nervous coordination. This made the question to be one of the most challenging for a number of candidates.

This is a good response that has tried to compare throughout the passage.



(c) Compare this response of a shoot to light with hormonal coordination in animals.

(4)

The response of the shoot is an external phototropic response while hormonal responses are there to an internal stimulus. The ~~effect~~ response of the shoot is specific to just that part of the plant while hormonal responses generally affect ~~the~~ different cells all over the body. Both responses ~~are~~ deal with chemicals. Both responses are long-lived, since neither hormonal chemicals nor shoot growth is stopped easily. Both responses are slow and generally take a few hours to happen.

ResultsPlus
Examiner Comments

The marking point sequence is 2, 1, 5 and 4.

ResultsPlus
Examiner Tip

'Remember that, in a compare question, both similarities and differences should be considered.

Question 3 (a) (i)

Most candidates gave good descriptions of the necessary interpretation of the trace to determine breathing rate and tidal volume.

This response illustrates the tack taken by a number of candidates who wrote details about using the spirometer rather than using the trace.

3 When exercise begins, both ventilation rate and heart rate increase. This supplies more oxygen to muscles.

(a) (i) Describe how breathing rate and tidal volume can be determined from a spirometer trace.

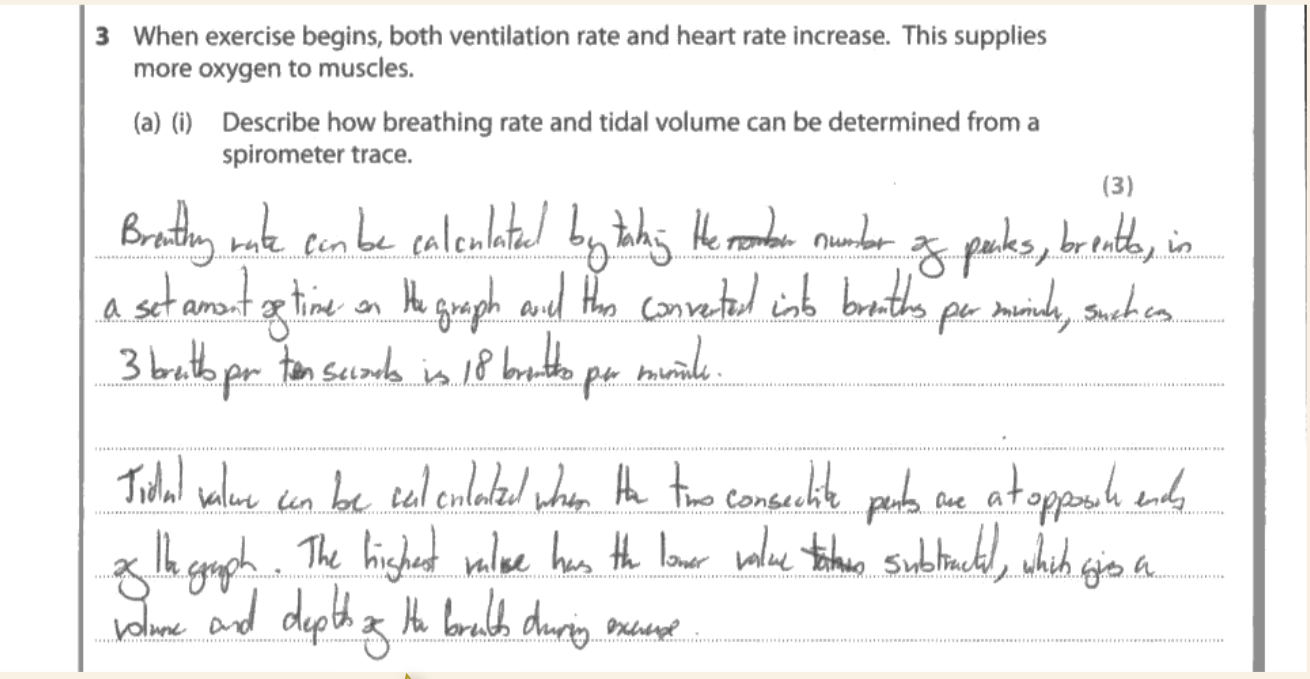
(3)

An individual breathes into a tank of oxygen suspended on a water tank. A dot is made once the person has finished breathing into the tank. After all air is expelled another dot is made on the chart. The dots made for each inhalation and exhalation can then be joined to provide a spirometer trace.

ResultsPlus
Examiner Comments
No marks were awarded for this answer.

ResultsPlus
Examiner Tip
Make sure that the response matches the question being asked.

This answer focused on describing how to determine breathing rate and tidal volume from the trace.



3 When exercise begins, both ventilation rate and heart rate increase. This supplies more oxygen to muscles.

(a) (i) Describe how breathing rate and tidal volume can be determined from a spirometer trace.

(3)

Breathing rate can be calculated by taking the ~~number~~ number of peaks, breaths, in a set amount of time on the graph and then converted into breaths per minute, such as 3 breaths per ten seconds is 18 breaths per minute.

