L3 Lead Examiner Report 1901

January 2019

L3 Qualification in Sport and Exercise Science

Unit 1: Sport and Exercise Physiology (31813H)

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Grade Boundaries

What is a grade boundary?

A grade boundary is where we set the level of achievement required to obtain a certain grade for the externally assessed unit. We set grade boundaries for each grade, at Distinction, Merit and Pass.

Setting grade boundaries

When we set grade boundaries, we look at the performance of every learner who took the external assessment. When we can see the full picture of performance, our experts are then able to decide where best to place the grade boundaries – this means that they decide what the lowest possible mark is for a particular grade.

When our experts set the grade boundaries, they make sure that learners receive grades which reflect their ability. Awarding grade boundaries is conducted to ensure learners achieve the grade they deserve to achieve, irrespective of variation in the external assessment.

Variations in external assessments

Each external assessment we set asks different questions and may assess different parts of the unit content outlined in the specification. It would be unfair to learners if we set the same grade boundaries for each assessment, because then it would not take accessibility into account.

Grade boundaries for this, and all other papers, are on the website via this link:

http://qualifications.pearson.com/en/support/support-topics/results-certification/grade-boundaries.html

31813H – Unit 1: Sport and Exercise Physiology (31813H)

Grade	Unclassified	Level 3			
		N	P	M	D
Boundary Mark	0	14	25	36	48

Introduction

The format of this assessment followed that of previous test series. As previously, the paper was split into four questions. Each question was based on a sport or exercise scenario and required learners to demonstrate knowledge and understanding of a range of specification topics and apply this knowledge to the specific question scenario. Three questions were marked out of 18 marks, and one out of 16 marks, 8 marks being awarded for the final part of each question where an extended response was required.

Each of the extended response questions were marked using a 'levels based' approach to assessment where the overall quality of the response was considered rather than the specific number of facts stated, although this obviously had a bearing on the quality of the response. The remainder of the questions on the paper were assessed using a traditional point-based approach, where a mark was given for each appropriate point. More detail can be found below in the individual question section of the report.

Four extended response questions make this a potentially challenging assessment for learners, but centres and learners should be congratulated on their preparation for this assessment. Overall learners appeared well prepared and well versed on many of the specification topics covered in this assessment.

Introduction to the Overall Performance of the Unit

Learner performance varied throughout the paper. Whilst the extended response questions were challenging most learners gained some marks for these questions. The style of the assessment is challenging due to the depth and breadth of knowledge required to fully address the demands of the paper. The extended response questions account for 45% of the paper, each question demanding depth of knowledge, but across the paper this also requires breadth as each of these questions examines different areas of the specification.

The assessment is also challenging due to the need to apply knowledge not only in the extended response questions but also the 'points-based' questions, for example, Q02b; Q03b and Q04a. There are limited instances within each question were only recall of knowledge is required, for example, Q01a; Q03a and Q04bi, again, raising the demand on the learner.

Individual Questions

The following section considers each question on the paper, providing examples of popular learner responses and a brief commentary of why the responses gained the marks they did. This section should be considered with the live external assessment and corresponding mark scheme.

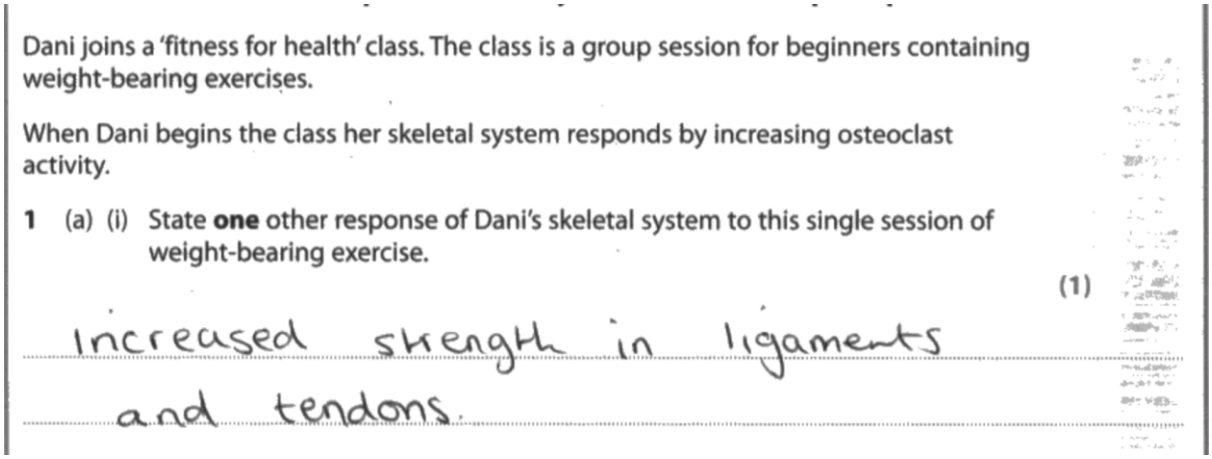
Q 01(a) (i)

The first question is in the context of a beginner joining a weight-bearing exercise class. Learners are told that the exercise class causes an increase in osteoclast activity. They are then asked to state one other response of the skeletal system to a single weight-bearing exercise session.

It is clearly important that learners understand the different terminology used in the specification as this terminology will be used in the examination. In this case it is important learners know the difference between adaptations and responses to training on a body system.

The majority of learners did gain the available mark by stating an appropriate response, those that did not tended to give an adaptation to the skeletal system instead.

This response gained 0 marks



Dani joins a 'fitness for health' class. The class is a group session for beginners containing weight-bearing exercises.

When Dani begins the class her skeletal system responds by increasing osteoclast activity.

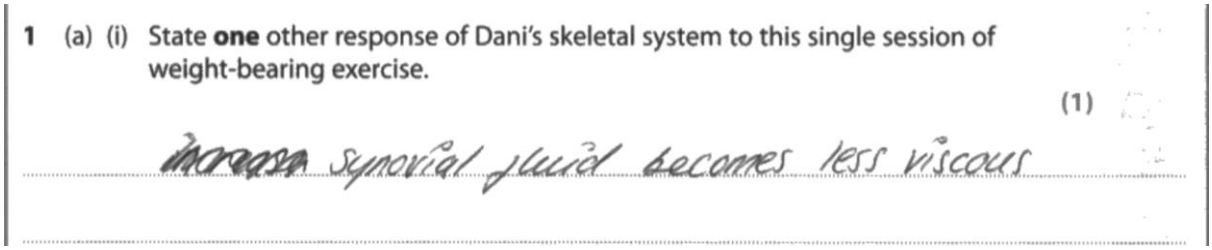
1 (a) (i) State **one** other response of Dani's skeletal system to this single session of weight-bearing exercise.

(1)

Increased strength in ligaments and tendons.

No mark was awarded as the learner stated an adaptation rather than a response to weight-bearing exercise.

This response gained 1 mark


1 (a) (i) State **one** other response of Dani's skeletal system to this single session of weight-bearing exercise.

(1)

increase synovial fluid becomes less viscous

Q 01 (a) (ii)

The second part of the question asked learners to state the role of three different bone cells during the process of bone remodelling. Learners were given the name of the bone cells they needed to provide the role for.

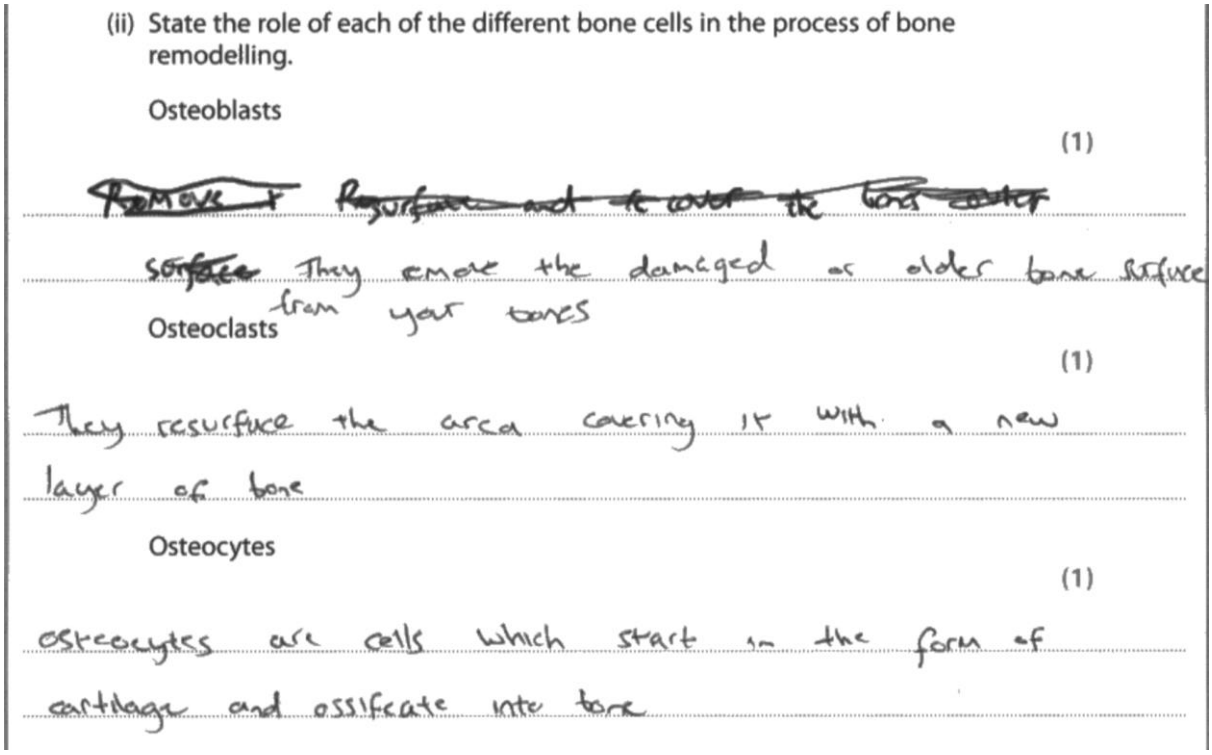
The three bone cell types were:

- Osteoblasts
- Osteoclasts
- Osteocytes

Many learners were able to correctly identify the role of osteoblasts to build bone and osteoclasts to clear away or destroy old bone, but experienced greater difficulty giving a clear role for osteocytes. Those not achieving two marks tended to switch the role of osteoblasts and osteoclasts.

To gain the third mark it had to be clear that osteocytes had a different role to the other bone cells. Simply stating that they helped produce new bone was insufficient as this did not differentiate between osteocytes and osteoblasts, more detail of the role was required, for example, that they helped direct where bone remodelling should be targeted.

This response gained 0 marks



(ii) State the role of each of the different bone cells in the process of bone remodelling.

Osteoblasts

(1)

~~Remove~~ ~~Resurface and it cover the bone cover~~

~~Surface~~ They remove the damaged or older bone surface from your bones

Osteoclasts

(1)

They resurface the area covering it with a new layer of bone

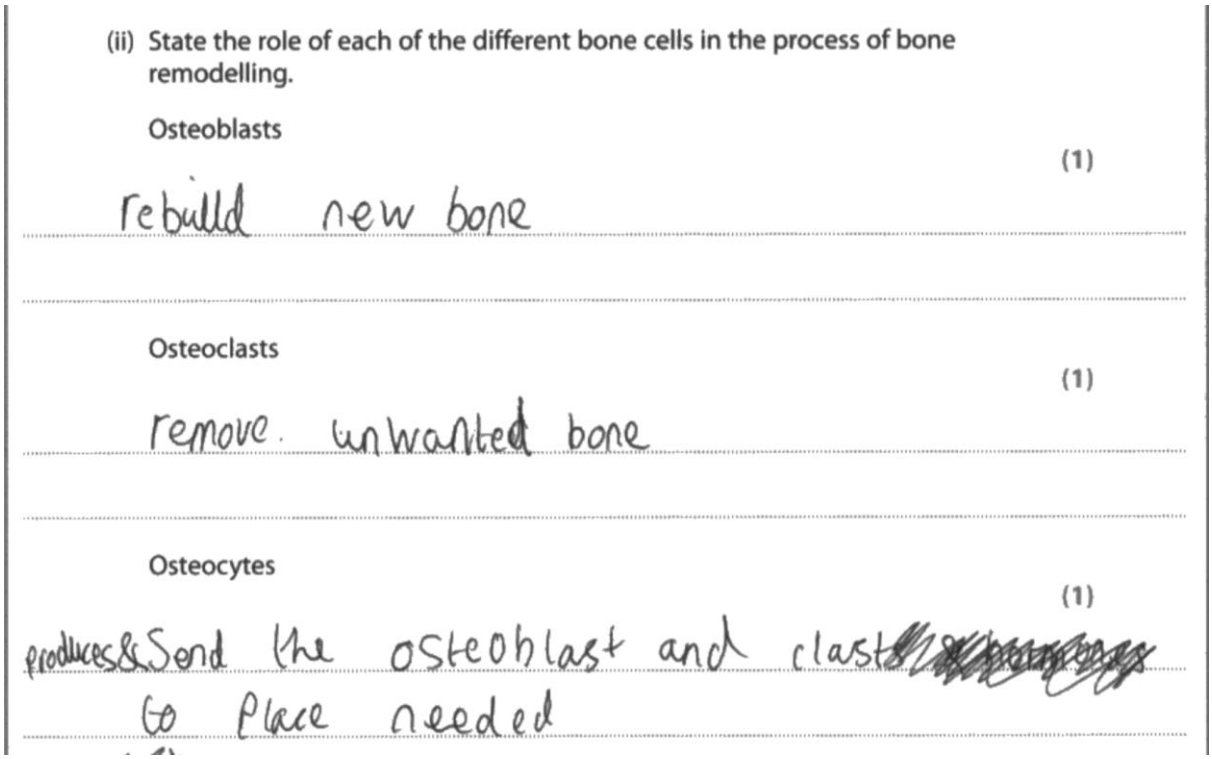
Osteocytes

(1)

osteocytes are cells which start in the form of cartilage and ossificate into bone

The learner has confused the role of osteoblasts and osteoclasts. The response for osteocytes is too vague for a mark to be awarded.

This response gained 3 marks



(ii) State the role of each of the different bone cells in the process of bone remodelling.

Osteoblasts

(1)

rebuild new bone

Osteoclasts

(1)

remove unwanted bone

Osteocytes

(1)

produces & send the osteoblast and clast[illegible] to place needed

Osteocytes are credited as the response conveys the idea that they direct where bone remodelling occurs. The role of the other two bone cells is also correctly stated.

Q 01(b) (i)

It is important that learners read all the information provided in the question, including the general text or stem immediately above the question, as this gives more context on which to base a response. The context for this part of the question was still within the exercise session but the focus is moved to blood flow to the working muscles.

Learners are asked to state two reasons why blood flow increases to the working muscles during exercise. If asked for two reasons it is important that these reasons are sufficiently different, for example, reference to redistribution of blood flow or a description of it would be considered the same reason.

The anticipated responses to this question, and the most popular correct responses related to increased oxygen demand and increased need for removal of waste products. Other correct responses included delivery of nutrients, increased heart rate or redistribution of blood flow, all of which are relevant reasons to increase blood flow to the working muscles. The majority of learners gained two marks for this question, those that did not either gave no response or tried to link to adrenaline and the anticipatory rise prior to the exercise session rather than focus on what was happening during it. Some learners incorrectly made reference to muscle temperature.

