Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

Summer 2019

Pearson Edexcel GCSE
In Physical Education (3PE0) Short Course
Component 1: Theory

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Summer 2019
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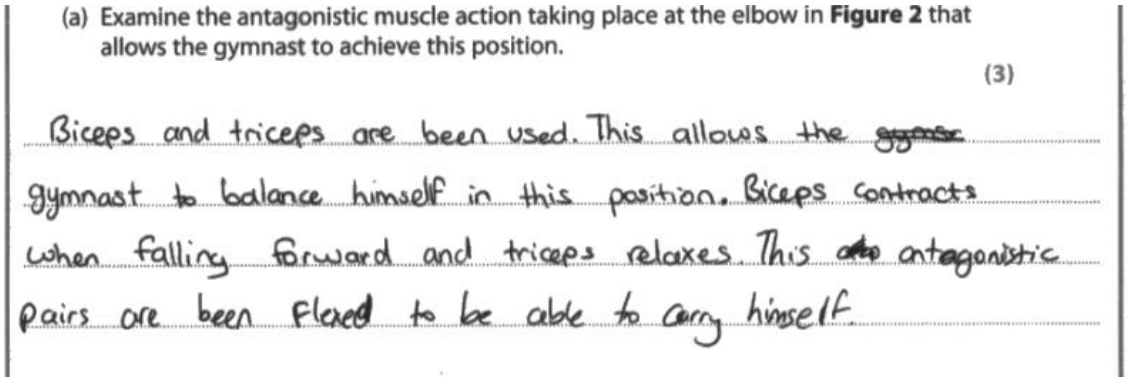
Introduction

This was the second series for this qualification. The level of difficulty of the paper was broadly in-line with the first series, with many candidates and centres showing good preparation, overall, achieving the full range of marks across all questions.
The paper begins with some multiple-choice questions; these are designed to be accessible for candidates. The main section of the paper is devoted to one, two, three or four-mark part questions - the question total might be larger than this, but the allocation of marks within the question will have been broken down into parts, e.g. part (a), (b) and so on.
The final section of the paper is comprised of an extended response question.
To access all available marks on 3PE0_01, candidates need to recall knowledge, demonstrate understanding of this knowledge through its application to a range of question scenarios. They will need to demonstrate understanding and higher-order skills of analysis and evaluation in the two, three, four and nine-mark questions.
It was pleasing to see the continued increase in the number of candidates providing well-structured, well-organised responses even to the most challenging questions. Many candidates developed their ideas, following a point through in greater depth for 'describe and explain' questions, rather than only providing a more generalised approach to their responses.

3PE0_01_Q02a

Candidates were given an image and asked to examine the antagonistic muscle action taking place at the elbow. In order to 'examine', there should be some analysis, therefore to gain maximum marks for this question, candidates would need to look at the image and analyse joint and muscle action allowing the elbows to extend as shown.
Most candidates correctly identified the biceps and triceps as being the antagonist pair operating at the elbow or that extension was occurring at the elbow. Many candidates were also able to go on to analyse the role of the biceps and triceps in bringing about this movement.
Where candidates did not achieve three marks, this tended to be due to confusion or contradictory statements over the role of the muscles. For example, no credit would be given for identifying the tricep correctly as the agonist but then stating that this was relaxing.
Whilst many candidates used correct technical language when answering this question, this was not always the case. For example, incorrect responses made reference to muscles flexing and extending, rather than contracting and relaxing.



(a) Examine the antagonistic muscle action taking place at the elbow in **Figure 2** that allows the gymnast to achieve this position.

(3)

Biceps and triceps are been used. This allows the ~~gymnast~~ gymnast to balance himself in this position. Biceps contracts when falling forward and triceps relaxes. This ~~also~~ antagonistic pairs are been flexed to be able to carry himself

The candidate correctly identifies the antagonistic muscle pair operating at the elbow. One mark

(a) Examine the antagonistic muscle action taking place at the elbow in **Figure 2** that allows the gymnast to achieve this position.

(3)

In figure 2 biceps and triceps work as antagonistic pairs. ~~The~~ Both arms are extended which means that tricep contracts and bicep relaxes. This allows the gymnast to keep balance during this position.

The antagonistic pair operating at the elbow are correctly identified, as is the joint movement at the elbow. There is also appropriate analysis of the role of each muscle. Three marks

3PE0_01_Q02b

Candidates were told that the body weight of the gymnast in the image was being supported by the bones in the wrist. They were then asked to classify these bones.
Many candidates correctly identified these as short bones. Incorrect responses included the classification of the joint, rather than of the bone type, emphasising the need for candidates to be familiar with the terminology used within the specification to differentiate between different areas of knowledge.

(b) The gymnast in **Figure 2** is supporting her body weight using the bones in the wrist.

Classify the bones of the wrist.

(1)

Carpels

The carpals are the names of the bones in the wrist rather than their classification. Zero marks

(b) The gymnast in **Figure 2** is supporting her body weight using the bones in the wrist.

Classify the bones of the wrist.

(1)