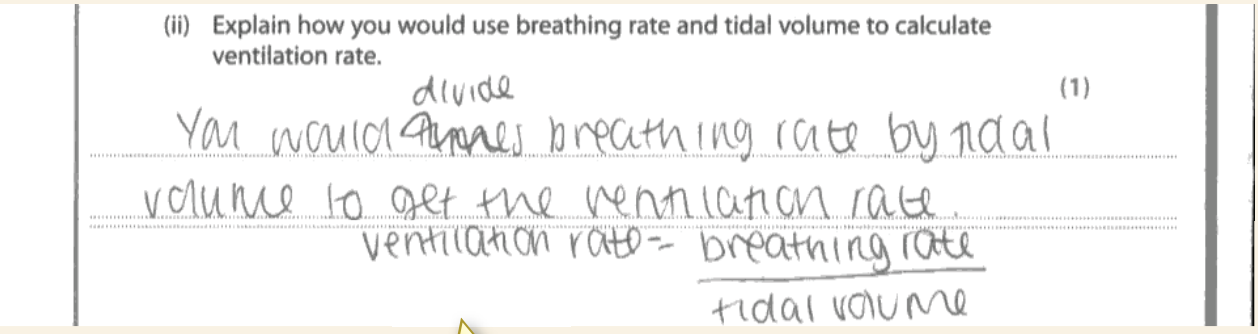
Tidal value can be calculated when the two consecutive peaks are at opposite ends of the graph. The highest value has the lower value ~~taken~~ subtracted, which gives a volume and depth of the breath during exercise.

ResultsPlus
Examiner Comments
Make sure that the response matches the question being asked.

Question 3 (a) (ii)

The majoity of candidates dealt effectively with ventilation rate in terms of the relationship between breathing rate and tidal volume.

Most candidates gained the mark but this example illustrates the most common incorrect response.



(ii) Explain how you would use breathing rate and tidal volume to calculate ventilation rate.

(1)

You would ~~times~~ divide breathing rate by tidal volume to get the ventilation rate.

ventilation rate = $\frac{\text{breathing rate}}{\text{tidal volume}}$

ResultsPlus
Examiner Comments
No mark awarded.

Question 3 (b) (i)

Many tackled this effectively with a nice variety of factors given such as fitness level.

An example showing one such alternative answer.

(b) An investigation was carried out to study the changes in oxygen uptake by the blood in the lungs after the first ten seconds of exercise.

Men with artificial pacemakers agreed to exercise with their heart rate controlled at 50 beats per minute. The ventilation rate and the oxygen uptake at rest were measured. These were also measured, after the first ten seconds of exercise and the differences recorded.

This was repeated with the heart rate controlled at 100 beats per minute.

The results are shown in the table below.

Heart rate / beats per minute	Increase in ventilation rate / $dm^3\ min^{-1}$	Increase in oxygen uptake by the blood / $cm^3\ min^{-1}$
50	4.3	87
100	3.9	190

(i) State **one** factor, other than heart rate, that could have affected the rate at which blood passed through the heart.

(1)

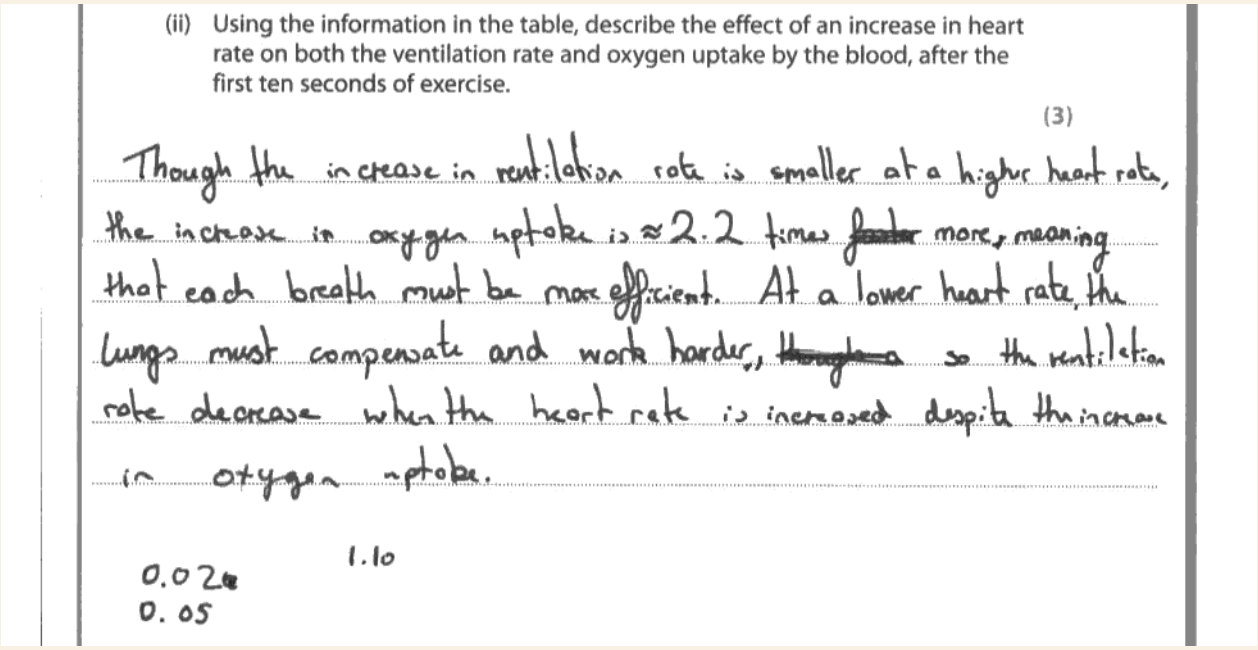
presence of caffeine or drugs

ResultsPlus
Examiner Comments
Mark awarded.

Question 3 (b) (ii)

It was encouraging to see a good number of candidates offering a correctly manipulated figure to support the description of the change in ventilation rate and oxygen uptake, when heart rate was higher after 10 seconds of exercise.

A good and complete answer.



(ii) Using the information in the table, describe the effect of an increase in heart rate on both the ventilation rate and oxygen uptake by the blood, after the first ten seconds of exercise.