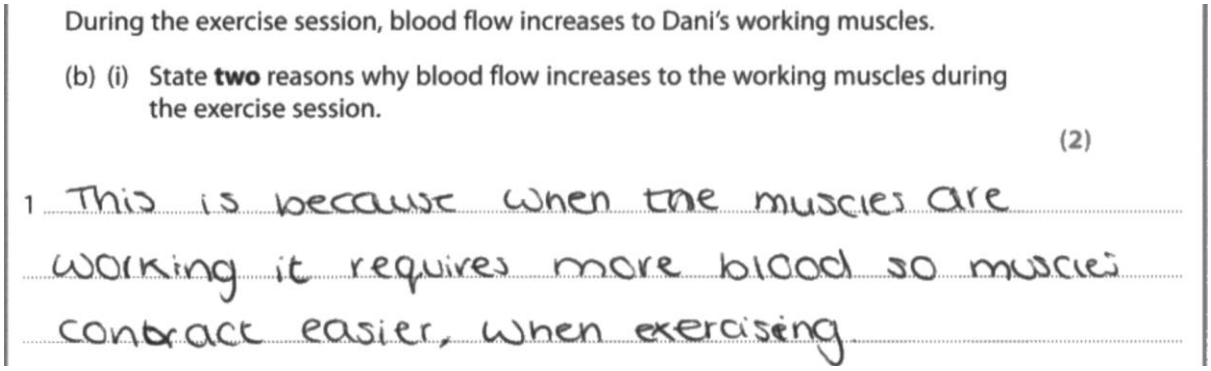
This response gained 0 marks


(2)

1 As they need more blood compared to the non working muscles

The learner does not tell us why there is a need for increased blood flow, ie why they need more blood, therefore no mark is awarded.

This response gained 0 marks


During the exercise session, blood flow increases to Dani's working muscles.

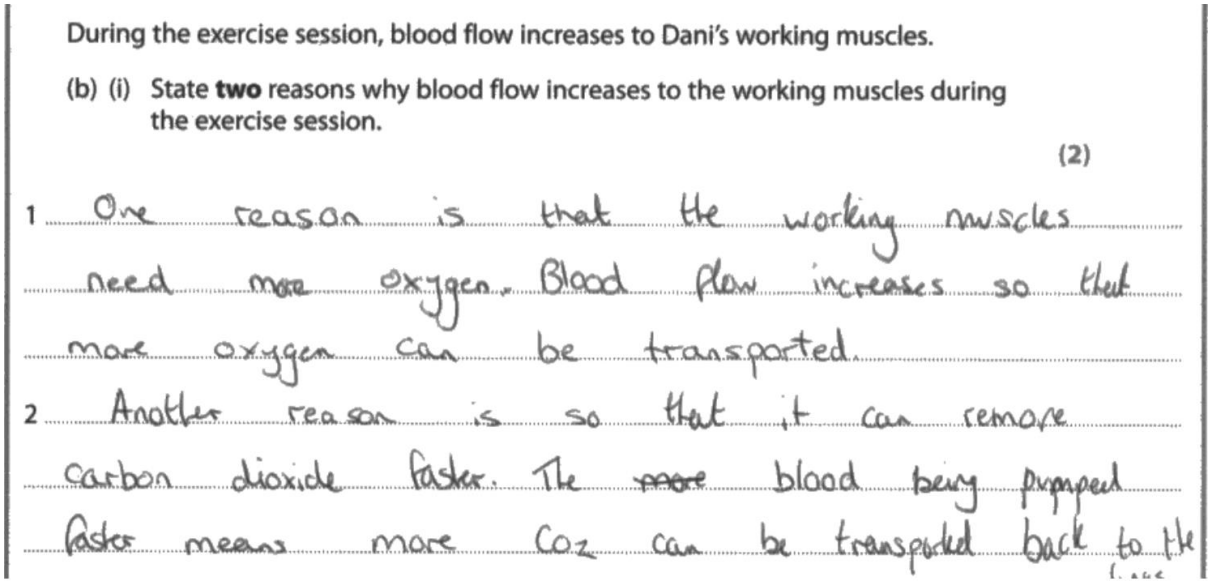
(b) (i) State **two** reasons why blood flow increases to the working muscles during the exercise session.

(2)

1 This is because when the muscles are working it requires more blood so muscles contract easier, when exercising

Although the learner attempts to tell us why more blood is needed the reason is vague 'so muscles contract easier' therefore no mark was awarded.

This response gained 2 marks


During the exercise session, blood flow increases to Dani's working muscles.

(b) (i) State **two** reasons why blood flow increases to the working muscles during the exercise session.

(2)

1 One reason is that the working muscles need more oxygen. Blood flow increases so that more oxygen can be transported.

2 Another reason is so that it can remove carbon dioxide faster. The ~~more~~ blood being pumped faster means more CO_2 can be transported back to the

Two reasons are correctly given, the need for more oxygen and the need for removal of carbon dioxide.

Q 01 (b) (ii)

This part of the question develops from the previous part, asking learners to describe how blood flow to the working muscles is increased.

The expected, and most popular response to this was through a description of the process of vasodilation. Descriptions varied, some focusing on vasodilation whilst others looked at the whole of redistribution, making reference to vasoconstriction

as well. Provided it was clear from the response how blood flow increased marks were awarded.

Incorrect responses occasionally focused on the role of chemoreceptors and changes in pH but did not then link this to an increase in heart rate.

This response gained 1 mark

(ii) Describe how blood flow to Dani's working muscles increases.

(2)

As you start exercising, the heart rate increases which pumps faster to increase the amount of blood passing through the body at one time

One mark is awarded for appreciation that an increase in heart rate will increase blood flow.

This response gained 2 marks

(ii) Describe how blood flow to Dani's working muscles increases.

(2)

The redistribution of Dani's blood to his working muscles is performed via the vesscular Shunt. This includes vasodicilution and vasoconstrichen. The blood vessels of the working muscles dilate to allow more blood to flow through whereas the blood vessels for the non-working muscles constrict to reduce blood flow.

The learner provides a very clear and full description, in excess of that required for 2 marks.

Q 01 (c)

This was the first of four extended response questions on the paper.

This question asked learners to analyse how the respiratory and nervous systems work together to change breathing rate when working at different intensities in an exercise class.

It is important that learners fully address a question to allow access to the highest level of marks.

Responses to extended answer questions are marked using levels-based mark schemes; the quality of the response determining the level. There are four levels; level 0 where there is no rewardable material presented and then levels 1, 2, 3; the higher the level the better the quality of the response.

To address this question, learners needed to demonstrate knowledge and understanding of the two systems and be able to expand on the specific role of each system in controlling breathing rate. Learners also needed to give some context within their response, ie apply their knowledge to the question scenario.

The mark scheme for levels-based responses consists of two parts. The first part, the indicative content, has suggestions of the types of things learners are saying in their responses that would gain credit, contributing to the overall mark. Note how the indicative content is split and how the example content in one section becomes more developed or demanding in the next. This is known as indicative content as learners can gain credit for other correct content.

The second part of the mark scheme provides the levels descriptors, the quality of the response, ie what determines the final mark for the question.

Many learners were able to make some general points about the effects of the exercise session on breathing rate, oxygen demand and carbon dioxide levels. Responses based solely on these types of general points were placed at level 1. Some learners were able to give a good account of chemical control of breathing rate and even linked this to the changes of intensity during the exercise session, this type of response often achieved level 2. To achieve level 3 both body systems needed to be included in the response and also some application to the question context was required. The majority of candidates gained 3 or more marks for this question.

This response was placed at level 1: and awarded 3 marks

This response was placed at level 1 as it only made reference to knowledge points, there was limited analysis, just a demonstration of isolated elements of knowledge.

(c) Analyse how the respiratory system and the nervous system work together to change Dani's breathing rate during the different intensities of her exercise class.

(8)

The respiratory System and nervous system work together to increase Dani's breathing rate. The nervous System involves the brain, spinal cord and ~~lungs~~ heart. The nervous System is the messenger for the respiratory system, this is through neurotransmitters. The respiratory system then works together to get Dani a sustainable amount of Oxygen in and Carbon dioxide out.

During high intensity exercise Dani will have an increase in her breathing rate due to the high demand of Oxygen needed for her working muscles. Also to get rid of the waste product Carbon dioxide. The medulla oblongata in the brain will detect a change in Dani's breathing rate therefore telling the respiratory System through neurotransmitters to increase Dani's breathing rate. In high intensity exercise their is a higher demand than in lower intensity exercise as your body is working harder therefore needing more energy, so quicker rate of inhalation (O_2) and exhalation (Co_2) is much needed.

During low intensity exercise Dani will notice a

decrease in her breathing rate as her body isn't working as hard, therefore not needing as much O_2 in and CO_2 out. The medulla oblongata will detect a change and send an impulse to decrease breathing rate as there is a less demand for O_2 in and CO_2 out.

Content within the response that contributes to overall mark:

- Paragraph 2 - knowledge and understanding points about:
  - increased breathing rate;
  - removal of CO2.

  NB no credit is given for 'sustainable amount of oxygen'
- Paragraph 2/3 - knowledge and understanding point about:
  - high demand for oxygen

  NB no credit is given for 'medulla oblongata detects change in breathing rate' due to vagueness of this part of the response

This response was placed at level 2: and awarded 6 marks

During Dani's exercise class she performs repeated bursts of high intensity activity separated by intervals of lower intensity activity.

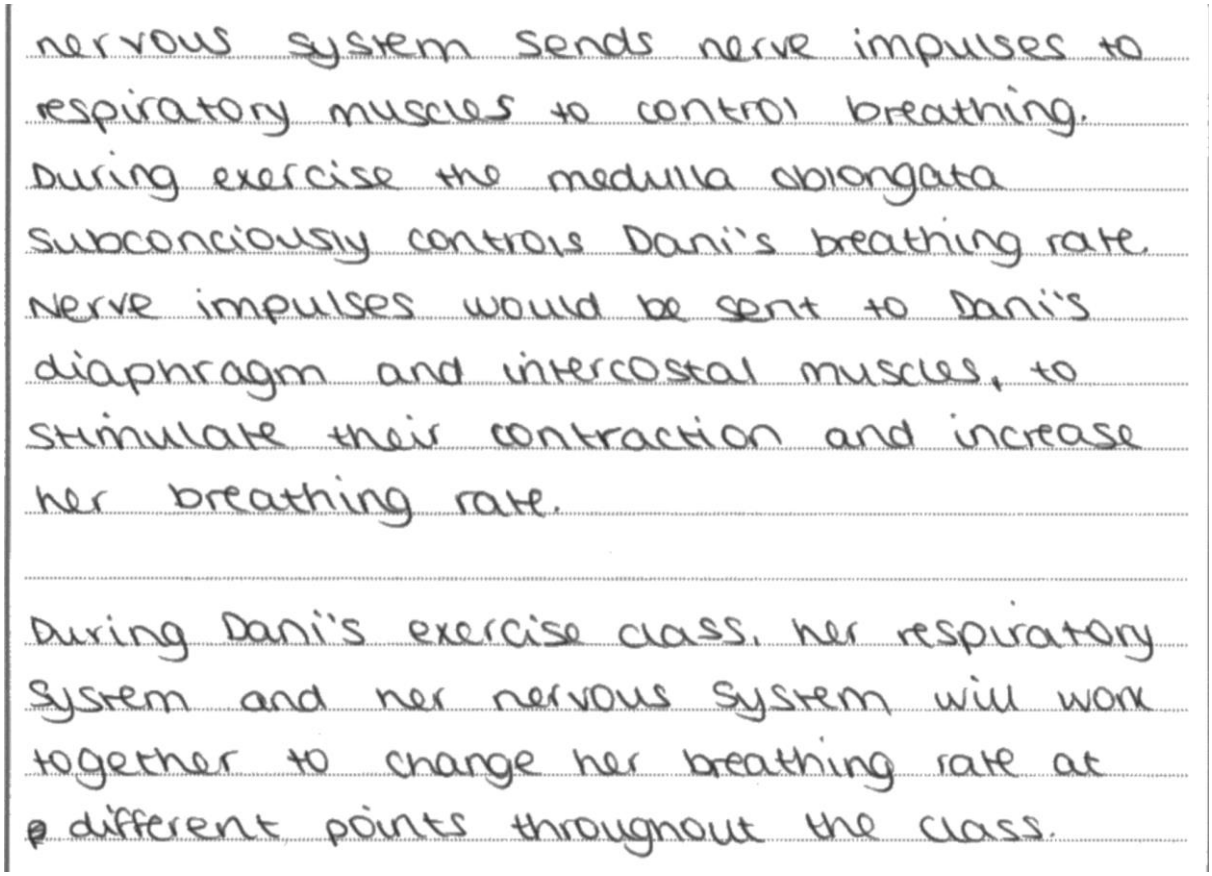
(c) Analyse how the respiratory system and the nervous system work together to change Dani's breathing rate during the different intensities of her exercise class.

(8)

The respiratory system and the nervous system change Dani's breathing rate during different intensities within her class.

The respiratory system ~~EOA~~ changes Dani's breathing rate during her class to keep up with the increased oxygen demands of her working muscles. Her respiratory system will increase her breathing rate during periods of high intensity, not only to meet the increased oxygen demands but also to remove the carbon dioxide that would be building up in her body, to prevent ~~it~~ it causing fatigue. The respiratory system would need to change her breathing rate because if the increased oxygen demands aren't met, there will be a build up of carbon dioxide within the blood, causing the blood pH level to decrease.

The nervous system also changes Dani's breathing rate during her exercise class. The


nervous system sends nerve impulses to respiratory muscles to control breathing. During exercise the medulla oblongata subconciously controls Dani's breathing rate. Nerve impulses would be sent to Dani's diaphragm and intercostal muscles, to stimulate their contraction and increase her breathing rate.

During Dani's exercise class, her respiratory system and her nervous system will work together to change her breathing rate at different points throughout the class.

The response demonstrates knowledge and understanding of the two body systems and develops knowledge points made by linking the factors that control breathing rate. The reason this response is not placed at level three is due to insufficient application to the question context, ie how these factors change based on the intensity of the class.

Content within the response that contributes to the overall mark:

- Pg1 - knowledge and understanding points about: increased oxygen demand; increased breathing rate during high intensity; removal of CO2 and decrease in blood pH
- Pg 2 - knowledge and understanding points about: nervous system sends nerve impulses to control breathing; the medulla oblongata controls breathing rate
- Pg 2 - Linked factor: nerve impulses sent to diaphragm and intercostal muscles to stimulate contraction to increase breathing rate

Therefore, the response demonstrates knowledge and understanding and some linkage, to provide partial analysis. Without application the response is not considered to provide a sustained, developed and logical analysis.

This response was placed at level 3 – 7 marks

There is clearly a very good knowledge and understanding of how the two systems work together. The whole response is written in relation to exercise, the implication being that during more intense exercise there would be more waste materials to 'neutralise'. The one short fall of this response is in the final paragraph where the learner could have really spelled out the difference during high and low intensity, ie how everything speeds up at higher intensity to extract even more waste products, or how that even at lower intensity breathing rate would need to remain elevated (and why). Despite this there is sufficient context to be placed at level 3.