Short bones

The bones of the wrist are correctly classified as short bones. One mark

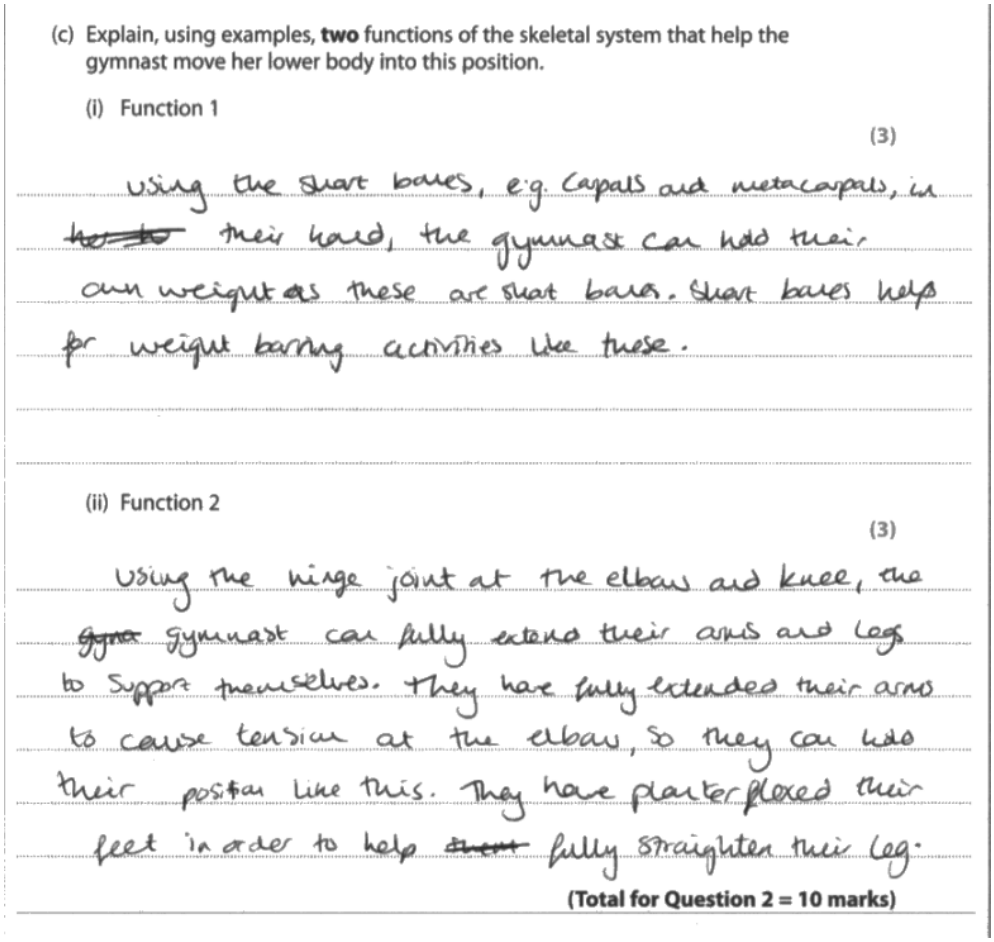
3PE0_01_Q02c

For this part of the question, candidates were asked to explain, using examples, two functions of the skeletal system that would help the gymnast move her lower body into the position shown in the image.

As the question specifically referenced the lower body any links to the upper body were not credited, emphasising the need for candidates to take time to read questions carefully, even under potentially stressful examination conditions. The required functions were muscle attachment or the use of joints. Support was also accepted. Other functions such as protection and blood cell production were not accepted, due to the question context.

As the use of examples was specifically requested in the question a mark was available for these within the explanation. This was often the mark achieved by candidates. For example, the ball and socket joint at the hip allowing flexion to lift the legs in the position shown was often cited correctly.

Whilst some candidates did achieve maximum marks for this question, the requirement to provide two functions was quite challenging, therefore many candidates achieved well for one function but not necessarily for two. In many cases, candidates received two marks for each function, omitting the 'explanation' mark, gaining credit for identification of the function and giving an appropriate example.



(c) Explain, using examples, **two** functions of the skeletal system that help the gymnast move her lower body into this position.

(i) Function 1

(3)

Using the short bones, e.g. Carpals and metacarpals, in ~~her~~ their hand, the gymnast can hold their own weight as these are short bones. Short bones help for weight barring activities like these.

(ii) Function 2

(3)

Using the hinge joint at the elbow and knee, the ~~gym~~ gymnast can fully extend their arms and legs to support themselves. They have fully extended their arms to cause tension at the elbow, so they can hold their position like this. They have plantar flexed their feet in order to help ~~them~~ fully straighten their leg.

(Total for Question 2 = 10 marks)

Function 1 - The candidate provides an appropriate example of one of the functions of the skeleton. i.e. that the short bones in the hand allow the gymnast to take their weight on their hands to achieve this position.
Function 2 - The candidate provides another suitable example of a function of the skeletal system. The example is credited as it relates to a different function of the skeleton, (joints rather than support).
Two marks

(c) Explain, using examples, **two** functions of the skeletal system that help the gymnast move her lower body into this position.

(i) Function 1

(3)

The skeletal system has joints for movement. The gymnast has a ball and socket joint between their pelvis and femur. This allows a wide range of movement from circumduction to flexion and extension to adduction and abduction. This ball and socket joint allows the gymnast to lift her legs through flexion of their body at the hip.

(ii) Function 2

(3)

The skeletal system also has a large surface area for muscle attachment. Her the femur has a large surface area for muscle attachment of quadriceps to the long bone, femur, by tendons. Here tendons pull on the skeletal system causing extension of the leg at the knee and acheive this position.

(Total for Question 2 = 10 marks)

Function 1 - the function of joints for movement is correctly identified. The example of the hip joint is provided and there is expansion of this point, explaining how this helps the gymnast achieve this position.
Function 2 - the function of muscle attachment is correctly identified. How this aids movement is expanded on, the muscles being attached to the skeleton by tendons which pull on the bone and a relevant example is given of the muscle responsible for causing extension of the leg at the knee.
Six marks