(3)

Though the increase in ventilation rate is smaller at a higher heart rate, the increase in oxygen uptake is ≈2.2 times ~~faster~~ more, meaning that each breath must be more efficient. At a lower heart rate, the lungs must compensate and work harder, ~~though~~ so the ventilation rate decrease when the heart rate is increased despite the increase in oxygen uptake.

1.10

0.02
0.05

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Examiner Comments

Three marks awarded.
The candidate has correctly recognised that whilst the ventilation rate has increased at a pacemaker induced heart rate of 100 beats per minute, the increase is less than at 50 beats per minute. They have also referred to oxygen uptake increasing and manipulated the data correctly to offer a 2.2x increase in uptake.

ResultsPlus

Examiner Tip

Always consider offering a manipulated figure if being asked to describe numerical data.

This response illustrates the most common incorrect data interpretation - that of ventilation rate decreasing.

(ii) Using the information in the table, describe the effect of an increase in heart rate on both the ventilation rate and oxygen uptake by the blood, after the first ten seconds of exercise.

(3)

Increased heart rate causes a decrease in ventilation rate but an increase in oxygen uptake by the blood
When heart rate doubles the increase in oxygen uptake is more than double ($103\ cm^3\ min^{-1}$) but the decrease in ventilation rate is quite small ($0.4\ dm^3\ min^{-1}$)

ResultsPlus
Examiner Comments

The calculations done here are perhaps the most straight forward. However, they are fine and marking points 2 and 3 were achieved.

ResultsPlus
Examiner Tip

Be careful with general statements such as 'more than doubled' which would not have been awarded. The increase was times 2.18.

Question 3 (b) (iii)

It was very pleasing to see that a good majority of candidates had recognised that this question was requiring details of oxygen uptake in the context of an increased heart rate. Many fine and complete answers were offered.

Question 3 (b) (iv)

Candidates were able to consider the data and draw sensible conclusions.

This answer gives one such conclusion.

(iv) What conclusions could be drawn from the results of this investigation?

(2)

This investigation shows that at a higher heart rate, more ~~blood is taken~~ oxygen is taken up by blood. Also, uptake of oxygen in the lungs is dependant on blood arriving at the lung, heart rate.

ResultsPlus
Examiner Comments

Marking point 1 awarded.

Question 4 (b) (i)

Many candidates had an impressive grasp of this mechanism of habituation at the synapse and gave good accounts for this question.

A clear and logical answer.

(b) (i) Suggest how a repeated stimulus could result in less response from the gill.

(3)

because at the synapse, the calcium channels in presynaptic membrane become less responsive so, less calcium flows in and as a result less neurotransmitter released into synaptic cleft so they aren't as many to bind to receptors on post synaptic membrane so less action potentials sent to motor neurone in gill so less response from the gill.

ResultsPlus
Examiner Comments

Three marks gained.

Question 4 (b) (ii)

Candidates generally demonstrated a clear appreciation of the usefulness of habituation to the sea slug.
Whilst all marking points were seen, most candidates gained their marks from points 1 and 2.

The first sentence offers an example of the converse of marking point 2, whilst the second sentence was awarded marking point 1.

(ii) Suggest how this habituation may be of benefit to a sea slug.

(2)

Allows the slug to focus on important stimuli and ignore harmless stimuli. Saves energy as ~~the~~ there is less muscle contraction. Ensures greater uptake of oxygen through the gills.

ResultsPlus
Examiner Comments

Both marks awarded.

This response offers two alternative examples for marking point 1.

(ii) Suggest how this habituation may be of benefit to a sea slug.

(2)

It enables the sea slug to conserve energy, therefore enabling it to stay active. ~~write~~ This will enable it to survive when it is attacked by a predator.

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Examiner Comments
Only the first marking point awarded.

Question 5 (a)

The majority of candidates handled the extraction of data from the graphs well and gained both marks.

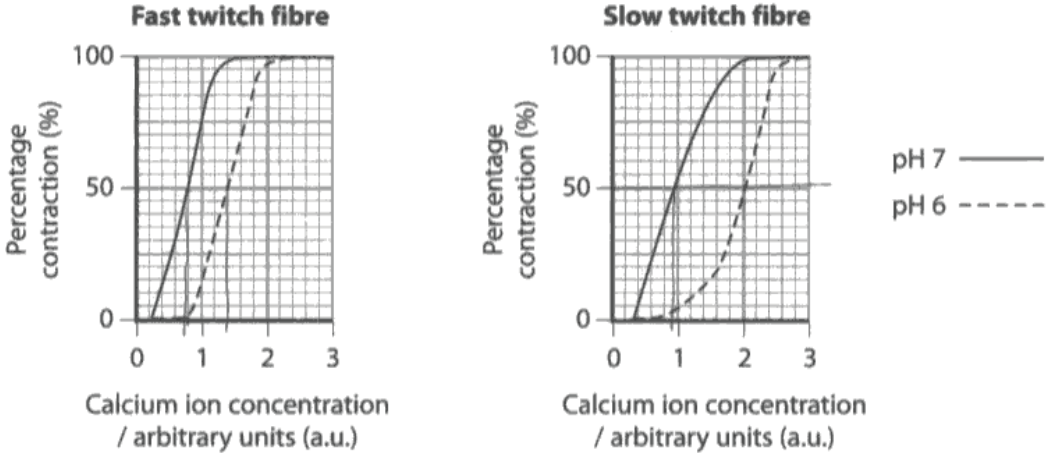
A minority of candidates did not achieve both marks as in this example.

5 An investigation was carried out into the effect of pH on the contraction of muscle fibres.

Single muscle fibres were used with their surrounding membranes removed. These fibres will contract when exposed to calcium ions in solution.

Isolated slow twitch and fast twitch fibres were tested at pH 7 and pH 6, in a range of calcium ion concentrations.