(c) Analyse how the respiratory system and the nervous system work together to change Dani's breathing rate during the different intensities of her exercise class.

(8)

~~different when~~

Waste product levels depend on the intensity of the exercise and work put on the body. During Dani's exercise, her breathing rate rises to neutralise the waste products, such as CO_2 and lactate, in her blood stream. Chemoreceptors ~~sense~~ sense a decrease in her blood pH due to the waste products making it more acidic. This causes the nervous system to react. ~~As her breathing rate~~ As the blood acidity rises, chemoreceptors send an ~~electronic~~ electronic impulse to the ~~brain~~ Medulla Oblongata, located in the brain. ~~The~~ Once the Medulla Oblongata has recieved the impulse, it sends an impulse down to Dani's respiratory system. The impulse is send to the diaphram, a muscle tissue underlying the lungs. As well as, ~~a signal is~~ an impulse is also send to the intercostal muscles, surrounding the lungs. This impulse from the

Medulla Oblongata, forces them to contract faster and harder to allow the lungs to contract and relax much faster and harder. This increases the rate of diffusion in the blood, removing the waste product within the blood. CO_2 would be diffused out of the blood and exchanged with air and O_2 much faster, overall neutralising the blood acidity.

This entire reaction involving the ~~respiratory~~ respiratory ~~sty~~ system and the nervous system speed up or slow down depending on ~~Dani~~ what exercise intensity Dani is performing at.

Q 02(a) (i)

This question asked learners to explain one way the muscular system would adapt to aerobic training.

There are three key words, other than the command word, for learners to consider:

- the first is 'adapt', so the question is asking about long-term training effects;
- the second is 'aerobic training', therefore discounting all anaerobic adaptations and
- the third is 'muscular system' therefore discounting any adaptations to other body systems.

A large percentage of learners gaining at least one mark for this question, tailoring their response to focus specifically on the muscular system and adaptations as a result of aerobic training. Popular correct responses included increased muscular endurance and capillarisation (although a CV adaptation, as it also occurs in the muscles this was credited).

Popular incorrect responses tended to be anaerobic adaptations, eg increased tolerance to lactic acid or increased muscle strength. In addition, some learners made reference to responses of the muscular system to exercise, eg muscle fatigue rather than adaptations.

This response gained 0 marks

Explain **one** way that Adam's muscular system would adapt to each type of training.

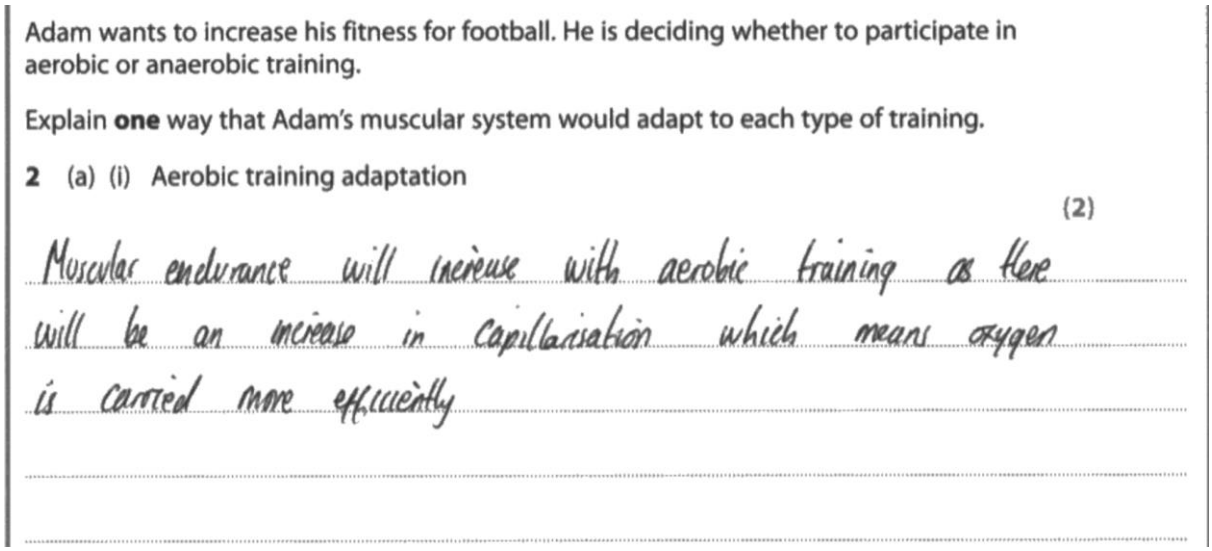
2 (a) (i) Aerobic training adaptation

(2)

Adam will benefit from ~~decreases~~ cardiac hypertrophy. This means the heart gets stronger resulting in a decreased heart rate. This allows Adam to use more oxygen and inspire more oxygen as a result of an increased VO2 max. Therefore improving his performance by allowing him to train for a longer time

The learner identifies an adaptation to the cardiovascular system rather than the muscular system.

This response gained 2 marks



Adam wants to increase his fitness for football. He is deciding whether to participate in aerobic or anaerobic training.

Explain **one** way that Adam's muscular system would adapt to each type of training.

2 (a) (i) Aerobic training adaptation

(2)

Muscular endurance will increase with aerobic training as there will be an increase in capillarisation which means oxygen is carried more efficiently

Marks were awarded for correctly stating that muscular endurance would improve and for explaining the reason for this, ie capillarisation increasing oxygen delivery. Any appropriate adaptation to the muscular system could be linked to increased muscular endurance.

Q 02 (a) (ii)

The second part to Q02a asks about anaerobic, rather than aerobic, training adaptations to the muscular system.

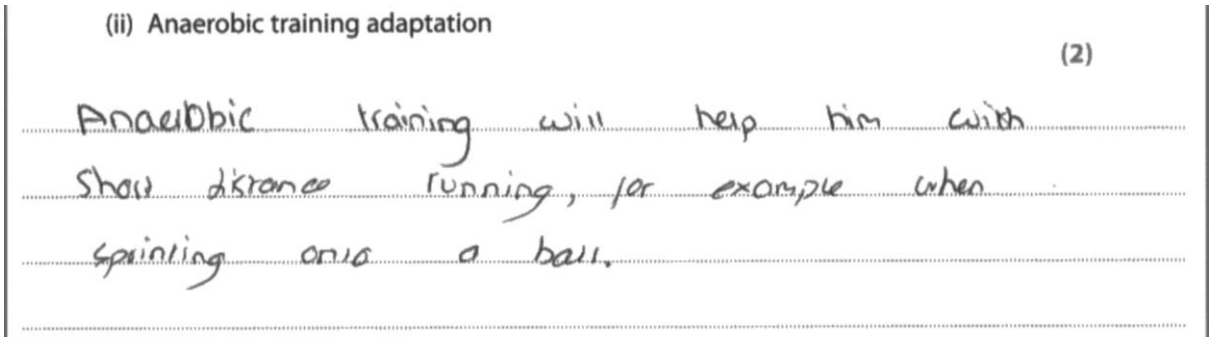
The demand of the question should have been identical to Q02a(i) although learners appeared to know more about anaerobic adaptions to the muscular system than aerobic, with a greater percentage of learners achieving both marks for this question and part (a) (i).

Popular correct responses referenced increased power or strength of the muscle as a result of increased muscle size.

A minority of learners focused on the impact of the training on performance rather than the adaptations causing the impact, for example, training might increase speed when sprinting. This type of response did not gain marks.

Similarly, some learners confused aerobic with anaerobic and incorrectly referenced an increase in muscular endurance.

This response gained 0 marks

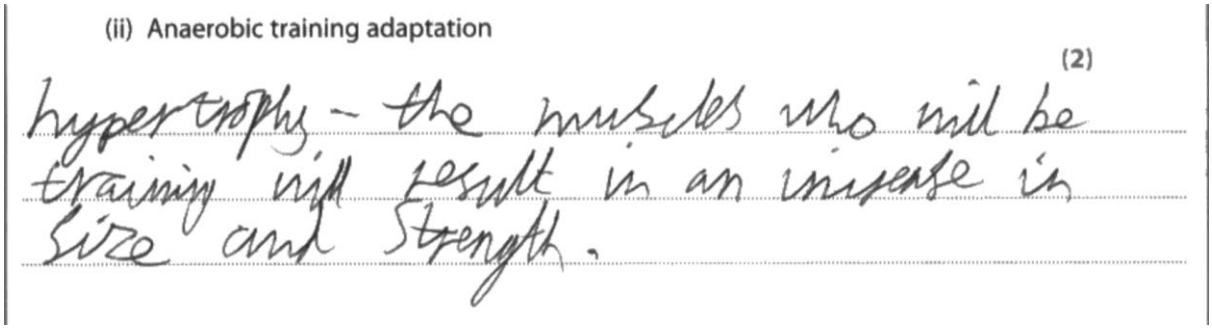

(ii) Anaerobic training adaptation

(2)

Anaerobic training will help him with short distance running, for example when sprinting and a ball.

No mark was given as the response focuses on performance rather than an adaptation to the muscular system that might result in this increase in performance.

This response gained 2 marks


(ii) Anaerobic training adaptation

(2)

hypertrophy - the muscles who will be training will result in an increase in size and strength.

Q 02 (b)

This question is split into three parts, each part of the question asks the same, but learners must apply their knowledge to different sporting contexts.

The question provides learners with some information about three different types of training activities:

- long distance running at the same pace for one hour
- single maximum weight lift (1RM)
- repeated 30-second stair climb at pace with 30 seconds rest between each climb

Learners are asked to explain the muscle fibre type most likely to be recruited in each of these activities.

Key information given in the question includes

- an indication that only one fibre type is required 'the muscle fibre type most likely...'
- the intensity and duration of each of the activities

Based on this information learners should have linked type I to long distance running; type IIx to the 1RM and type IIa to the repeated stair climb at pace with a rest in-between. Sufficient information was given in the question to allow learners to discount each of the other fibre types.

Once the correct fibre type had been selected the learner had to justify their choice by explaining a characteristic of that fibre type to indicate why it would be the one recruited.

It is important when justifying the fibre type that the learner focused on the characteristic of the fibre not the activity, we needed to know why the fibre type was suitable.

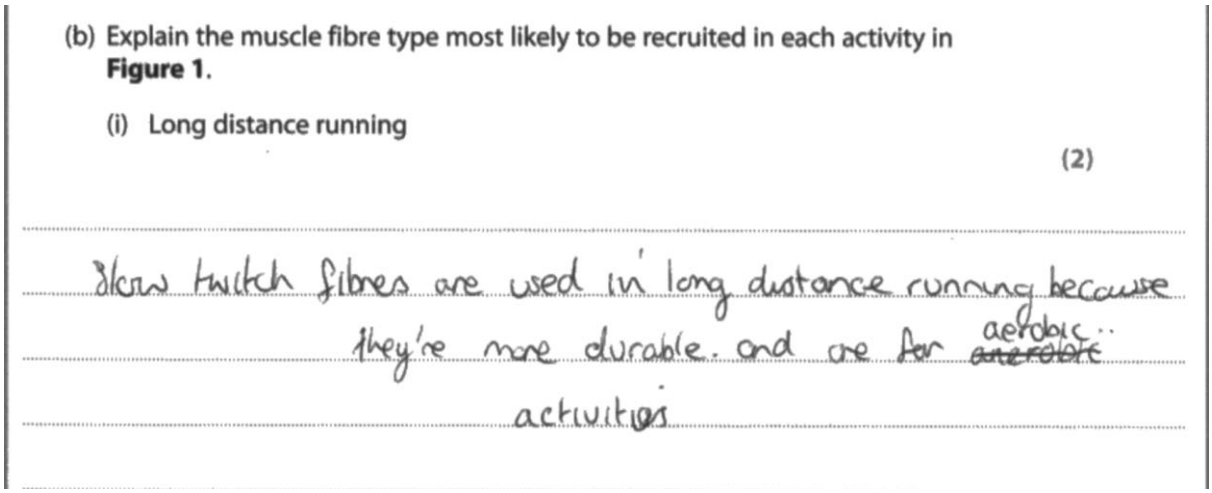
Most learners found this part of the question quite accessible, often scoring a minimum of 3 of the available 6 marks.

Where learners didn't achieve marks, this was often due to mislabelling of the fibre types, eg type Ia, rather than type I or not differentiating between type IIa and type IIx, simply referring to type II.

Some learners are still referring to type IIb, they should use the more up-to-date labelling used in the unit specification, ie type IIx.

Q 02 (b) (i)

This response gained 1 mark



(b) Explain the muscle fibre type most likely to be recruited in each activity in **Figure 1**.

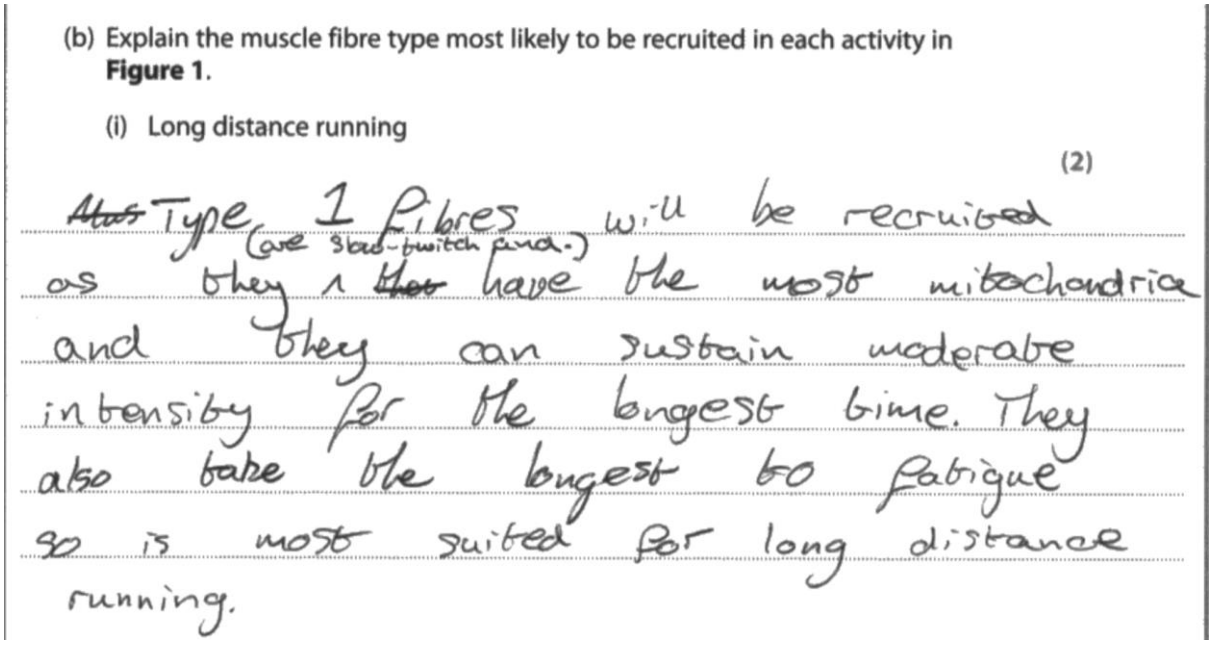
(i) Long distance running

(2)

Slow twitch fibres are used in long distance running because they're more durable. and are for ~~anerobic~~ aerobic activities

The correct muscle fibre type is selected for one mark, but the explanation is in relation to the activity rather than the muscle fibre therefore the second mark is not achieved. 'More durable' is too vague for fatigue resistant.