3PE0_01_Q03a

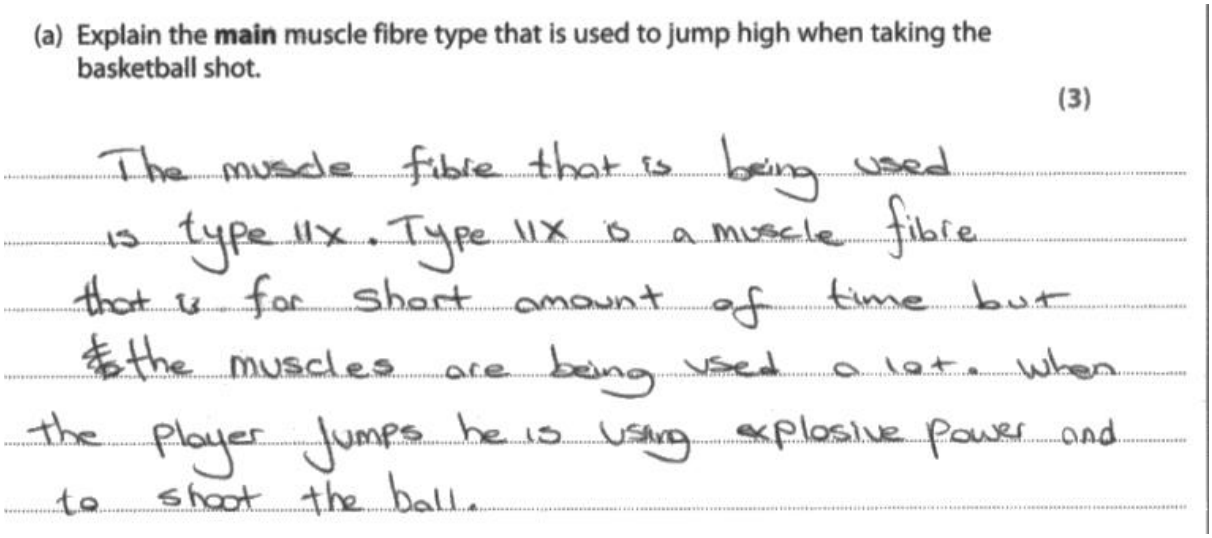
Candidates were supplied with an image of an individual jumping high during a practice shot in basketball. The image was not in the context of a game situation, but a lone player taking a shot. The question asked candidates to explain the main muscle fibre type used to get the height required whilst taking the shot. The word 'main' was in bold for emphasis.

The full range of marks continued to be accessed by candidates for this question. Type IIx was the fibre type required for one mark. To gain the 'explain' marks, candidates needed to talk about the nature of the action, e.g. explosive and a characteristic of the fibre type that allowed it to produce the necessary power, e.g. contracts forcibly.

Of the three available marks, it was the characteristic of the muscle fibre type that made it suitable for the activity, that was often omitted. Candidates who selected any other fibre type did not gain credit.

It is important when answering this type of question that candidates state why this particular fibre type would be used. i.e. by providing a relevant characteristic of the fibre type, e.g. although type IIx do fatigue quickly this does not explain why they are used.

Some candidates used 'energy' rather than power or force, and this was not credited.



(a) Explain the **main** muscle fibre type that is used to jump high when taking the basketball shot.

(3)

The muscle fibre that is being used is type IIx. Type IIX is a muscle fibre that is for short amount of time but the muscles are being used a lot. when the player jumps he is using explosive power and to shoot the ball.

The correct musle fibre type is identified and there is appropriate analysis of the action, ie that it is a powerful, explosive action.

To gain maximum marks there should also be a justification to explain why this is the most suitable muscle fibre type for this type of action.

Two marks

(a) Explain the **main** muscle fibre type that is used to jump high when taking the basketball shot.

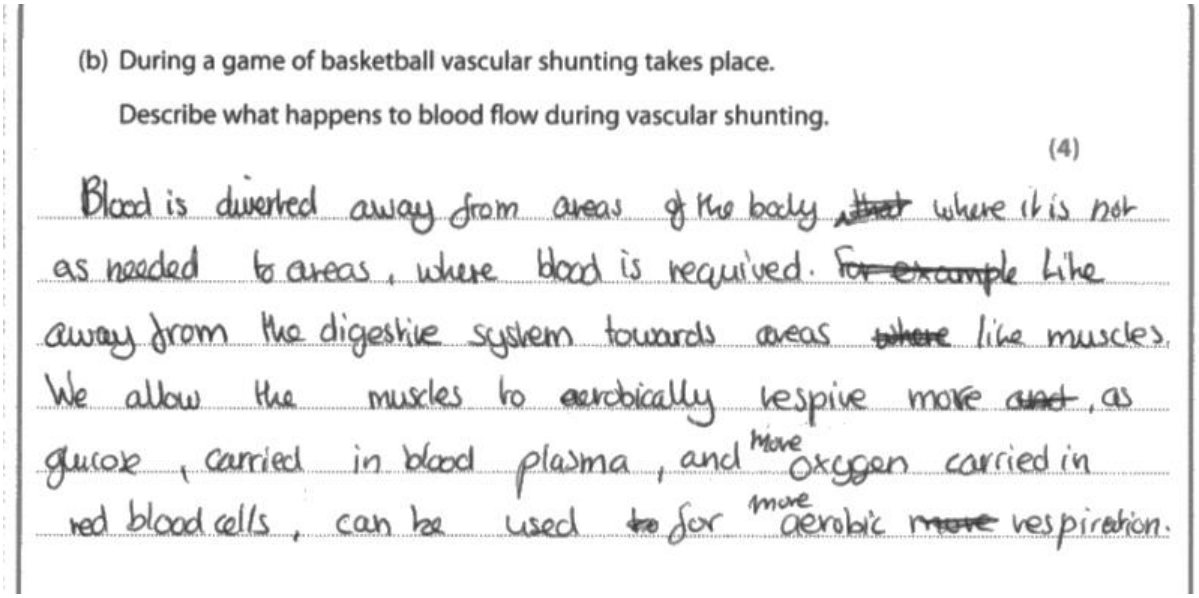
(3)

Type IIx is used → because the basketball player is doing an explosive action, and type IIx ~~allows for~~ generates much greater force and allows him to jump high and take the shot

Type IIx is correctly identified. The action is correctly analysed as being explosive and justification is given why this fibre type is used i.e. that the fibre type generates greater force allowing them to jump high.
Three marks

3PE0_01_Q03b

This question asked candidates to describe what happens to blood flow during vascular shunting. 'Describe' questions ask for an account of something: there is no need to provide reasons, therefore all that was required for this question was an account of the changes in blood flow. Typical correct responses were well-phrased and succinct, describing the increase in blood flow to active areas through vasodilation and the decrease in blood flow to inactive areas by vasoconstriction. This would have been sufficient for maximum marks.
If candidates were unfamiliar with the terminology of vasodilation/vasoconstriction full marks could still be achieved by describing the increase/decrease in the size of the lumen in the blood vessel.