Results for both types of fibre are shown in the graphs below.



(a) The sensitivity of a muscle fibre is defined as the concentration of calcium ions required to cause 50% of full contraction.

Using the information in the graphs, complete the table below.

(2)

Type of fibre	Sensitivity		Change in sensitivity / a.u.
	Calcium ion concentration at pH 7 / a.u.	Calcium ion concentration at pH 6 / a.u.	
Fast twitch	0.8	1.4	0.6
Slow twitch	0.7	2	1.3

ResultsPlus
Examiner Comments

For many that did not score 2 marks, it was the second component that was not achieved.

ResultsPlus
Examiner Tip

When collecting data from a graph, the use of a rule can help reduce the chance of misreading a figure.

This response illustrates the most common set of answers.

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Single muscle fibres were used with their surrounding membranes removed. These fibres will contract when exposed to calcium ions in solution.

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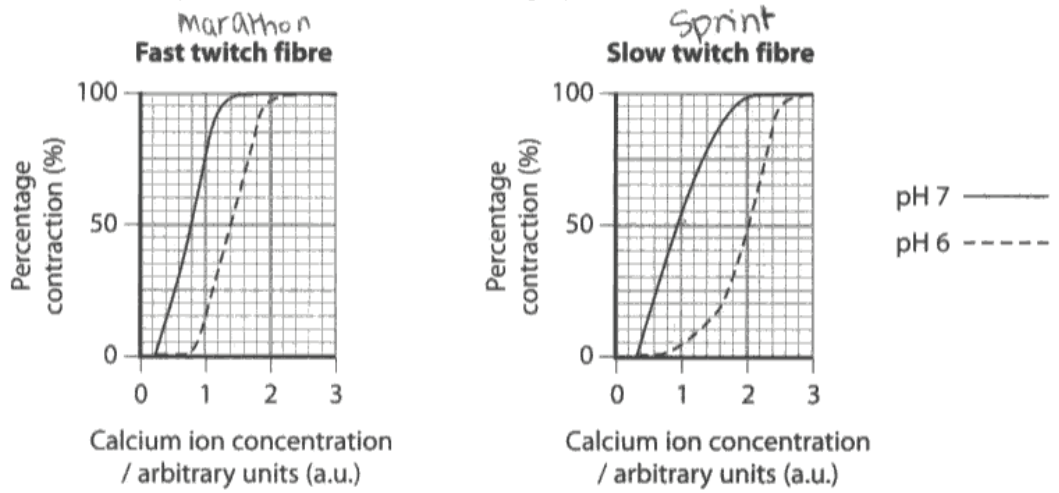

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Using the information in the graphs, complete the table below.

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Type of fibre	Sensitivity		Change in sensitivity / a.u.
	Calcium ion concentration at pH 7 / a.u.	Calcium ion concentration at pH 6 / a.u.	
Fast twitch	0.8	1.4	0.6
Slow twitch	0.9	2.0	1.1

ResultsPlus
Examiner Comments
Both marks awarded.

Question 5 (b)

A number of candidates gave full answers to this challenging question considering the effect of pH on slow and fast twitch fibres, but many did not offer a comparison as requested.

This example makes a comparison but has not linked the interaction of pH with the contraction of the fibres.

(b) Using the information in the graphs, compare the effect of pH on slow twitch and fast twitch fibres.

(2)

As pH increases the calcium ion concentration at both fibres decreased. In slow twitch the change was 0.6, while in slow twitch the change was 0.3

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Examiner Comments

No marking points were satisfied in this answer, hence no marks awarded. Repeating the data rarely elicits a mark.

Question 5 (c) (i)

Most candidates gained this mark and a number of thoughtful descriptions were offered.

This answer correctly offers anaerobic respiration which was the most common response.

(c) (i) Describe a circumstance that could cause a fall in pH in living muscle.

(1)

Increase in the rate of anaerobic respiration. ie lactic acid production.

ResultsPlus
Examiner Comments
Reference to lactic acid build up would have been an acceptable alternative.

Question 5 (c) (ii)

This suggest type of question allowed many candidates to effectively demonstrate their skill at working through a new biological situation.

This is a clear and considered answer displaying a good ability to apply knowledge to this novel situation.

(ii) Suggest how the different responses of these two types of fibre to pH may be related to their different functions in muscle.

(2)

fast twich fibres have to be less affected by lower pH as during anaerobic respiration lactic acid is produced which lowers muscle pH and so they have to be more resistant to these changes. slow twich however is used for aerobic respiration.

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Examiner Comments
This response achieved marking points 4 and 3.

ResultsPlus
Examiner Tip
For a question with a suggest command word, a novel circumstance or example may be used. However, such questions can be tackled by applying pre-exisiting knowledge.

Question 5 (d)

Many candidates appeared to have a thorough understanding of the sliding filament theory and produced detailed and accurate accounts.

This answer, like many, gained full marks by achieving marking points 1, 2 and 3.

(d) It is possible to replace the troponin in fast twitch fibres with troponin from slow twitch fibres. Fast twitch fibres that have been treated in this way have the same sensitivity as slow twitch fibres.

Use your knowledge of the sliding filament theory of muscle contraction to explain why this might have been predicted.

(3)

The theory tells us that troponin, when bonded to a Ca^+ ion, moves tropomyosin out of the actin-myosin binding area. The more reactive the troponin is to Ca^+ ions, the faster it will create the bonding place for the myosin head. This means that when slow twitch fibre troponin is put into fast twitch muscles, the troponin still reacts the same as in slow twitch. This gives the same reaction time as slow twitch therefore.