This response gained 2 marks



(b) Explain the muscle fibre type most likely to be recruited in each activity in **Figure 1**.

(i) Long distance running

(2)

~~Most~~ Type 1 fibres (are slow-twitch fibres) will be recruited as they ~~that~~ have the most mitochondria and they can sustain moderate intensity for the longest time. They also take the longest to fatigue so is most suited for long distance running.

The correct muscle fibre type is selected and then fully justified the reasoning for this. Ie they have the most mitochondria or that they take the longest to fatigue. Either of these explanatory points would have been sufficient for the second mark.

Q 02 (b) (ii)

This response gained 1 mark

(ii) Single maximum weight lift (1RM)

(2)

Type 2x muscle fibre type would be recruited as it is a fast twitch, anaerobic and best considered for maximal effort (high intensity) activities. Such as the one rep max.

Although the fibre type is correctly identified an appropriate reason to explain why it is the most appropriate is not given.

This response gained 2 marks

(ii) Single maximum weight lift (1RM)

(2)

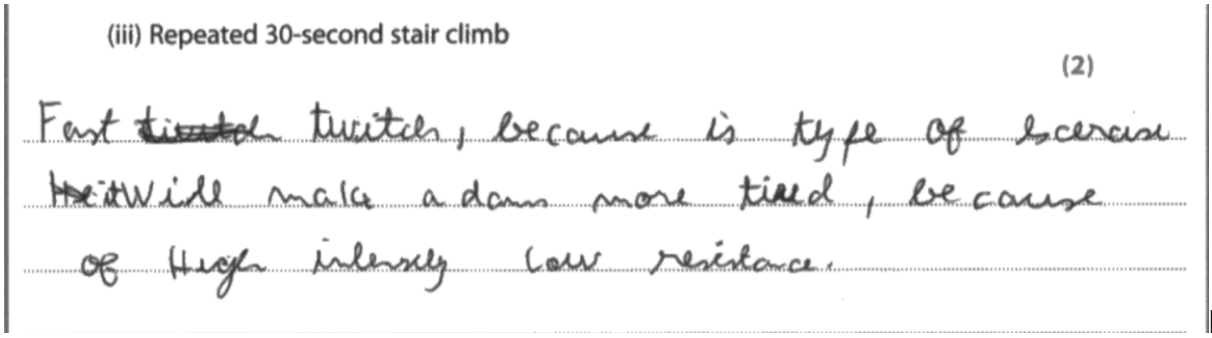
Type 11x muscle gibers. This is due to them having a low resistance of fatigue but producing maximal power for a shat duration of time. These would suit 1RM as allowing maximal force into reps. Also only last up to 10-12 seconds.

The fibre type is correctly identified and the reason for its use given, ie that it produces maximal power.

Q 02 (b) (iii)

Possibly the most challenging of the three fibre types for learners to justify as this is a hybrid fibre type. The explanation had to make it clear that it related to the properties of type IIa rather than the other fibre types. For example, reference to being fatigue resistant would not gain credit (due to overlap with type 1), but if this was quantified by stating the fibre type was moderately fatigue resistant or more fatigue resistant than type IIx the mark could be awarded.

This response gained 0 marks

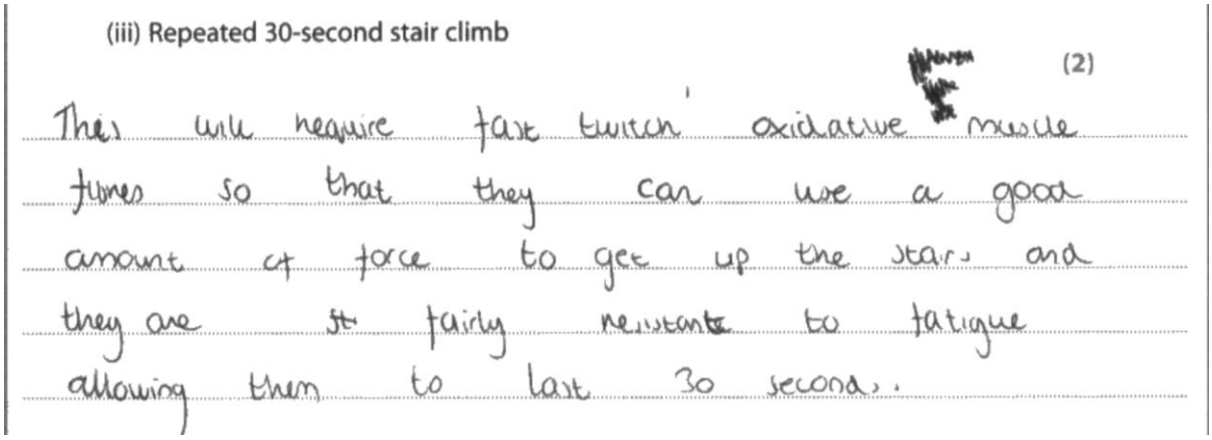

(iii) Repeated 30-second stair climb

(2)

Fast ~~tired~~ twitch, because is type of exercise ~~he~~ it will make a dam more tired, because of High intensity low resistance.

It is important to differentiate between the two types of fast twitch muscle fibres

This response gained 2 marks


(iii) Repeated 30-second stair climb

(2)

This will require fast twitch oxidative muscle fibres so that they can use a good amount of force to get up the stairs and they are ~~st~~ fairly resistant to fatigue allowing them to last 30 seconds.

The response identifies the correct muscle fibre type and explains the use of the fibre type as they 'are fairly resistant to fatigue'. This is considered an equivalent statement to having medium resistant to fatigue.

Q 02 (c)

The extended response for question 2 asked learners to assess the impact of training at high altitude on a performer's cardiovascular system and their football performance once back at sea level.

Adam trains regularly at high altitude for three months. This training causes adaptations to the cardiovascular system.

(c) Assess the impact of this training on Adam's cardiovascular system and future football performance once Adam is back at sea level.

(8)

It is always recommended that learners identify key words in any question, but this is particularly important for the extended responses. Many learners also add a brief plan, or a few key points they wish to address before beginning their response to make sure they fully address the question.

Such a plan for this question could have been:

- training adaptations to CV system due to high altitude
- how each training adaptation may benefit performance
- the impact of the adaptation once back at sea level

Some learners focused on the immediate responses to high altitude, for example increased heart rate, or the general conditions at high altitude, for example a lower partial pressure of oxygen. Whilst these statements were accurate, they did not address the question therefore did not contribute to the overall quality of the response.

Some credit was given for identification of adaptations due to altitude training to other body systems, however if this was the sole focus of the response this would have been a low scoring response due to limited relevance to the question. Similarly, if training adaptations to the CV system were given that were general adaptations, rather than those associated with high altitude training, some limited credit was given.

The complete range of marks were achieved by learners, although the majority found the question challenging, therefore most responses were placed at level 1 and tended to focus on general adaptations to training.

Those that did achieve high level 2/level 3 did so as they demonstrated a good knowledge of adaptations to the cardiovascular system at high altitude and could explain the importance of this to a performer and then make an assessment about the value of these adaptations once back at sea level.

This response was placed at level 0

No rewardable content was found within this response as it focuses on the respiratory and muscular systems rather than the required cardiovascular system.

Adam trains regularly at high altitude for three months. This training causes adaptations to the cardiovascular system.

(c) Assess the impact of this training on Adam's cardiovascular system and future football performance once Adam is back at sea level.

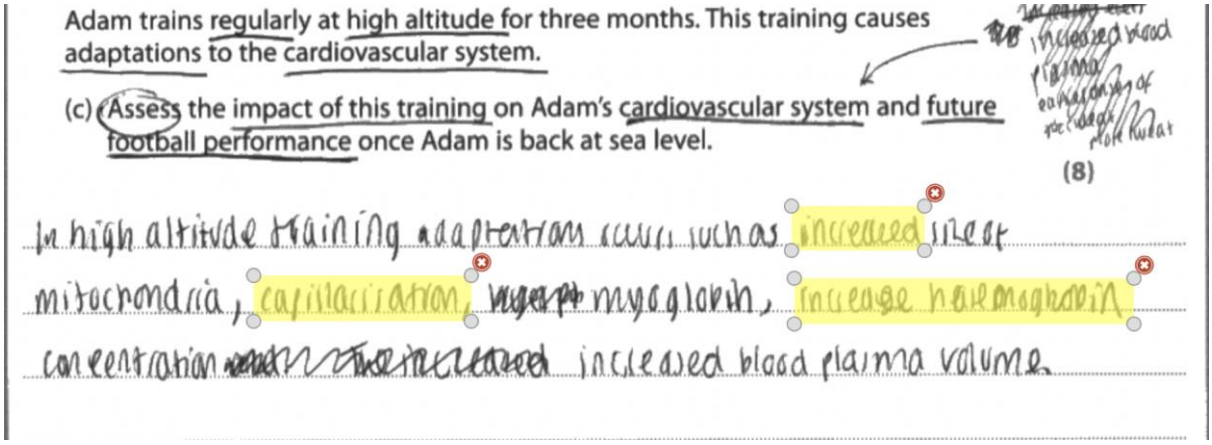
(8)

When training at higher altitude their is a decreased amount of oxygen present which means it becomes difficult for the respiratory system to work efficiently

Through Adams training he will have an increased lung capacity. This is because the air is thinner at altitude meaning it is harder to intake oxygen. This will result in the lungs expanding to help intake oxygen. Another adaptation would be a decreased breathing rate as he will now be able to deal with oxygen more efficiently. This will benefit him during a football match as less energy will be used for breathing. Another impact is he will have a increased amount of type 1 muscle fibres. This will benefit future football performance as his muscles will be able to deal with oxygen more efficiently.

This response was placed at level 3: and awarded 7 marks

The first paragraph identifies two specific training adaptations related to high altitude and some other more general training adaptations, therefore demonstrating some relevant knowledge of adaptations to the cardiovascular system as a result of training at high altitude.

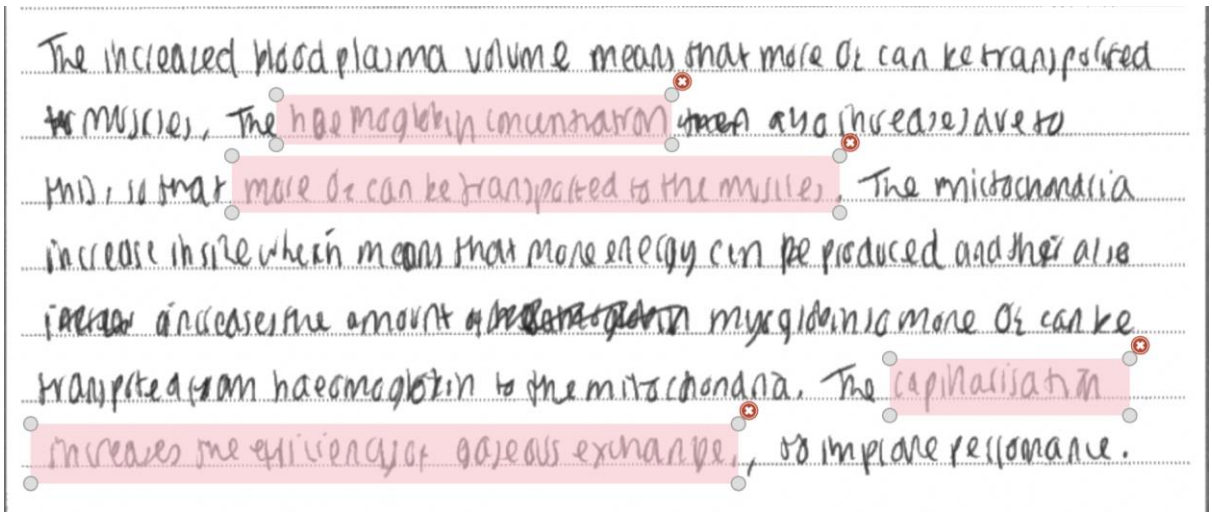

Adam trains regularly at high altitude for three months. This training causes adaptations to the cardiovascular system.

(c) Assess the impact of this training on Adam's cardiovascular system and future football performance once Adam is back at sea level.

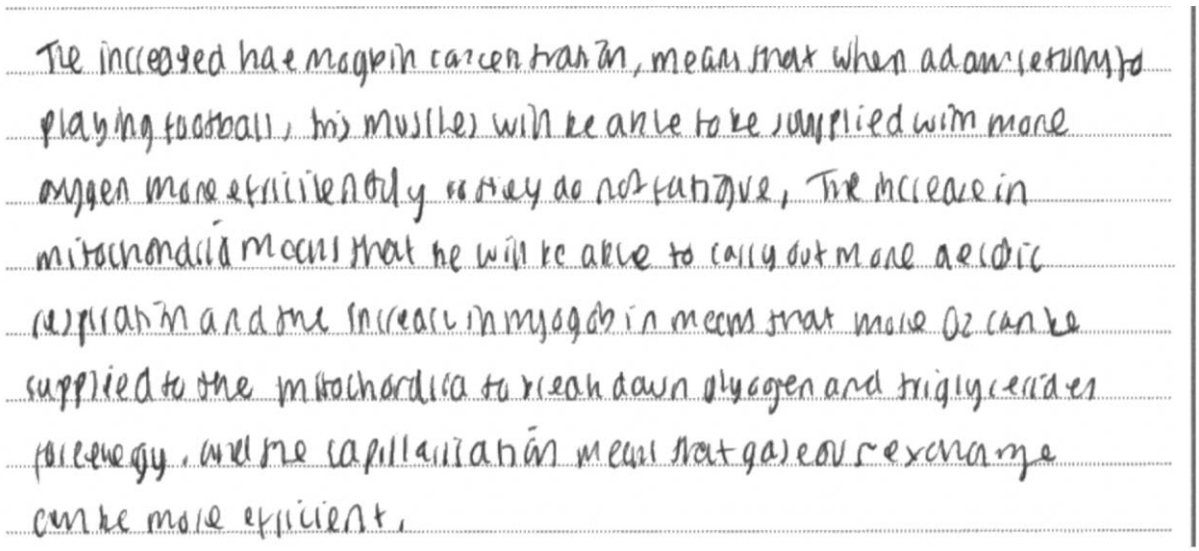
(8)

In high altitude training adaptations occur such as increased size of mitochondria, capillarisation, myoglobin, increase haemoglobin concentration, increased blood plasma volume.

This knowledge is then expanded on in the second paragraph through an explanation of the impact or the consequence of the adaptation. For example, that increased haemoglobin will increase the ability to transport oxygen, or that capillarisation will increase the efficiency of gas exchange.


The increased blood plasma volume means that more O2 can be transported to muscles. The haemoglobin concentration also increased due to this, so that more O2 can be transported to the muscles. The mitochondria increase in size which means that more energy can be produced and they also increases the amount of myoglobin so more O2 can be transported from haemoglobin to the mitochondria. The capillarisation increases the efficiency of gaseous exchange, so improve performance.