(b) During a game of basketball vascular shunting takes place.

Describe what happens to blood flow during vascular shunting.

(4)

Blood is diverted away from areas of the body ~~that~~ where it is not as needed to areas, where blood is required. ~~For example~~ like away from the digestive system towards areas ~~where~~ like muscles. We allow the muscles to aerobically respire more ~~and~~, as glucose, carried in blood plasma, and more oxygen carried in red blood cells, can be used ~~to~~ for more aerobic ~~more~~ respiration.

The response gives a partial description of vascular shunting. The decrease in blood flow to inactive areas is noted as is the increase in blood flow to active areas. Why this is necessary is not required in this part of the question as it is not part of the process, but rather why the process happens.
Two marks

(b) During a game of basketball vascular shunting takes place.

Describe what happens to blood flow during vascular shunting.

(4)

vascular shunting is the redistrobution of bloodflow blood to ~~areas~~ working muscles, for a example, during a 100m sprint, vascular shunting will take place to redistrobute blood to the legs via ~~vasoconstriction~~ vasodilation, as there is a higher demand for oxygen in the legs than the arms, so blood vessels will vasodilate sending more blood to the working muscles.

A partial description is given of vascular shunting.
This is a partial description as it only focuses on the increased blood flow to the active areas, omitting the part of the process that reduces blood flow to inactive areas.
Two marks

(b) During a game of basketball vascular shunting takes place.

Describe what happens to blood flow during vascular shunting.

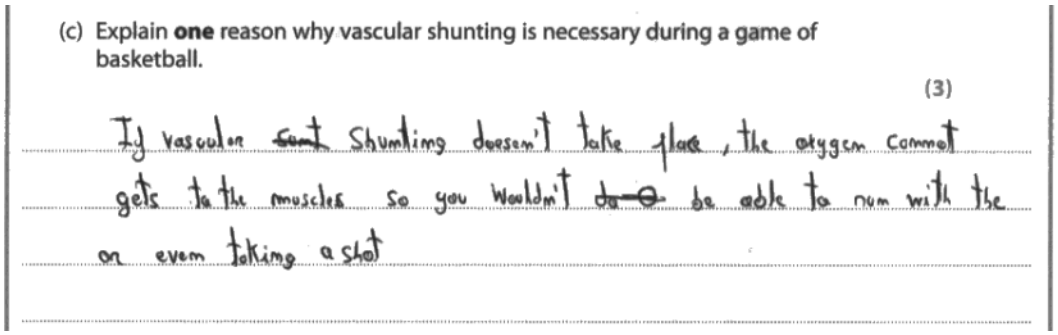
(4)

Vascular shunting is the redistribution of blood to the working muscles using vasoconstriction and vasodilation. In the areas ~~that~~ of the body that are not being used as much during the basketball game, ~~such~~ such as the digestive system, ~~vasodilation~~ vasoconstriction will occur, narrowing the internal diameter of the lumen in the arteries so less blood flows in that direction. ~~in the areas of~~ vasodilation will take place around the working muscles such as in the legs, widening the internal diameter of the lumen in the arteries so that more

This response provides a full description of vascular shunting.
Four marks

3PE0_01_Q03c

Some candidates had difficultly differentiating between Q03(b) and Q03(c). Part (c) was an 'explain' question and set in a specific activity context requiring application of knowledge, rather than just the recall of knowledge required in (b).
The issue with this was that these candidates often repeated responses suitable for (b) by describing the process of vascular shunting. Many candidates did, however, gain a mark by explaining the importance of oxygen being delivered to the working muscles.
High-scoring responses included information about oxygen to muscles, the use of this oxygen for energy and then linked this to a delay in fatigue. Marks could also have been gained by referring to carbon dioxide transport or temperature control. Whilst these were accessed, it was with much less frequency.

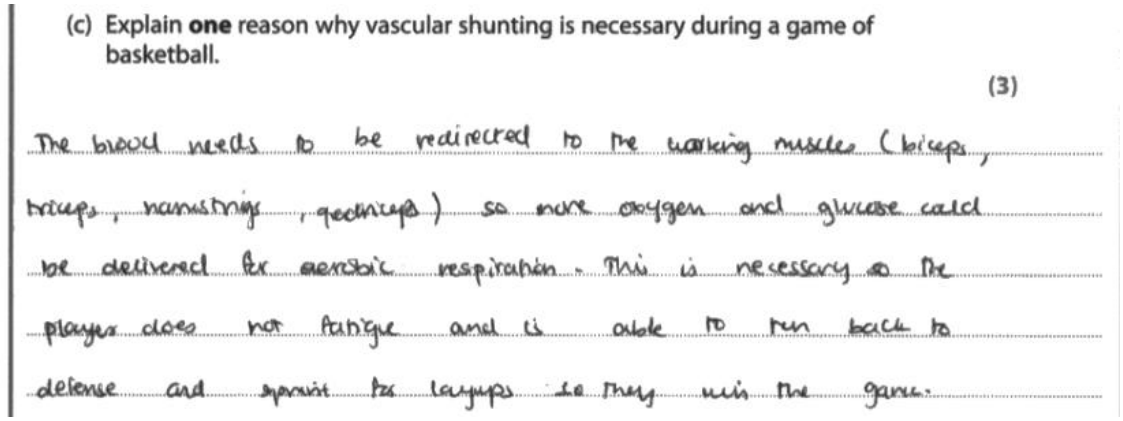


(c) Explain **one** reason why vascular shunting is necessary during a game of basketball.