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Examiner Comments

The reference to actin-myosin binding area was accepted as an alternative to marking point 3. For marking point 4, it would need to be obvious that the myosin binding sites were located on actin.

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Examiner Tip

The sliding filament theory process is a sequential one and supplying answers written in a logical, systematic manner tended to cover all the necessary points.

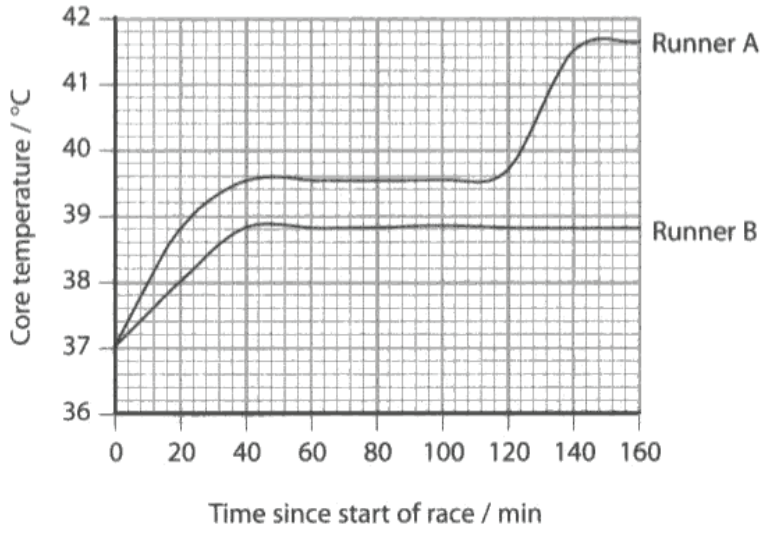
Question 6 (a)

Encouragingly, many candidates were able to make the biological link between the initial increase in core temperature of the runners as they tackled the first 30 minutes of a marathon.

This response gives a clear and considered suggestion for the initial rise in core temperature.

6 Marathon runners can have difficulty with thermoregulation over the course of a 26 mile race, particularly on a hot day. Two marathon runners, A and B, had their core temperatures recorded during a race.

The graph below shows the core temperatures recorded during the race.



(a) Suggest an explanation for the change in core temperatures of both runners in the first 30 minutes of the race.

(2)

There is a rapid increase in temperature for both runners in the first 30 minutes. This is because of an increase in respiration activity resulting in more product of water and heat.

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Examiner Comments

Both marks awarded. The first sentence repeated the data. However, the second sentence correctly identified that more respiration was occuring (marking point 1) and therefore more heat released (marking point 2).

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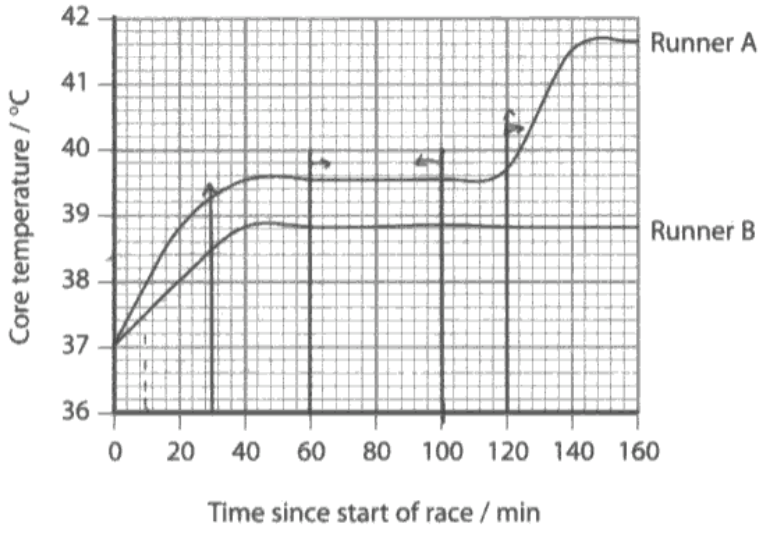
Examiner Tip

The candidate has used the word 'because' which is a good way of considering an explain question. The focus of such questions is usually how the biology explains the situation.

This answer was typical of a sizeable minority, as it repeated the data rather than focusing on the requirement to explain the core temperature change.

6 Marathon runners can have difficulty with thermoregulation over the course of a 26 mile race, particularly on a hot day. Two marathon runners, A and B, had their core temperatures recorded during a race.

The graph below shows the core temperatures recorded during the race.



(a) Suggest an explanation for the change in core temperatures of both runners in the first 30 minutes of the race.

(2)

In the first 30min RunnerA's core temperature increases from 37 to 39.2°C whereas RunnerB's core temp increases from 37°C to 38.4°C so RunnerA's core temp increases more. The body is warming up slowly due to exercise

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Examiner Comments
No marks awarded.

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Examiner Tip
Careful note should always be taken of the command words as this will dictate the approach of the answer. In this case it was a suggest an explanation type of question.

Question 6 (b)

Many candidates gave excellent accounts of thermoregulation, often covering the detection, coordination and responses such that many answers gained full marks.

This account is too general and does not really consider an explanation.

(b) Suggest an explanation for the constant core temperatures of both runners between 60 and 100 minutes of this race.