The final paragraph on the first page of the response assesses the impact of increased haemoglobin concentration on football performance, stating that his muscles will be supplied with more oxygen, so they do not fatigue. The learner also assesses the impact of other non-cardiovascular related adaptations which do not gain specific credit but do contribute to the overall quality of the response.


The increased haemoglobin concentration, means that when adam returns to playing football, his muscles will be able to be supplied with more oxygen more efficiently so they do not fatigue, The increase in mitochondria means that he will be able to carry out more aerobic respiration and the increase in myoglobin means that more O2 can be supplied to the mitochondria to break down glycogen and triglycerides for energy, and the capillarisation means that gaseous exchange can be more efficient,

The second page of the response focused on other cardiovascular adaptations, for example increased strength of the heart and the impact this would have on fitness but not what would happen to this fitness over time once back at sea level.

Whilst there is some inaccurate/irrelevant content included in the response there is sufficient relevant, applied content to warrant being placed at level 3. Several adaptations are identified, the value of these are explained and there is a clear attempt to apply these to the sporting context, although there is no reference to the loss of these adaptations shortly after return to sea level, which was an expected assessment.

Q 03 (a)

This part of the question asked learners to state the energy yield of the lactate and aerobic energy systems.

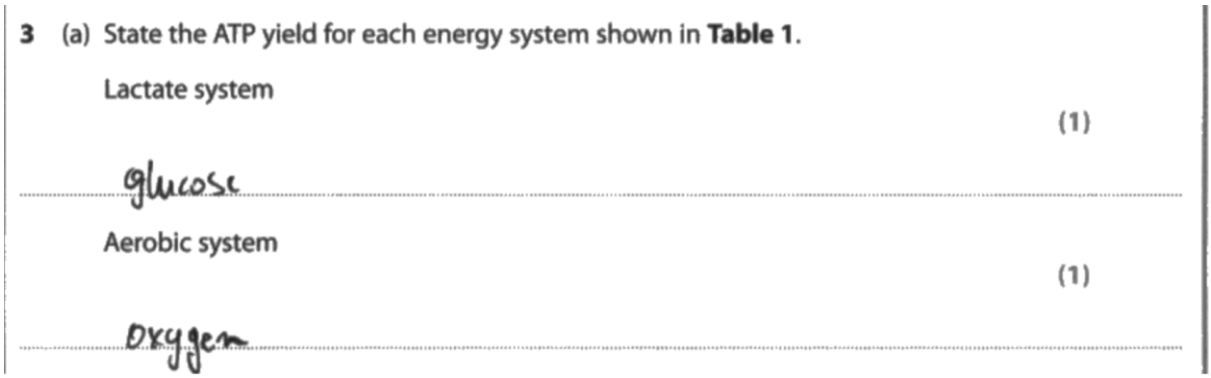
Whilst many learners correctly identified the yields a large number found this question challenging, possibly because they did not understand the term 'energy yield'.

The expected correct responses were 2 ATP yield for the lactate system and 34 for the aerobic system. There was some allowable lee-way with the yield as different theory sources will provide a slight variation on these figures. Therefore, learners would still gain credit if they gave slightly different responses.

Some learners recorded their response as a range, eg 1:2 for the lactate system, whilst others stated 2:1 without an indication of which represented the ATP yield. These were credited on this occasion, but learners should ensure their responses are not open to misinterpretation.

Popular incorrect responses stated the duration of the system or suggested an energy source for each system.

This response gained 0 marks



3 (a) State the ATP yield for each energy system shown in **Table 1**.

Lactate system

(1)

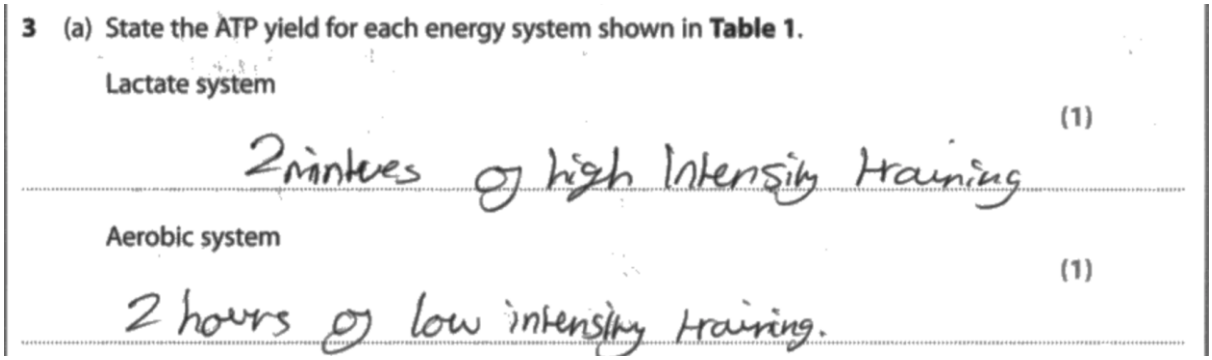
glucose

Aerobic system

(1)

Oxygen

This response gained 0 marks


3 (a) State the ATP yield for each energy system shown in **Table 1**.

Lactate system

(1)

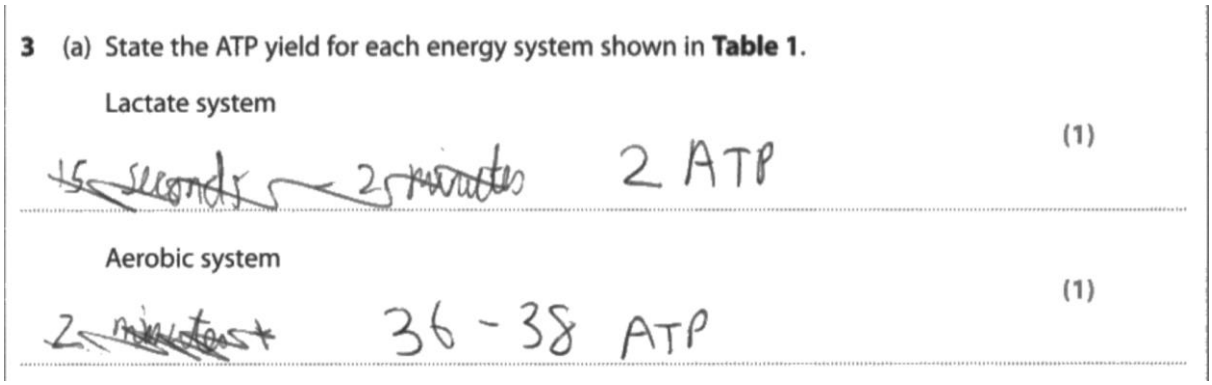
2 minutes of high intensity training

Aerobic system

(1)

2 hours of low intensity training.

This response gained 2 marks


3 (a) State the ATP yield for each energy system shown in **Table 1**.

Lactate system

(1)

~~15 seconds~~ ~ ~~2 minutes~~ 2 ATP

Aerobic system

(1)

~~2 minutes~~ 36 - 38 ATP

36-38 ATP was considered within the acceptable range for the aerobic energy yield therefore the response gained both available marks.

Q 3(b) (i)

This question tested learners' knowledge of the recovery process of the lactate energy system. Three marks were available for describing this process. Common correct responses linked the use of oxygen to break down the accumulated lactic acid, and that it took approximately 20 minutes to 2 hours to complete this process. Rather than state the time taken for the process others correctly continued their descriptions by stating what the lactic acid was converted into during its removal. Although energy systems are traditionally a challenging topic for learners, most achieved a minimum of one mark for this question making reference to the use of oxygen in recovery or that the lactate/lactic acid that had accumulated needed to be broken down/removed.

This response gained 0 marks

(b) Describe the recovery process for each energy system shown in **Table 1.**

(i) Lactate energy system

(3)

For short track speed skating the recovery levels ~~can~~ ~~be~~ ~~not~~ can be much shorter depending on how the body reacts compared to cross-country skiing. Realistically after an ~~exercise~~ long distance exercise the body will need more rest for the body to fully recover.

No marks are awarded for stating that rest is required for recovery, the response is considered too vague.

This response gained 3 marks

(b) Describe the recovery process for each energy system shown in **Table 1.**

(i) Lactate energy system

(3)

EPOC (Exercise post oxygen consumption) slow component is used to remove lactic acid from the system so ATP can be regenerated. Slow component is the amount of oxygen needed to get rid of the lactic acid.
This happens after 20 minutes of exercise most of the lactic acid is gone. The rest is then cleared within an hour.

Marks were awarded for oxygen being needed to remove the lactic acid and that this could take between 20 mins to one hour. This was deemed to be an acceptable time range, any range between 20 mins to 2 hours was accepted.

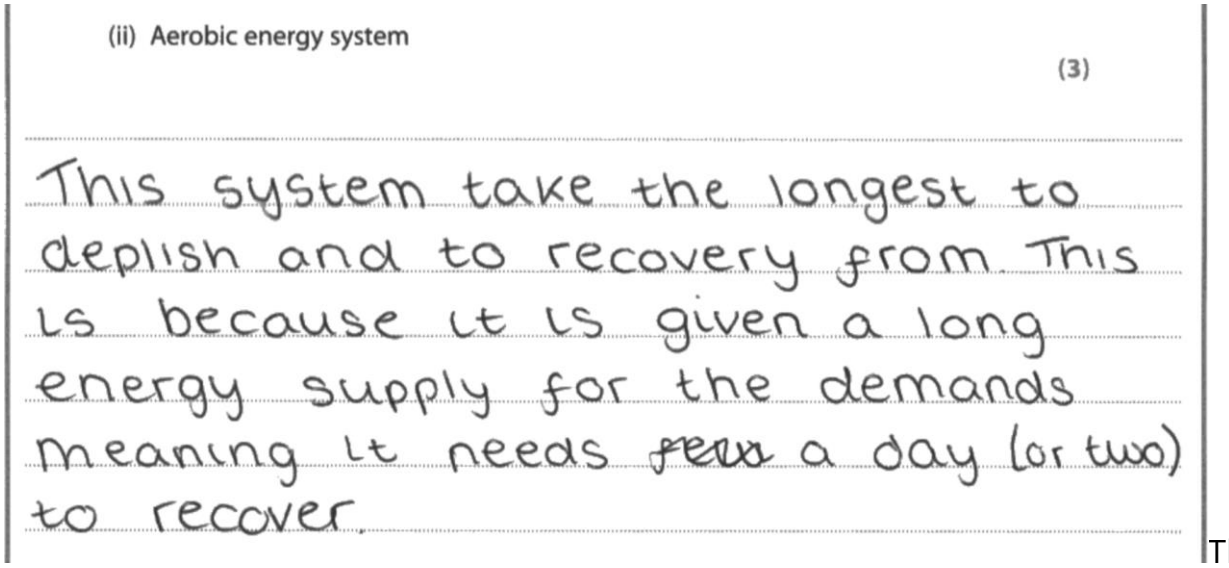
Q 3(b) (ii)

The previous part to this question tested learners' knowledge of the recovery process of the lactate energy system. For this part of the question learners needed to describe the recovery process of the aerobic energy system. Three marks were available for describing this process. Common correct responses focused on the need to replenish glycogen stores within the muscles through use of carbohydrates. As with the previous part of the question knowledge of an appropriate time frame for recovery of this system, in this case 2 to 48 hours, was also credited. Reference to the use of oxygen to restore myoglobin ready for use by the mitochondria was also stated by some learners.

A popular misconception was that the system would not take long to recover as it used oxygen therefore no waste products would need removing. These learners did not consider the fuel source, ie glycogen stores being depleted during activity. Other learners confused the two systems, stating that lactate would be produced

This part of the question was more challenging for learners than recovery of the lactate system. Despite this, many learners gained at least one mark for this question.

This response gained 1 mark

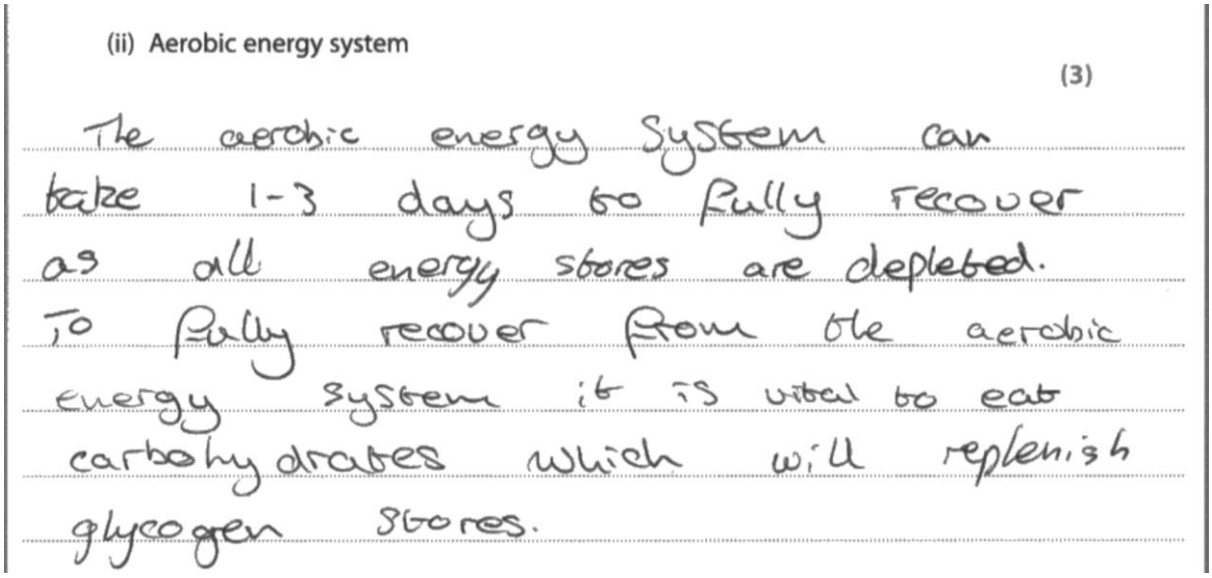

(ii) Aerobic energy system

(3)

This system take the longest to deplish and to recovery from. This is because it is given a long energy supply for the demands meaning it needs ~~few~~ a day (or two) to recover.

The mark was awarded for being within an appropriate time-frame for recovery, ie 24 to 48 hours.