(3)

If vascular ~~cont~~ Shunting doesn't take place, the oxygen cannot gets to the muscles so you wouldn't ~~do~~ be able to run with the on even taking a shot

A reason is given why vascular shunting is necessary during exercise, i.e. to ensure oxygen gets to the muscles. Whilst there is a limited attempt to explain why this is necessary it is too vague for further credit. One mark



(c) Explain **one** reason why vascular shunting is necessary during a game of basketball.

(3)

The blood needs to be redirected to the working muscles (bicepes, triceps, hamstrings, quadriceps) so more oxygen and glucose could be delivered for aerobic respiration. This is necessary so the player does not fatigue and is able to run back to defense and sprint for layups so they win the game.

A valid reason for vascular shunting is given and then succinctly explained, including an impact on performance. Oxygen and nutrients are needed by the muscles, so they can aerobically respire so the player does not fatigue. Three marks

3PE0_01_Q04

Candidates were presented with a table to complete in this question. There were two tasks associated with the question, the first, to identify a short-term effect of exercise on the three named body systems. The second was to give an example of the importance of this short-term effect on the performer during exercise.
Whilst some candidates confused the respiratory and cardiovascular systems, generally, candidates demonstrated good knowledge of the short-term effect of exercise on the body systems. The muscular system proved more challenging.
Common incorrect responses focussed on long-term adaptations rather than short-term effects, or lacked clarity. For example, some candidates made reference to more oxygen to the working muscles as the importance of increased tidal volume, rather than increased oxygen intake (or equivalent).
Short-term effects on the cardiovascular and respiratory systems were the most frequent correct answers. The importance of the cardiovascular system in terms of oxygen transport was also often identified correctly, therefore a large number of candidates achieved at least three of the available six marks for this question.

4 Exercise causes short-term effects on our body systems.

Complete **Table 2** by:

(a) Stating **one** short-term effect of exercise on each of the named body systems.

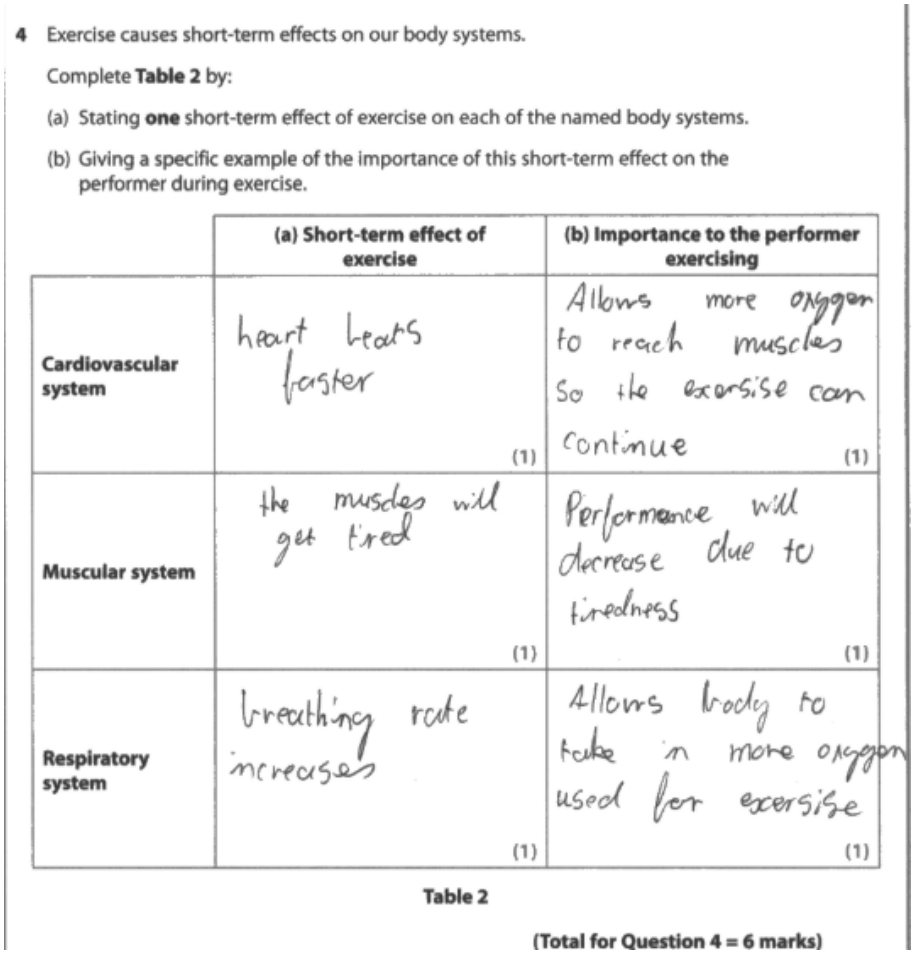
(b) Giving a specific example of the importance of this short-term effect on the performer during exercise.

	(a) Short-term effect of exercise	(b) Importance to the performer exercising
Cardiovascular system	Heart rate increases. (1)	More oxygen can be transported to the working muscles via the blood stream. (1)
Muscular system	Muscular hypertrophy (1)	Muscles become stronger and can exercise for longer. (1)
Respiratory system	Breathing rate increase. (1)	More air is breathed into the lungs. More oxygen to the blood stream – to go to working muscles. (1)

Table 2

(Total for Question 4 = 6 marks)

(a) Short-term effects of exercise on the cardiovascular and respiratory systems are correctly identified. Hypertrophy is a long-term adaptation therefore is incorrect.
(b) The importance of the increase in heart rate during exercise is correctly stated as an increase in oxygen delivery.
Three marks



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Complete **Table 2** by:

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(b) Giving a specific example of the importance of this short-term effect on the performer during exercise.