(5)

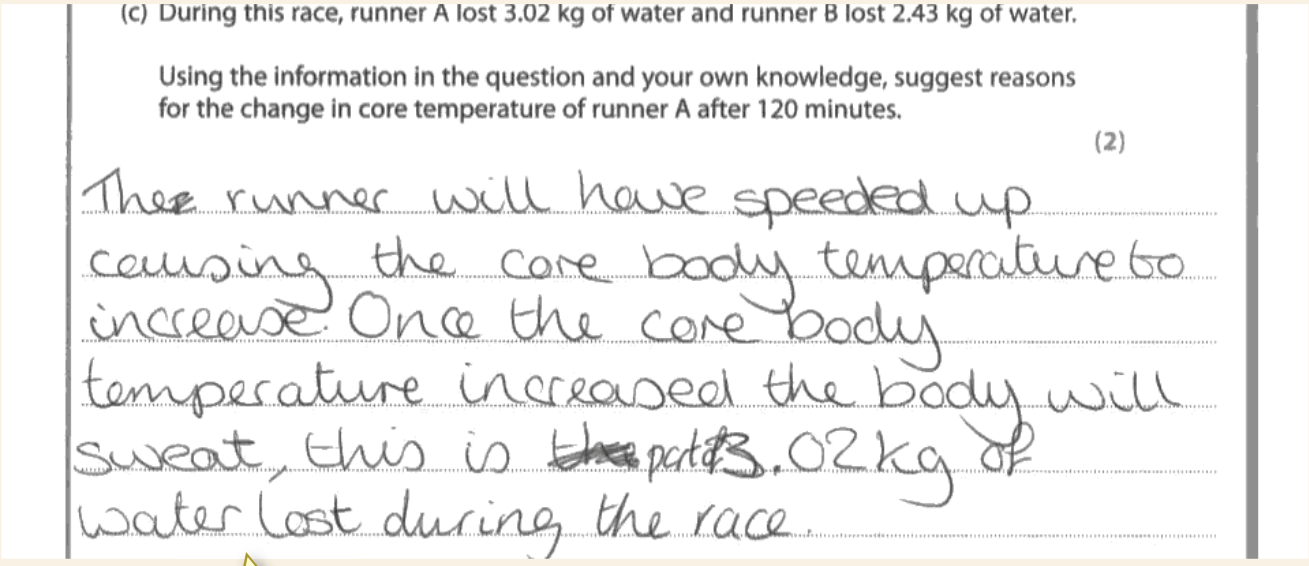
This is homeostatis, the body is at the same temperature as the outside. Body's functions are maintained and stable, ~~in~~ dynamic equilibrium. Means their core temperature is constant, they've found their equilibrium. However Runner A's equilibrium is at 39.5 °C whereas Runner B's is ~~at~~ around 0.4°C less.

ResultsPlus
Examiner Comments
No marks were awarded.

Question 6 (c)

Whilst this question was a challenging one concerning core temperature change and the level of water loss in the two runners, it was pleasing to see a number of candidates offering logical and reasonable suggestions. Two different approaches are illustrated below.

As this is a suggest question a variety of appropriate ideas can be considered. This response focused on increased pace.



(c) During this race, runner A lost 3.02 kg of water and runner B lost 2.43 kg of water.

Using the information in the question and your own knowledge, suggest reasons for the change in core temperature of runner A after 120 minutes.

(2)

Thee runner will have speeded up causing the core body temperature to increase. Once the core body temperature increased the body will sweat, this is ~~the~~ part of 3.02kg of water lost during the race.

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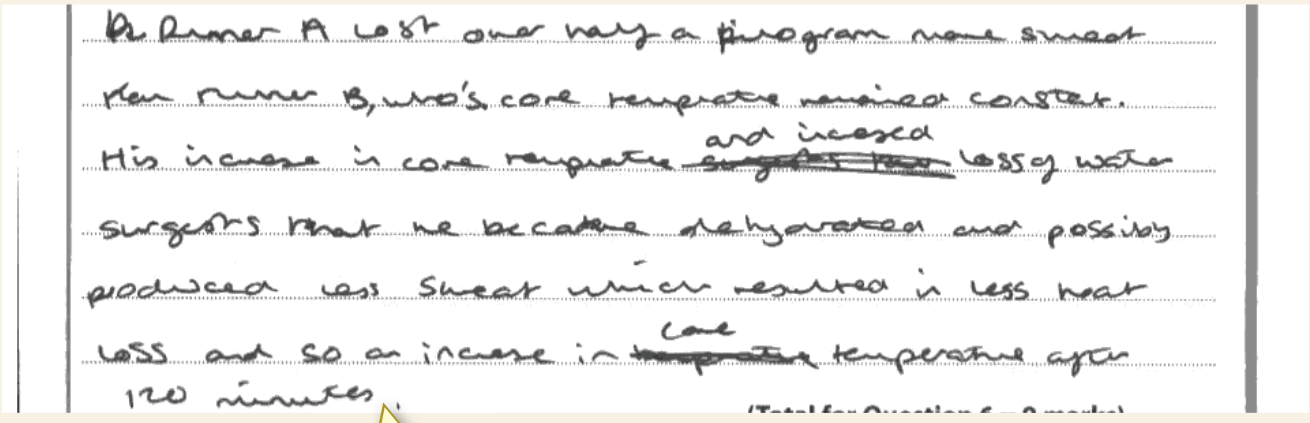
Examiner Comments

To gain more than marking point 5, this candidate would have needed to have expanded on why the core temperature increased and link this to the information given in the stem of the question.

A good response that considered the significance of the additional water loss and the heightened core temperature.



Runner A lost over half a litre more sweat than runner B, who's core temperature remained constant. His increase in core temperature and increased ~~surgeons~~ loss of water surgeons that he became dehydrated and possibly produced less sweat which resulted in less heat loss and so an increase in core temperature after 120 minutes.

ResultsPlus
Examiner Comments

A clear and logical initial explanation that subsequently led to marking points 1 and 2 being awarded.

Question 7 (a)

The question dealt with the activation/deactivation of a gene and proved to be challenging for many candidates. Most focused on the epo receptor.