This response gained 2 marks

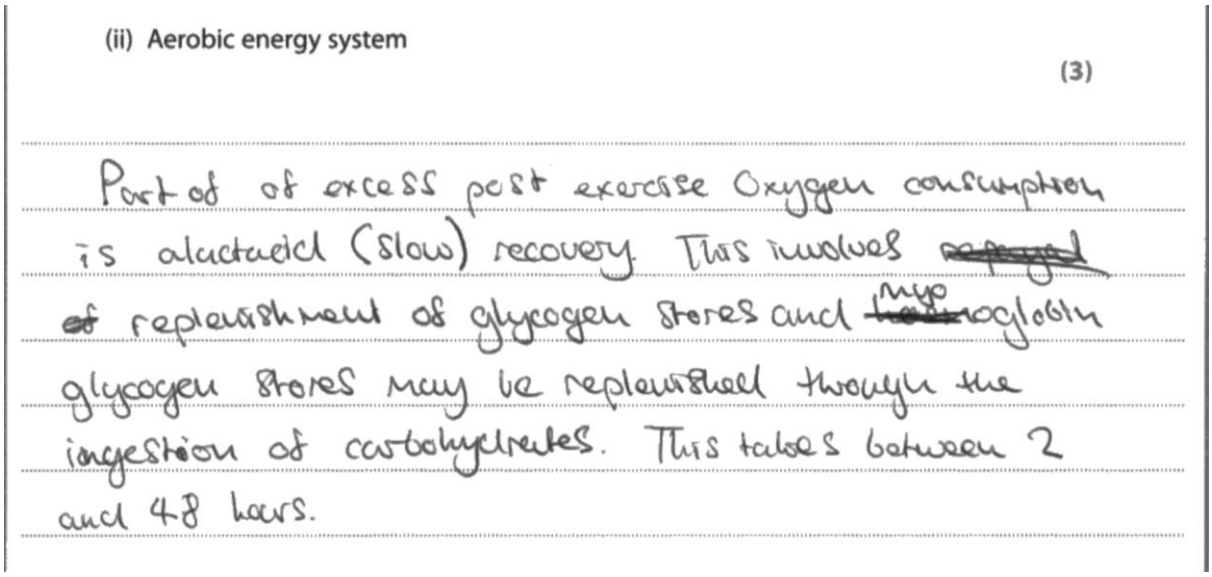


(ii) Aerobic energy system (3)

The aerobic energy system can take 1-3 days to fully recover as all energy stores are depleted. To fully recover from the aerobic energy system it is vital to eat carbohydrates which will replenish glycogen stores.

Two marks were awarded for the last two lines for the description that carbohydrates were required in recovery to replenish glycogen stores.

This response gained 3 marks



(ii) Aerobic energy system (3)

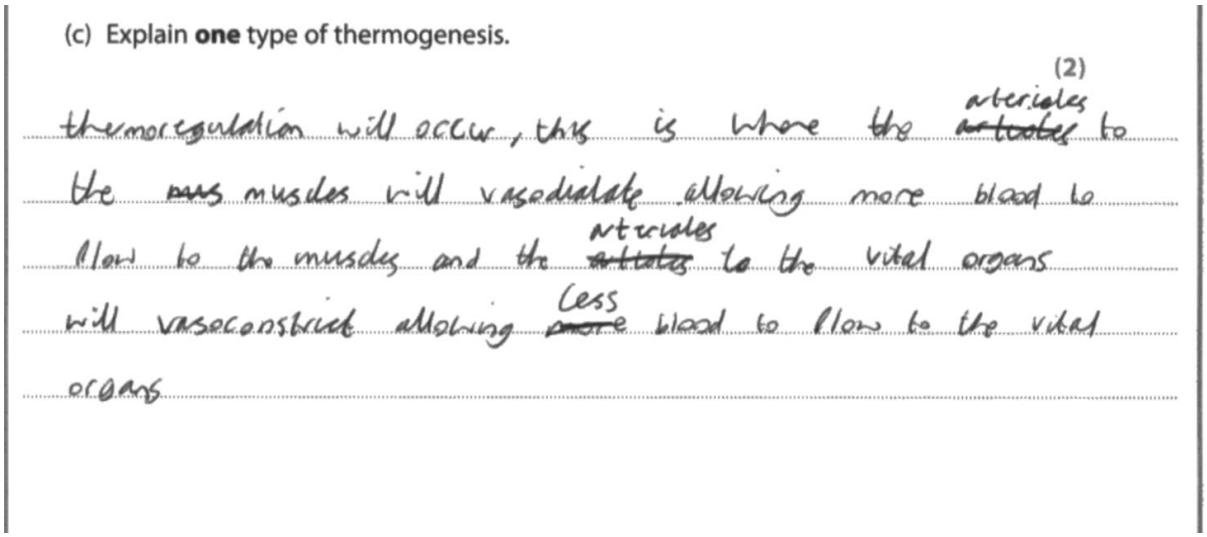
Part of of excess post exercise Oxygen consumption is alactaeic (slow) recovery. This involves ~~of~~ replenishment of glycogen stores and myoglobin ~~haemoglobin~~ glycogen stores may be replenished though the ingestion of carbohydrates. This takes between 2 and 48 hours.

Although slightly confused there is sufficient correct content to gain all three marks for the description of recovery. The learner describes that oxygen is used in recovery to replenish glycogen stores and myoglobin, that glycogen stores are replenished through carbohydrates in the diet and that the process can take between 2 and 48 hours.

Q 3(c)

This part of the question moved the focus from the energy systems the winter athletes used, to thermoregulation and in particular thermogenesis to maintain body heat in cold conditions. Learners were asked to explain one type of thermogenesis. Responses could be in relation to shivering or non-shivering thermogenesis. Of the two types the majority of learners reported on shivering thermogenesis, although both were given as correct responses.

This response gained 0 marks



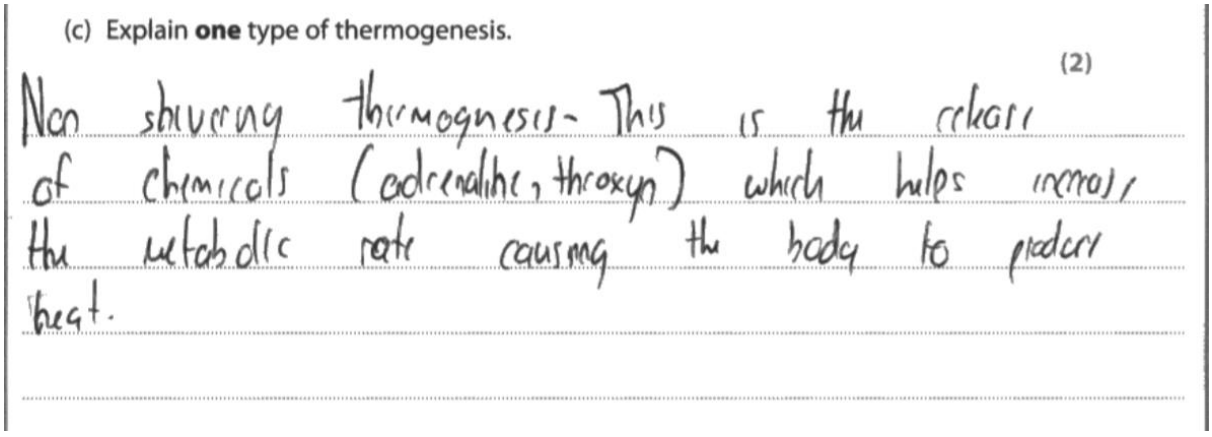
(c) Explain **one** type of thermogenesis.

(2)

thermoregulation will occur, this is where the ~~arteries~~ arterioles to the ~~vans~~ muscles will vasodialate allowing more blood to flow to the muscles and the ~~arteries~~ arterioles to the vital organs will vasoconstrict allowing ~~more~~ less blood to flow to the vital organs

The learner provides information about one way of reducing heat loss but does not respond to the specific question on thermogenesis.

This response gained 2 marks

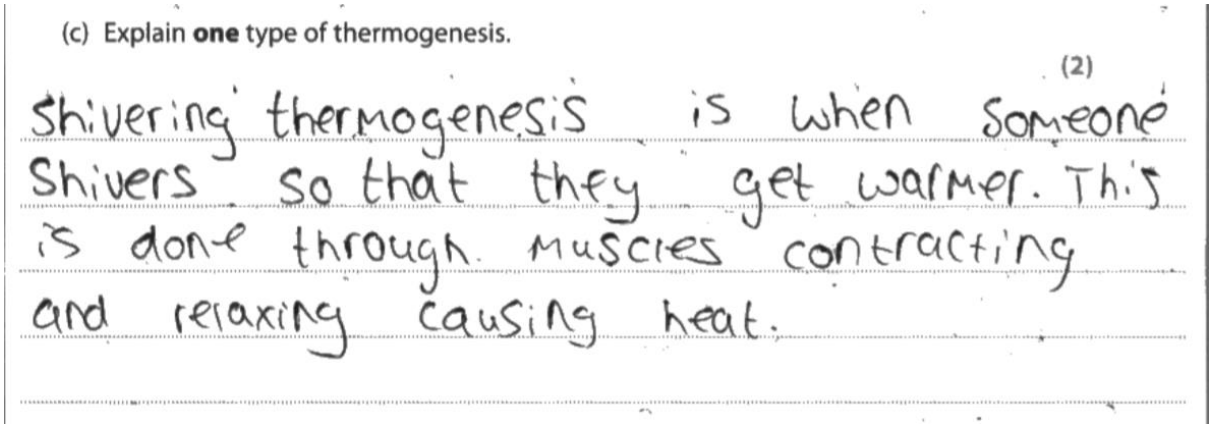


(c) Explain **one** type of thermogenesis.

(2)

Non shivering thermogenesis- This is the release of chemicals (adrenaline, throxyn) which helps increase the metabolic rate causing the body to produce heat.

This response gained 2 marks



(c) Explain **one** type of thermogenesis.

(2)

Shivering thermogenesis is when someone shivers so that they get warmer. This is done through muscles contracting and relaxing causing heat.

The focus in this example is on shivering thermogenesis, the more frequently occurring type of thermogenesis presented by learners.

Q 03 (d)

This was the third extended response question. Learners were given information about additional items given to spectators at the 2018 Olympics due to the extreme cold. They were asked to assess how the additional items would help the spectators reduce heat loss. As the command word was 'assess' to achieve level 3 learners would need to make an assessment about the relative effectiveness of the different items rather than just state how they prevented heat loss. Those that just explained how the items prevented heat loss achieved a maximum of level 2, 6 marks.

Incorrect, or low scoring responses tended to focus on slightly different topics to that required, for example, the implications of severe cold if the body was unable to thermoregulate, or what the athletes did to stay warm, eg warming up, or a description of vasoconstriction and vasodilation or shivering thermogenesis.

As with all extended responses the learner's response was judged on the quality with which it addressed all aspects of the question. For example, responses at level 1 tended to simply identify the different methods of heat loss in the body. Those learners who could apply their knowledge to the question context, correctly linking the items to the relevant method of heat loss, tended to achieve level 2 and those that went on to assess moved into level 3.

Most responses included some relevant knowledge, either identifying a method of heat loss, conduction, convection and so on or the need for thermoregulation to maintain core temperature at 37°C, therefore the majority of learners achieved some marks for this question, although learners did find this question particularly challenging as the majority achieved level 1. Assessment points made by learners related to the sedentary nature of spectating and therefore the importance of these additional items or made reference to heating pads being most effective as they were actually a source of heat. To be considered an 'assessment' a judgement and a reason for this judgement had to be given. For example, the judgement that the heating pads were the best would not be considered an assessment unless the learner justified this, eg by stating it was the only one that actually produced heat for the spectators.

This response was placed at level 1

(d) Assess how these additional items reduce heat loss to assist in thermoregulation of the spectators.

(8)

these additional items will reduce heat loss and help thermoregul of the spectators as it will keep the muscle warm and keep blood ~~flowing~~ flowing. This will also reduce the risk of hyperthermia frostbite. Hyperthermia is when body is in extreme cold and body core temperate drops below 32°. Also if body core body temperature drops below 29° this is chronic hyperthermia and could die if ~~medical attention~~ not treated straight away. Frostbite is when body is exposed to extreme cold and blood flow is stop therefore causing tissue to die. This normally occurs at the peripheral bits of body ie: Toes, finger, ears etc. ~~This can~~ Frostbite occurs as a Redish, white, blackish white, greyish/yellowish colour. If treated fast it can be saved. By giving spectators heating pods, blanket and warm seat cushions assis thermoregulation at keeping the core body temp of 37°

Much of the response focuses on issues if the temperature drops too low rather than focussing on how the items given to the spectators help thermoregulation.

This response was placed at level 2

(d) Assess how these additional items reduce heat loss to assist in thermoregulation of the spectators.

(8)

Reduce heat loss

Heating pads:

- allow for radiation to occur as the material is heated the heat travels towards them because of the concentration of heat particals so they try to reach an equallibrium by moving to a cool place, being the body. Therefore reducing heat loss

Blankets:

- Blankets stop evaporation / convection of the body from occuring as it sheilds the body from the cold air to reduce the amount of cold air comes into contact with the skin. reducing the amount of heat loss

warm seat cushions:

- This allows for conduction as the lower body is incontact with the heated object the heat travels through the body to the cold areas due to the concentration of hot to cold particles. This reduces heat loss as it is the slowest form of heat transfer.

All four methods of heat loss are identified and, with the exception of evaporation and radiation (as they will be in direct contact with the pads), used in the correct applied context within the question.

This response was placed at level 3: and awarded 7 marks

(d) Assess how these additional items reduce heat loss to assist in thermoregulation of the spectators.

(8)

Heating pads will transfer heat through conduction which then heats up the body, keeping them warm. This reduces heat loss as it actuall provides a heat source and is the best one out of the three items.

Blankets help minimumly, they are useful for covering your outer extremities which stops convection from the cold air molecules making contact with your skin.

Warm seat cushions provide heat transfer through conduction but only for a certain time. It is used to warm up the largest muscle in your body.

All of these help thermoregulate your body in a certain way.

Thermoregulation is regulating your core body temperature at around 37°c.

The response contains relevant knowledge, identifying two of the methods of heat loss:

- conduction
- convection

and at the end of the response the knowledge statement that thermoregulation means keeping the core temperature at 37° C.

This knowledge is then applied to the question context, for example through statements such as 'Heating pads will transfer heat through conduction which then heats up the body' or 'Blankets … stop convection from the cold air molecules making contact with your skin'. There is even reference to 'Warm seat cushions provide heat transfer through conduction …. to warm up the largest muscle in your body'. The reason this response is placed at level 3 is because it demonstrates assessment, there is a judgement about the effectiveness of these methods and an accompanying reason to support the judgement. The judgement is that heating pads are the most effective and the reason being they are an actual heat source. There are other attempts to make an assessment, but these are insufficiently precise to provide the quality needed for maximum marks. For example, reference is made to blankets providing minimal value, but this is not expanded on, so we have the judgement but not the reason for it. There is another missed opportunity for assessment of the items after the phrase about warm seat cushions only providing heat transfer for a certain time. This could have been expanded on to provide justification why they might not be the most effective, for example if they lost their heat before the end of the opening ceremony.