	(a) Short-term effect of exercise	(b) Importance to the performer exercising
Cardiovascular system	heart beats faster (1)	Allows more oxygen to reach muscles so the exersise can continue (1)
Muscular system	the muscles will get tired (1)	Performance will decrease due to tiredness (1)
Respiratory system	breathing rate increases (1)	Allows body to take in more oxygen used for exersise (1)

Table 2

(Total for Question 4 = 6 marks)

(a) The response provides a valid short-term response of each body system to exercise.
(b) The importance of all of these responses is also accurately provided for each body system
Six marks

3PE0_01_Q05a

This question asked candidates to identify the class of lever in use when moving from standing to going onto toes. An image was also provided, therefore the movement being described was clear.
Many candidates identified correctly the second-class lever system.
Incorrect responses tended to be either first-class or third-class levers, with similar frequency.
Occasionally, candidates would state the name of a plane, instead of the required lever system.

5 **Figure 4** shows a performer during a weight training session.

(Source: © Nicholas Piccillo/Shutterstock)

Figure 4

(a) Identify the class of lever system in use when the performer moves from standing onto her toes in **Figure 4**.

(1)

1st class lever system

An incorrect lever system is identified.
Zero marks

(a) Identify the class of lever system in use when the performer moves from standing onto her toes in **Figure 4**.

(1)

Second Class lever.

The correct lever system is identified.
One mark

3PE0_01_Q05b

This question asked candidates to give another example of the use of this lever system, in any sporting situation.
This was designed as a very accessible question, which gave candidates much scope when choosing a relevant example. The majority of candidates took advantage of this opportunity, securing the available mark.
Where the mark was not achieved, this tended to be because the response had not been linked to a sporting activity. Alternatively, it was because the response was too vague. Candidates might name a sport such as football, rather than providing an example from a specific sporting situation within football, e.g. at take-off, when jumping to head the ball.

(b) Give another example of the use of **this** lever system, at the ankle, in a sporting situation of your choice.

(1)

loom Sprint

The response is too vague for credit. A sport/activity is stated rather than a specific sporting situation. E.g. when pushing off the starting blocks to start the 100m
Zero marks

(b) Give another example of the use of **this** lever system, at the ankle, in a sporting situation of your choice.

(1)

take off a high [redacted] jump

A relevant sporting situation is given where this second class lever system would be used.
One mark

3PE0_01_Q05c

This question asked candidates to define mechanical advantage. Some candidates did this but others focussed instead on the arrangement of the lever system that allowed a mechanical advantage, referring to the length of effort and load arms. Whilst this is good knowledge, it does not address the specific question.

A number of candidates took a different approach, trying to link to the use of machinery to aid performance, but this could not be credited. To gain the mark, candidates needed to make clear that a load could be moved with relatively small muscular effort. A wide range of alternative ways of expressing this was accepted.

(c) The lever system being used in **Figure 4** provides a mechanical advantage.

Define the meaning of the term mechanical advantage.

(1)

a mechanical advantage is when the effort arm is longer than the load arm making

(Total for Question 5 = 3 marks)

Rather than define the meaning of the term mechanical advantage the response states the arrangement of the lever system that would allow a mechanical advantage.
Zero marks

(c) The lever system being used in **Figure 4** provides a mechanical advantage.

Define the meaning of the term mechanical advantage.

(1)

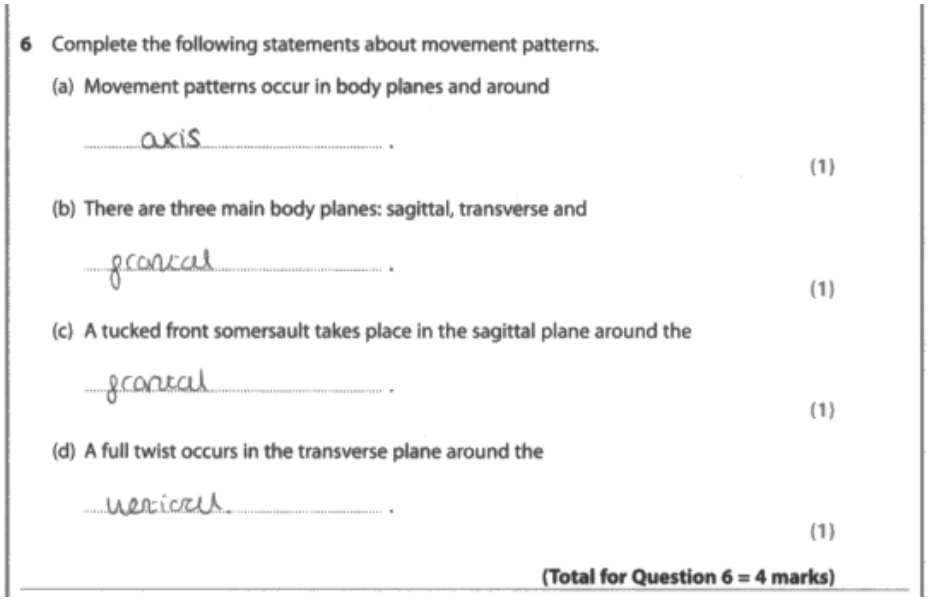
when a heavy weight can be lifted with relatively low effort. for example first and second class levers.

(Total for Question 5 = 3 marks)

An appropriate definition of mechanical guidance is given.
One mark

3PE0_01_Q06

This question tests candidates' knowledge of planes and body axes. The majority of candidates received at least one mark for this question, although many candidates received more. Of the parts to the question, (a) and (b) appeared more accessible than (c) and (d).



6 Complete the following statements about movement patterns.

(a) Movement patterns occur in body planes and around

axis .

(1)

(b) There are three main body planes: sagittal, transverse and

frontal .

(1)

(c) A tucked front somersault takes place in the sagittal plane around the

frontal .

(1)

(d) A full twist occurs in the transverse plane around the

vertical .