Question 7 (b)

This question, which considered how the immune system may deal with adenovirus, was tackled well. Many candidates had an encouraging level of knowledge and understanding of this body defence mechanism.

This response supplied a general overview but did not offer sufficient detail to elicit full marks.

*(b) Describe how adenoviruses in the blood 'are recognised and destroyed by the immune system' (page 3, paragraph 4).

(5)

Adenoviruses are destroyed by the non-specific primary immune response. This involves phagocytes ~~excist~~ engulfing the pathogen ~~and~~ into its cytoplasm and destroying it in a process known as phagocytosis. White Blood Cells are also involved in this process, causing lysis of pathogens, who are recognised by the immune system due to the antigen proteins on their surface. B memory cells help with this process, delivering specific B effectors to help with agglutination.

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Examiner Comments
The candidate gained marking points 11 and 1.

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Examiner Tip
QWC can assess spelling of technical words. This is the case here with words such as antigen, antibody, interferon and phagocytosis being included.

Question 7 (c)

Many tackled this suggest question effectively, offering cell death as the most common correct option for the injection of genes not having a permanent effect.

Question 7 (d)

This question illustrated that many candidates had a good understanding of this aspect.

A response that gave a clear and precise account of the association between high blood pressure and atherosclerosis.

(d) 'Sludge blood' (page 4, paragraph 1) can lead to high blood pressure and atherosclerosis.

Explain the connection between high blood pressure and atherosclerosis.

(3)

Increase in blood pressure causes damage to the endothelia walls of coronary artery this cause blood clot to form and eventually calcium carbonate compound and cholesterol collect at this point forming a plague

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Examiner Comments

This candidate has considered how high blood pressure can lead to atherosclerosis and gained marking points 2, 1 and 4.

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Examiner Tip

The subject matter relates to 6BI01. Make sure you are familiar with AS material for the synoptic elements of the A2 papers.

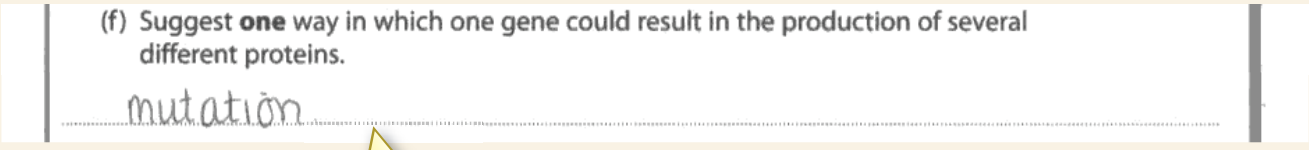
Question 7 (e)

Few candidates found difficulty with this question.

Question 7 (f)

This question about one gene leading to the production of several different proteins was generally tackled well by most candidates. For those that did not, it was overwhelmingly due to insufficient detail rather than a lack of understanding.

This response was the most commonly sited correct response.


(f) Suggest **one** way in which one gene could result in the production of several different proteins.

mutation

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Examiner Comments
The second most popular correct answer was post transcriptional modification of RNA.

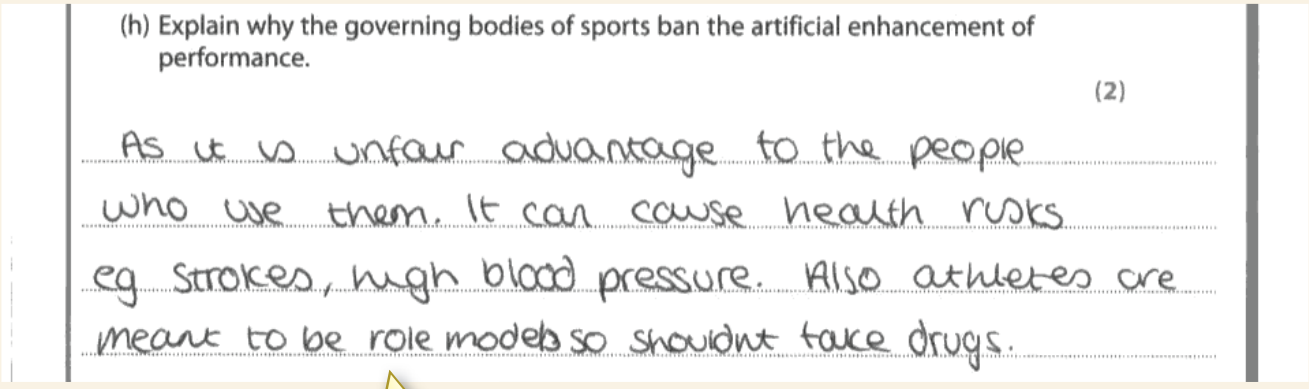
Question 7 (g)

The majority of candidates were able to correctly access three ways to artificially enhance performance from the article. Those that did not achieve all three marks tended to be too general in their answer.

Question 7 (h)

Most candidates appreciated why sports governing bodies have banned artificial enhancement of performance.

This answer adequately describes the unfair advantage and health risks.


(h) Explain why the governing bodies of sports ban the artificial enhancement of performance.

(2)

As it is unfair advantage to the people who use them. It can cause health risks eg strokes, high blood pressure. Also athletes are meant to be role models so shouldnt take drugs.

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Examiner Comments
Both marks awarded.

Question 7 (i)

A number of candidates found it hard to elicit the marks for this item. Many gave general accounts of the structure of a protein rather than how it can be broken down.

Question 7 (j)

Generally candidates were able to explain that repolarisation was the return to the resting potential (or to approximately -70mV). However, it was common to see incorrect descriptions of the movement of ions or the roles of the channel proteins and sodium-potassium pump.

This clear and precise answer gained both marks.