Q 4(a)

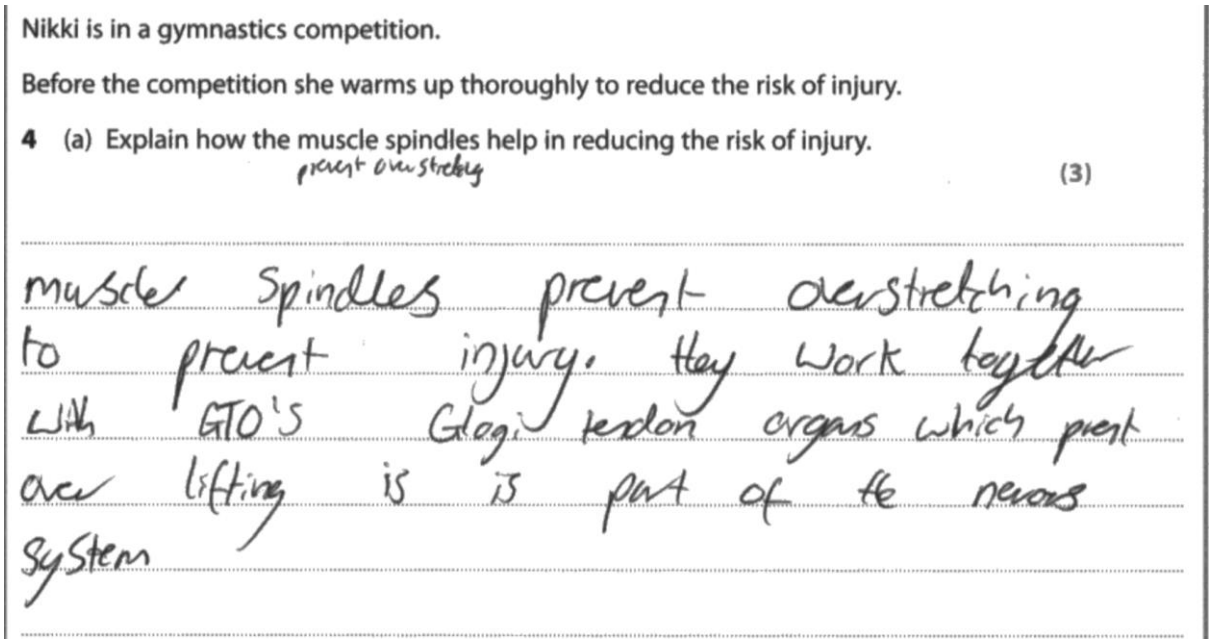
The context for question 4 is a gymnast. In part (a) she is warming up before competition to reduce the risk of injury. Learners are asked to explain how the muscle spindles help in reducing the risk of injury.

As reference to injury is in the question this cannot be credited as part of the response.

Responses that identified the role, for example to detect the stretch or changing length of the muscle and then went on to explain how the role was fulfilled scored maximum marks. For example, a response that stated that, the muscle spindle detects the length of stretch of the muscle and triggers the stretch reflex if it detects the muscle is stretching too far, would be awarded maximum marks.

Many learners successfully identified the role of the muscle spindles and could expand on this a little, often making reference to the prevention of overstretching but not necessarily how it achieved this.

This response gained 1 mark



Nikki is in a gymnastics competition.

Before the competition she warms up thoroughly to reduce the risk of injury.

4 (a) Explain how the muscle spindles help in reducing the risk of injury.

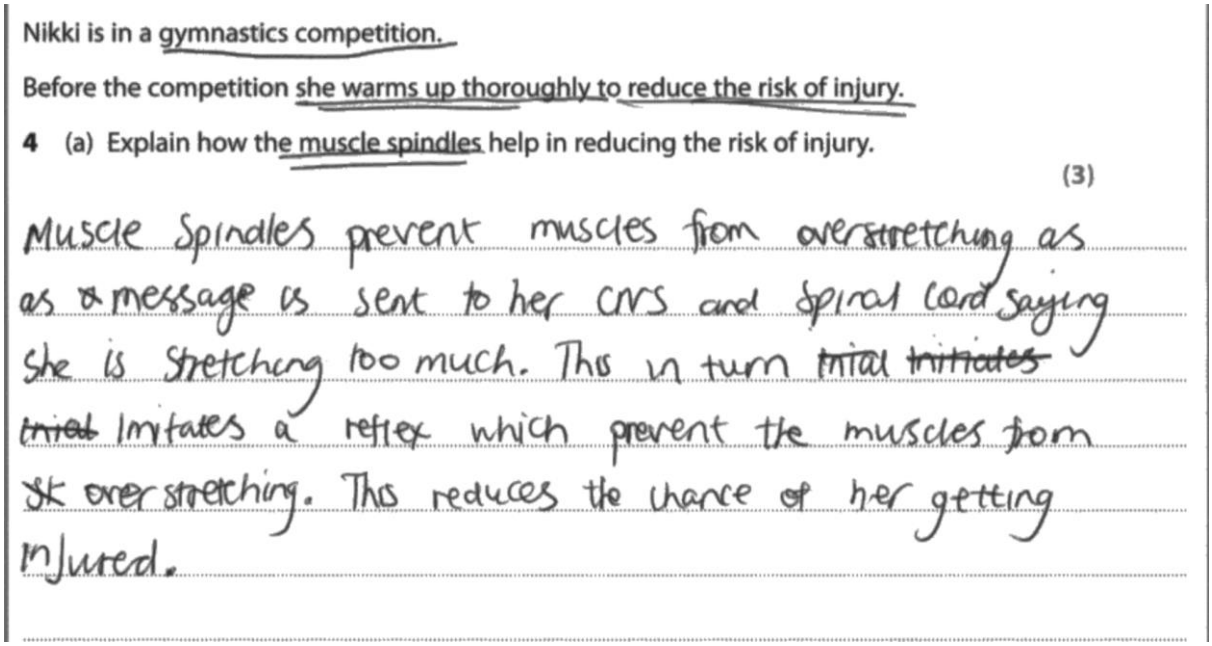
prevent overstretching

(3)

muscle Spindles prevent overstretching to prevent injury. they work together with GTO's Golgi tendon organs which prevent over lifting is is part of the nervous system

One mark was awarded for the spindles preventing overstretching. No further marks could be awarded as the response does not explain how this is brought about.

This response gained 3 marks



Nikki is in a gymnastics competition.

Before the competition she warms up thoroughly to reduce the risk of injury.

4 (a) Explain how the muscle spindles help in reducing the risk of injury.

(3)

Muscle Spindles prevent muscles from overstretching as as a message is sent to her CNS and Spinal Cord saying she is stretching too much. This in turn ~~initial~~ ~~initiates~~ ~~initial~~ Initates a reflex which prevent the muscles from ~~st~~ overstretching. This reduces the chance of her getting injured.

The response provides a clear explanation regarding how injury is prevented. Ie that the spindles prevent overstretching by sending a message to the CNS when they detect too much stretch which triggers a reflex response to prevent the overstretch. The only thing that could have been added to the response was that this is called a stretch reflex or that the reflex resulted in muscle contraction.

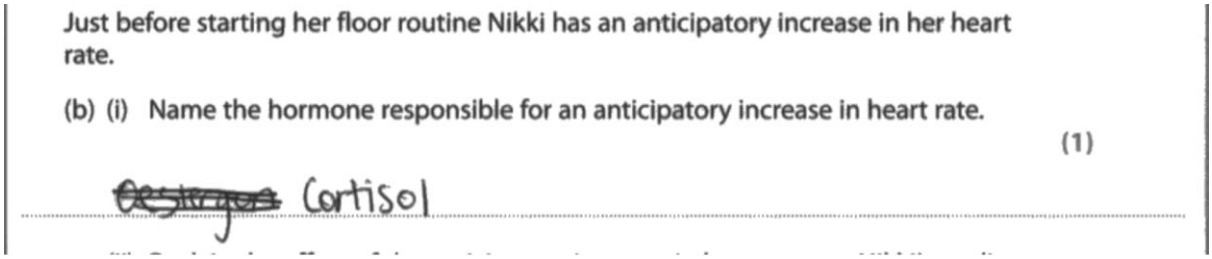
Q 04 (b) (i)

Question part (b) was designed as an accessible question. In (b) (i) learners were asked to name the hormone responsible for the anticipatory rise in heart rate the gymnast would experience just before starting her routine.

The majority of learners correctly identified adrenaline as the hormone responsible.

There were other acceptable responses, for example noradrenaline and epinephrine which some learners referred to. Popular incorrect responses were testosterone, human growth hormone and oestrogen.

This response gained 0 marks


Just before starting her floor routine Nikki has an anticipatory increase in her heart rate.

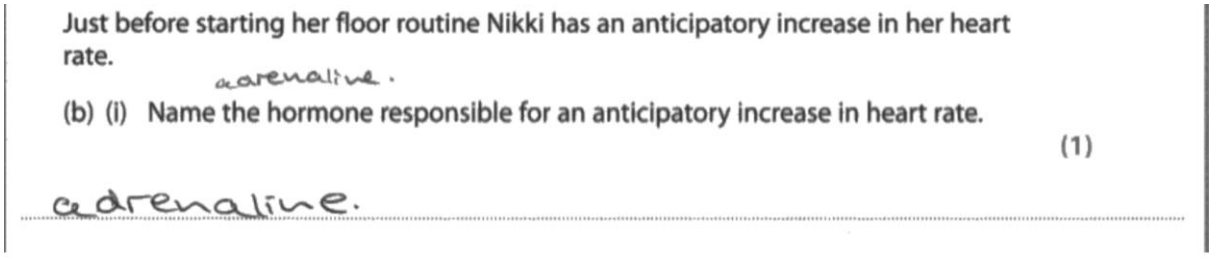
(b) (i) Name the hormone responsible for an anticipatory increase in heart rate.

(1)

~~oestrogen~~ Cortisol

No mark was awarded as although cortisol is a hormone, it is not responsible for the anticipatory rise in heart rate.

This response gained 1 mark


Just before starting her floor routine Nikki has an anticipatory increase in her heart rate.

adrenaline.

(b) (i) Name the hormone responsible for an anticipatory increase in heart rate.

(1)

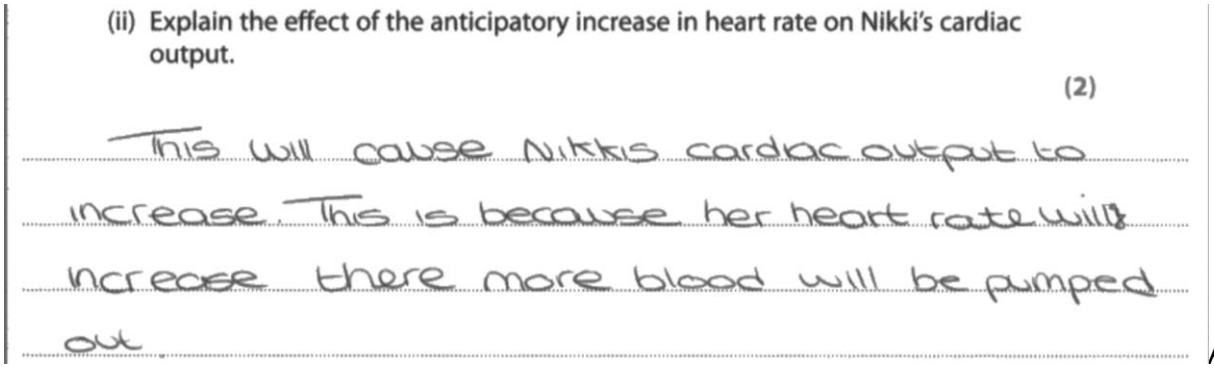
adrenaline.

The learner correctly identified the hormone as adrenaline

Q 04 (b) (ii)

This part of the question asked learners to explain the effect of the anticipatory increase in heart rate on the gymnast's cardiac output. To gain both marks the learner had to state the effect, ie cardiac output increased, and then state why this increase occurred. Most learners achieved at least one mark for this question, correctly identifying that cardiac output would increase. Those that achieved both marks explained this by making the link between increasing the number of times the heart beats per minute and the resultant increase in blood flow from the heart per minute. Where the second mark was not achieved this was often due to a lack of precision in the response, for example referencing increased blood flow but not specifying per minute. Others linked increased heart rate to increased stroke volume rather than cardiac output.

This response gained 1 mark


(ii) Explain the effect of the anticipatory increase in heart rate on Nikki's cardiac output.

(2)

This will cause Nikkis cardiac output to increase. This is because her heart rate will increase there more blood will be pumped out.

A mark is awarded for identifying that cardiac output will increase but the link to cardiac output was not clearly explained, making reference to increased blood flow, but not per minute.

This response gained 2 marks

(ii) Explain the effect of the anticipatory increase in heart rate on Nikki's cardiac output.

(2)

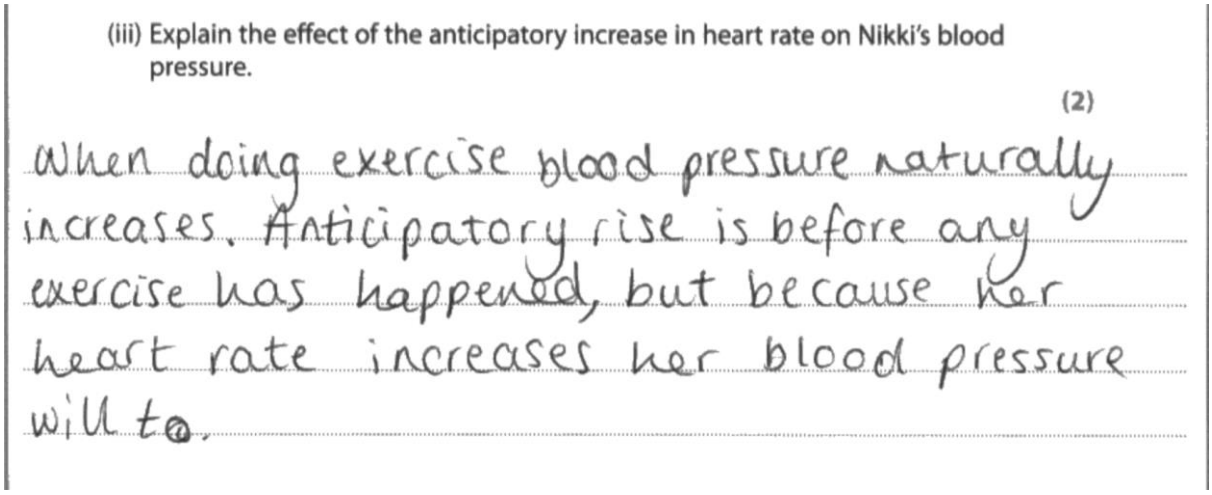
Cardiac output is made of heart rate and stroke volume
Q = HR x SV (Q = cardiac output)
Adrenaline makes the heart rate increase which will
then in turn increase the cardiac output, or amount
of blood pumped around the body.

A mark is awarded for identifying the increase in cardiac output and the second mark is awarded for the explanation, ie that heart rate is part of cardiac output so if you increase this you must increase the cardiac output.

Q 04 (b) (iii)

This part of the question asked learners to explain the effect of the anticipatory increase in heart rate on the gymnast's blood pressure. To gain both marks the learners had to state the effect, ie increased, and then state why this increase occurred.

This response gained 1 mark



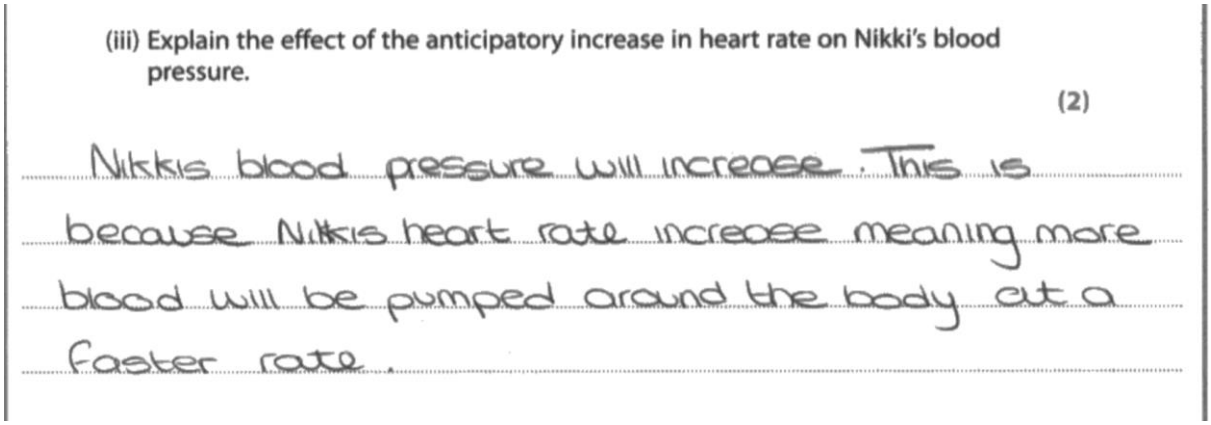
(iii) Explain the effect of the anticipatory increase in heart rate on Nikki's blood pressure.