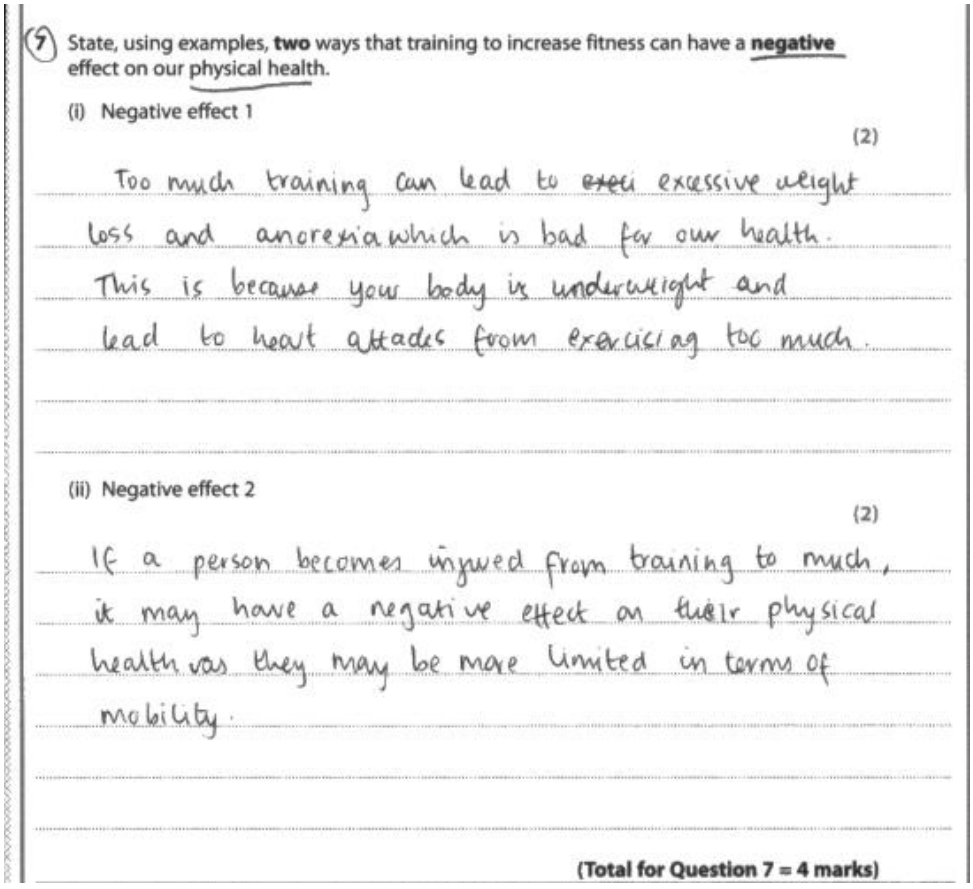
(1)

(Total for Question 6 = 4 marks)

All parts of the question correctly answered.
Four marks

3PE0_01_Q07

This question required candidates to apply their knowledge of physical health and fitness. Candidates were asked to provide two examples and state how training to increase fitness can negatively affect health. To gain both marks for each example, the negative effect needed to be clearly stated and an example of this provided, e.g. one effect could be a less effective immune system and the example that they were more prone to illnesses such as colds.
Popular correct responses tended to relate to increased risk of injury, for example a twisted ankle or muscle tear. Where maximum marks were not achieved, this tended to be because only one response was attempted, or, more often, just examples were given.



(7) State, using examples, **two** ways that training to increase fitness can have a **negative** effect on our physical health.

(i) Negative effect 1

(2)

Too much training can lead to ~~exci~~ excessive weight loss and anorexia which is bad for our health. This is because your body is underweight and lead to heart attacks from exercising too much.

(ii) Negative effect 2

(2)

If a person becomes injured from training to much, it may have a negative effect on their physical health as they may be more limited in terms of mobility.

(Total for Question 7 = 4 marks)

(i) The example of excessive weight loss due to training is given, without the statement of why this may occur, e.g. that training may result in upsetting the energy balance if more calories are used than consumed.
(ii) Injury as a consequence of training is given, without the statement of why this may occur.
Two marks

7 State, using examples, **two** ways that training to increase fitness can have a **negative** effect on our physical health.

(i) Negative effect 1

(2)

can lead to injury - training to increase fitness can lead to injury (e.g. a pulled muscle) or may lead to overtraining, which can then result in an injury.

(ii) Negative effect 2

(2)

can lead to extreme weight loss - Training to increase fitness would require a lot of energy. This would be gained through the burning of fats. However, if this energy is not replaced (through food) the person may become under weight and have lower levels of energy.

(Total for Question 7 = 4 marks)

Two ways that training can negatively affect physical health are given with appropriate examples to gain maximum marks.
Four marks

3PE0_01_Q08

Whilst the specification does not require candidates to carry out a PEP, candidates are required to know why it is important to monitor training programmes.
Important information is given in the question, which most candidates used to help guide their responses. In particular, that this question concerned monitoring a programme, ie not the initial planning, and that it was about making sure the training was effective.
Whilst some candidates ignored this additional information and talked about initial fitness testing and the reasons for this, most gained a mark for explaining that it was important because it allowed them to track their progress or to check that they were making progress.
Candidates gained further credit by developing this a little further, acknowledging that this allowed them to see if the programme was working or needing amendment.

8 To make sure training is effective a training programme must be carefully designed, developed, monitored and evaluated.

Explain why it is important to monitor a training programme.

(3)

it is important to monitor a training programme so that you can see if it is working, that they can still have a normalise, am not be really tired, that they can't easily move, e.g. muscle fatigue.

A reason for monitoring a training programme is given, ie to see if the programme is working.
One mark

8 To make sure training is effective a training programme must be carefully designed, developed, monitored and evaluated.

Explain why it is important to monitor a training programme.