(j) Explain what is meant by repolarisation of a cardiac muscle cell or a nerve cell.

(2)

Repolarisation is when the potential difference is restored from +30mV to the resting potential of -70mV. To do this, sodium ion channels are closed, and potassium channels opened, allowing diffusion of K^+ ions.

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Examiner Comments
The marks were given for marking points 3 and 1.

Question 7 (k)

Candidates generally recognised why cells have mitochondria, but often did not consider why muscle cells in particular.

A nice, complete answer worthy of both marks.

(k) Suggest why large numbers of mitochondria are found in muscle cells.

(2)

Large numbers of mitochondria in muscle cells are used to produce ATP energy through aerobic respiration therefore especially in slow twitch muscles plenty of ATP is available for long slow exercise.

ResultsPlus
Examiner Comments
The marks were given for marking points 1 and 2.

Question 7 (l)

This question elicited the full range of marks but many candidates were able to gain two or more marks. They had to draw information from the article.

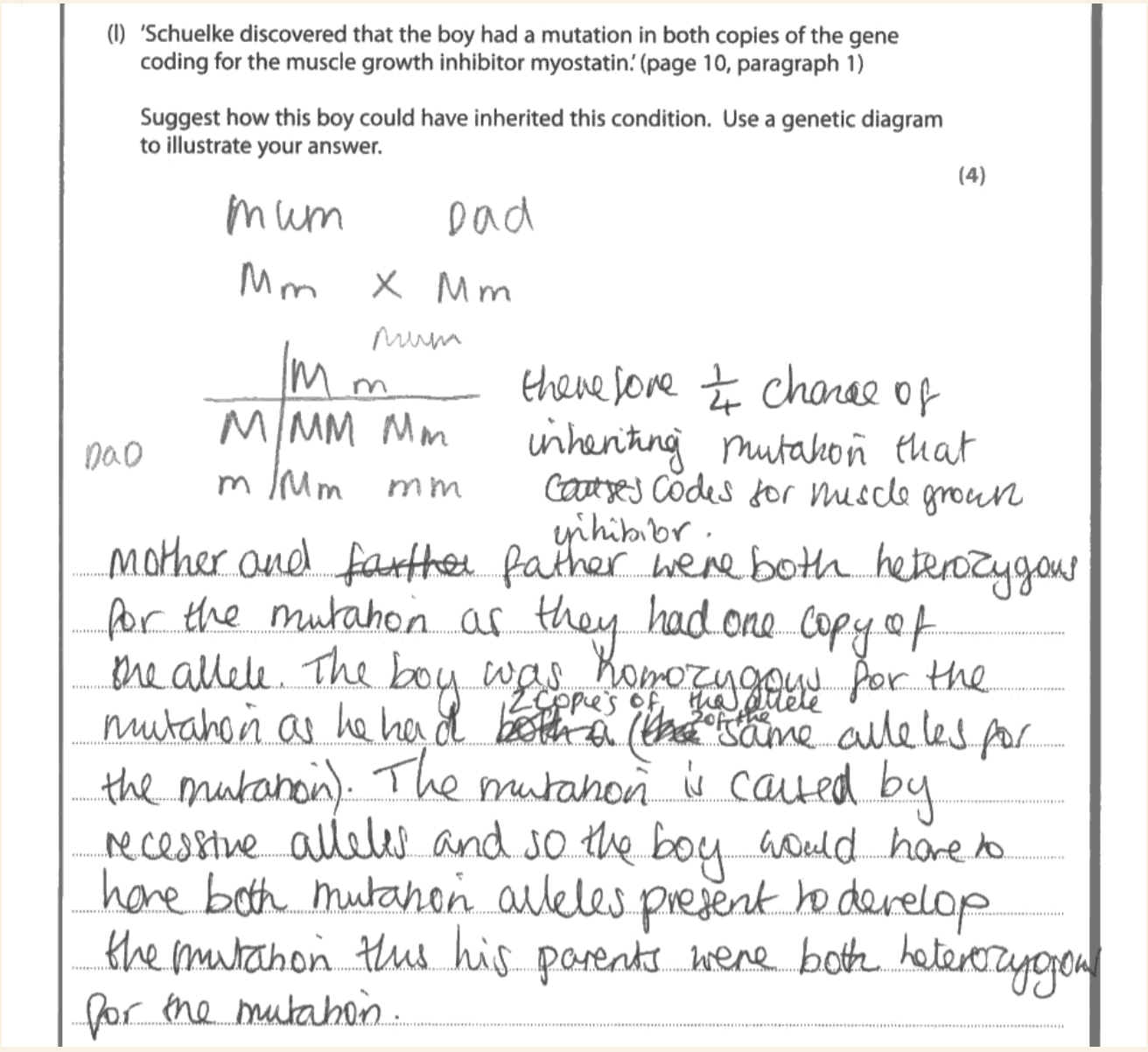
In a number of cases candidates freely and incorrectly interchanged genes and alleles.

This was a good and clear answer using a Punnett square.

(l) 'Schuelke discovered that the boy had a mutation in both copies of the gene coding for the muscle growth inhibitor myostatin.' (page 10, paragraph 1)

Suggest how this boy could have inherited this condition. Use a genetic diagram to illustrate your answer.

(4)



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Examiner Comments
Both parental genotypes are given in the diagram, but are also offered in the text. The gametes can be awarded from the Punnett square. The text correctly states that the boy is homozygous, hence all four marks awarded.

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Examiner Tip
When producing genetic crosses such as this, include parental genotypes.

Paper Summary

The paper was wide-ranging in terms of skills being tested, 6BI05 content and diversity within the question relating to the scientific article. It delivered a good spread of marks both within each question and across the paper as a whole.

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