(2)

When doing exercise blood pressure naturally increases. Anticipatory rise is before any exercise has happened, but because her heart rate increases her blood pressure will too.

A mark is awarded for identifying that there is an increase in blood pressure. There is an attempt to provide a reason, 'because her heart rate increases her blood pressure will too', but this is too vague for the mark to be awarded as we are not told why the increased heart rate would increase blood pressure.

This response gained 2 marks



(iii) Explain the effect of the anticipatory increase in heart rate on Nikki's blood pressure.

(2)

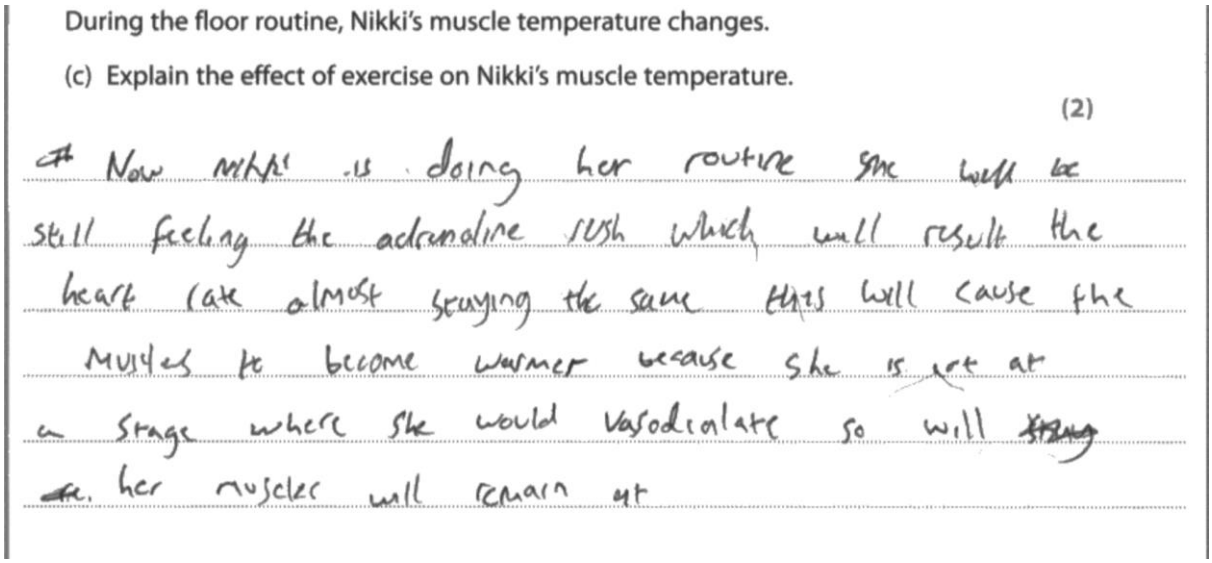
Nikkis blood pressure will increase. This is because Nikkis heart rate increase meaning more blood will be pumped around the body at a faster rate.

One mark is awarded for stating that blood pressure will increase, and a second mark is awarded for the reason for this, ie due to the increased heart rate blood would be flowing at a faster rate.

Q 4(c)

This part of the question asked learners to explain the effect of exercise on the gymnast's muscle temperature. Again, an accessible question as most learners achieved at least one mark for this question. Whilst the first marking point was accessible, learners just needed to state that the temperature would increase, learners found it much more challenging to achieve the second marking point. The required response was that the increase in muscle temperature was due to heat energy being given off as a by-product during muscle contraction. Whilst many learners were aware of this a large number incorrectly stated that the increase in temperature was due to vasodilation of the blood vessels, the increased rate of blood flow or due to sweating.

This response gained 1 mark



During the floor routine, Nikki's muscle temperature changes.

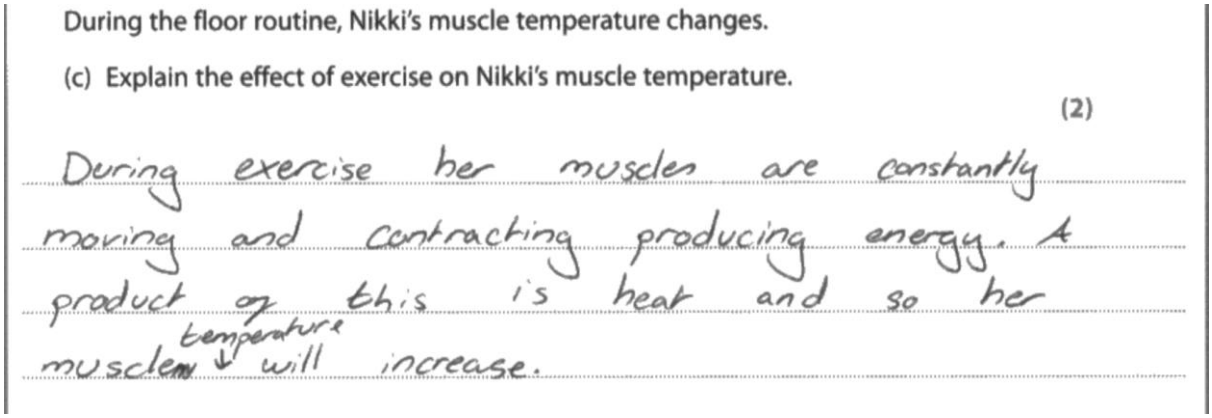
(c) Explain the effect of exercise on Nikki's muscle temperature.

(2)

Now Nikki is doing her routine she will be still feeling the adrenaline rush which will result the heart rate almost staying the same this will cause the Muscles to become warmer because she is not at a stage where she would vasodialate so will her muscles will remain at

Despite the irrelevant information, one mark was awarded for the increase in muscle temperature, 'this will cause the muscles to become warmer'

This response gained 2 marks


During the floor routine, Nikki's muscle temperature changes.

(c) Explain the effect of exercise on Nikki's muscle temperature.

(2)

During exercise her muscles are constantly moving and contracting producing energy. A product of this is heat and so her muscles temperature will increase.

One mark is awarded for identifying that muscle temperature increases and one mark is awarded for the reason for this, ie that 'during exercise her muscles are constantly moving and contracting producing energy. A product of this is heat'.

Q 4(d)

The final extended response question asked learners to analyse the nutritional strategies the gymnast should consider, to recover after her floor routine.

Learners were given information about the gymnastics routine to help inform their response. They were told that the routine requires power, speed and the ability to work at high intensity for up to 90 seconds.

As with the other extended responses the indicative content contained in the mark scheme is split into three sections, each section demonstrating typical content that a learner might include within the various levels of response. For example, a response placed in level 1 might just contain knowledge of nutritional strategies, this might be a brief factual account of general strategies that could be employed by any athlete. At level 2 it is likely responses would also have some application to the question context, for example linking the high intensity exercise to micro tears in the muscles or loss of fluid due to sweating to reduce heat during the routine. For a response to be placed at level 3 it would also require some analysis, ie why the routine means that they need to consider carbohydrate intake and what this will do for the gymnast.

Of the extended responses this topic area appeared to be the most accessible for learners, with a higher percentage achieving level 2 and level 3 compared to the other extended response questions.

Many learners were familiar with protein strategies and were able to talk about these in the context of the question providing a good analysis of the gymnasts needs in this respect. Carbohydrates were also referenced regularly but the application was not seen as often. Similarly, hydration was known, but the reasons for it and the impact on the gymnast were not so well known.

This response was placed at level 1 – 1 mark

(d) Analyse the nutritional strategies Nikki should consider to recover after her floor routine.

(8)

As Nikki has used a lot of energy and power it will probably resort in DOMS. This means she needs to rest for like 2 days after her competition. She needs to make sure she gets some protein in her system as this will help to recover of her muscles also she needs to make sure she gets some sugar as she has used alot of energy, probably get an energy as this will mean she wont intake any fats.

The response is very general and lacks subject specific knowledge, however, there is reference to protein and the need to use it in muscle recovery thus some credit is given.

This response was placed at level 2 – 4 marks

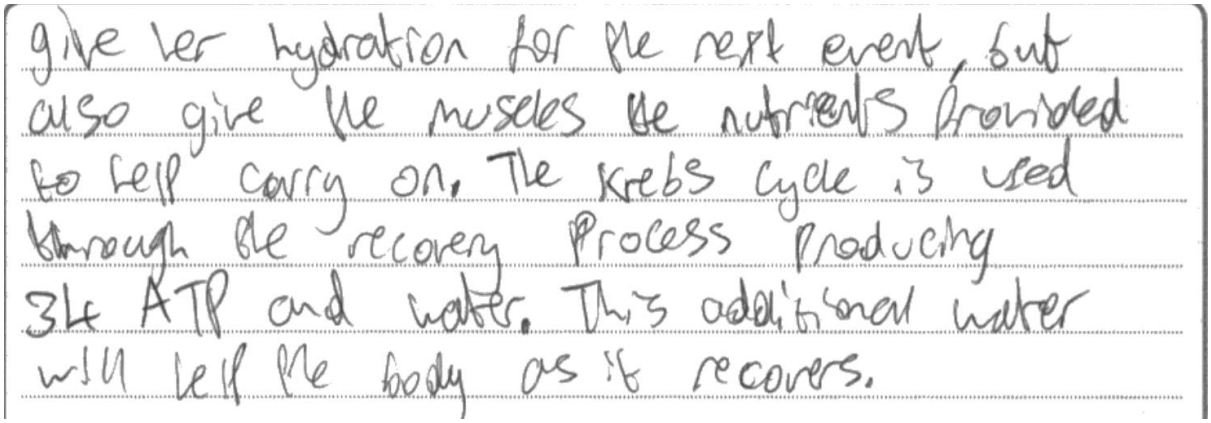
(d) Analyse the nutritional strategies Nikki should consider to recover after her floor routine.

(8)

Nikki will be performing at a high intensity through out the routine so therefore the muscles will be working hard and in doing so will ~~have~~ start to micro-tear. To help recover after Nikki will need to have an intake of protein in order to start the process of recovery the muscles so that the next event she goes to the body has started to slightly recover.

Nikki will also need to take on a high source of carbohydrates this is because she will need to aid and start to replenish her energy. Carbohydrates are a huge source of energy for the body which will allow the energy system to produce more ATP-PC at a faster rate.

Also, Nikki will need to take on fluid especially water. This is because it has the nutrients within it in order to


give her hydration for the next event, but also give the muscles the nutrients provided to help carry on. The krebs cycle is used through the recovery process producing 34 ATP and water. This additional water will help the body as it recovers.

Content contributing to the overall quality mark:

- the need for protein due to the potential for microtears in the muscles. This could have been further expanded on, analysing how the microtears came about and why protein would be so important to recovery
- the need for a carbohydrate strategy, but depth/quality of the response here was at level 1, there is no reference to the type of energy system/fuel source used or linked to the event and therefore what the carbohydrate is specifically being used for
- the need for a hydration strategy, but again why water would be needed as a result of the gymnastics routine is not clear, neither is the issue of not including it as a strategy.

This response was placed at level 3 – 8 marks

The three nutritional strategies from the specification are identified, this knowledge is linked to the question context, explaining how the routine causes a reduction in hydration, glycogen stores and the effect of the routine on the muscles. The impact of using each strategy is also analysed.

(d) Analyse the nutritional strategies Nikki should consider to recover after her floor routine.

(8)

Consuming simple carbohydrates after ~~the~~ each performance. As they are broken down quicker and release a quick rise in blood sugar levels to replenish some of the energy she has expelled. These can be jelly beans. As they will increase her energy levels after her floor routine. But they are also easy to consume making ~~time~~ them ideal to consume after each performance. TO help her with being able to work at a high intensity.

Hydration is important. This means that she will need to ~~drink~~ consume fluids like like an isotonic drink after her floor routine as they contain H2O carbohydrates to increase her energy levels and to replenish ~~the~~ some of the energy she has expelled. But also they contain water and they are rehydrate. This means that ~~they~~ they will also rehydrate her as dehydration can cause a loss in concentration and this would have a negative effect on her following performances. But also Nikki staying hydrated means she will be able to complete the routine effectively and this means she will be able to

Regulate her body temprture more efficently thy is extreamly important in sport as it will Prevent hypothermia and hypothermia.

She could also consume supplements like energy gels to increase her energy levels after her Performance. Thy is important as a floor routien is high intensity and means a lot of energy will be expelled. By consuming an energy gel it will replace the energy she has used. They are also quick and easy to consume making it ideal for her.

She could also consume a small amount of Protien in a shake, to help recovery of her muscles. As her floor routien requires speed and Power it means resistance will be Provided and could cause micro-tears in her muscles. By consuming a small amount of Protien it means her body can start to repair its muscle fibers, decreasing her fatigue levels soin the next event she could have maximised energy levels.

(Total for Question 4 = 18 marks)

Summary

- Please make sure that all centres read the Administrative Support Guide document for BTEC National in Sport that can be found on the Pearson Website at; http://qualifications.pearson.com/content/dam/pdf/BTEC-Nationals/Sport/20161/external-assessment/2017_Sport_ASG_L3_U2.docx Centres need to print off a Learner Record Sheet for each learner taking the task-based assessment and these should be submitted with their learner booklet.
- The scenario will always allow for all seven lifestyle factors to be commented on from the specification with regards to question 1. These are diet, exercise, smoking, alcohol, stress, exercise, sleep and sedentary lifestyle.
- Question 2 should see learners giving lifestyle modification techniques that are taken from the unit specification and that are relevant to the chosen individual within the scenario. These lifestyle modification techniques should then be justified taking the individual into content as well as the common barriers to change.
- Question 2, trait 3 asks learners to link their lifestyle modification techniques to the lifestyle factors from question one and give a conclusion that prioritises the different lifestyle modification techniques for the chosen individual. This will allow for more responses to fall into band 4 of the mark scheme for trait 3.
- Question 3 did not answer as well as expected this series. A large proportion of learners did not give specific nutritional guidance that would be relevant to a sprinter and would be more suited to a non-active individual. More specific guidance was needed as well as suitable justification to support this.
- For question 5, ensure the FITT principle is fully applied to the training programme including the intensity. For any aerobic based activity, the intensity values must include either MHR (Maximal Heart Rate) or BPM (Beats Per Minute). For any strength or muscular endurance based activities, the intensity must be in %1RM (One Rep Max).
- For question 6, ensure that the learners are justifying the design of their training programme through the application of the principles of fitness training. Some learners are only commenting on what they have planned for on specific days and weeks instead of demonstrating their knowledge around all of the principles of fitness training.