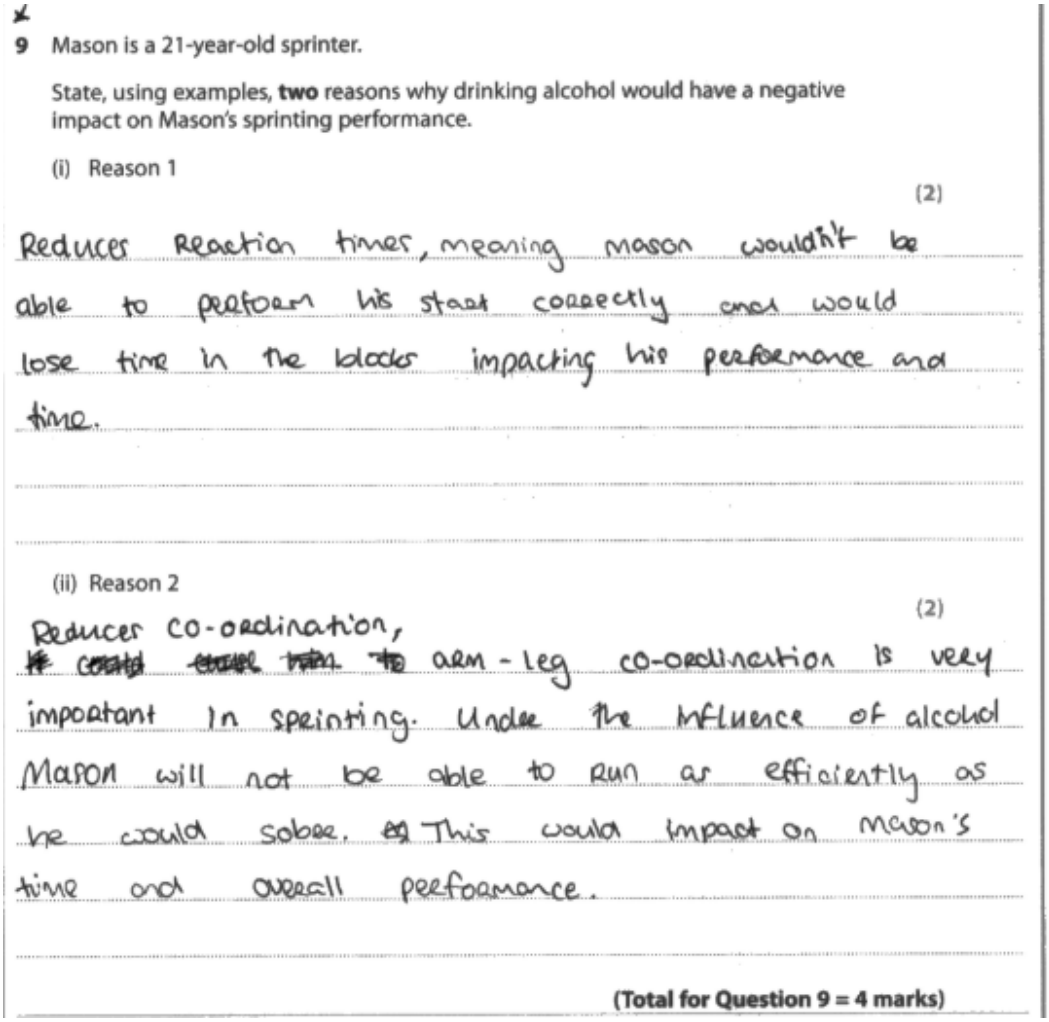
(3)

It is important to monitor a training programme for many reasons. It allows us to track progress. To this is useful as when we see the progress it gives us a boost ~~as it motivates us~~ and motivates us to keep going. It also allows us to make sure the training plan is suitable and if it's working correctly - if they aren't reaching their goals we will know that we need to alter parts of the training plan. Monitoring the plan will also help make sure their goals are attainable and will be reached in the time frame. **(Total for Question 8 = 3 marks)**

Tracking progress is given as an appropriate reason to monitor a training programme. Why this is important is expanded on in terms of seeing progress being motivating to the performer and the impact of this that it will motivate them to continue with training. A second justification, although not required, is also provided in the response through the statement that this allows a check to see the programme is working correctly, the impact of this being that changes can be made to the programme if it is not working.
Three marks

3PE0_01_Q09

This question required candidates to apply their knowledge of the negative effects of alcohol on performance. Candidates were asked to provide two reasons, with examples, why drinking alcohol would have a negative effect on a 100m sprinter.
Popular correct reasons for the sprinter not drinking alcohol focused on slower reaction time, this was often applied well, linking to a slower start; reduced coordination impacting on technique or an increase in weight slowing the runner down. Incorrect responses tended to focus on long-term effects of alcohol addiction on general health and well-being rather than the specific question context.



9 Mason is a 21-year-old sprinter.

State, using examples, **two** reasons why drinking alcohol would have a negative impact on Mason's sprinting performance.

(i) Reason 1

(2)

Reduces Reaction times, meaning mason wouldn't be able to preform his start correctly and would lose time in the blocks impacting his performance and time.

(ii) Reason 2

(2)

Reduces co-ordination, ~~it could affect the~~ arm - leg co-ordination is very important in sprinting. Under the influence of alcohol Mason will not be able to run as efficiently as he could sobee. eg This could impact on mason's time and overall perfoamance.

(Total for Question 9 = 4 marks)

(i) Reason 1 - although the response states that alcohol reduces reaction time, given the explanation the candidate intent is clear, i.e. that the reduction means the reaction time is worse. There is also a clear impact of this on the sprinter's performance.
(ii) Reason 2 - reduced coordination is also a valid reason for a sprinter not to drink alcohol. The impact of this on the sprinter's technique and time is also clear.
Four marks

(i) Reason 1

(2)

Alcohol is a diuretic, this means that it makes you need to urinate. If you are urinating alot you will ~~lose~~ lose alot of body fluid which can make you dehydrated. Mason's spinning would deteriate if he became dehydrated as it would make him lightheaded and unwell and therefore unable to train.

(ii) Reason 2

(2)

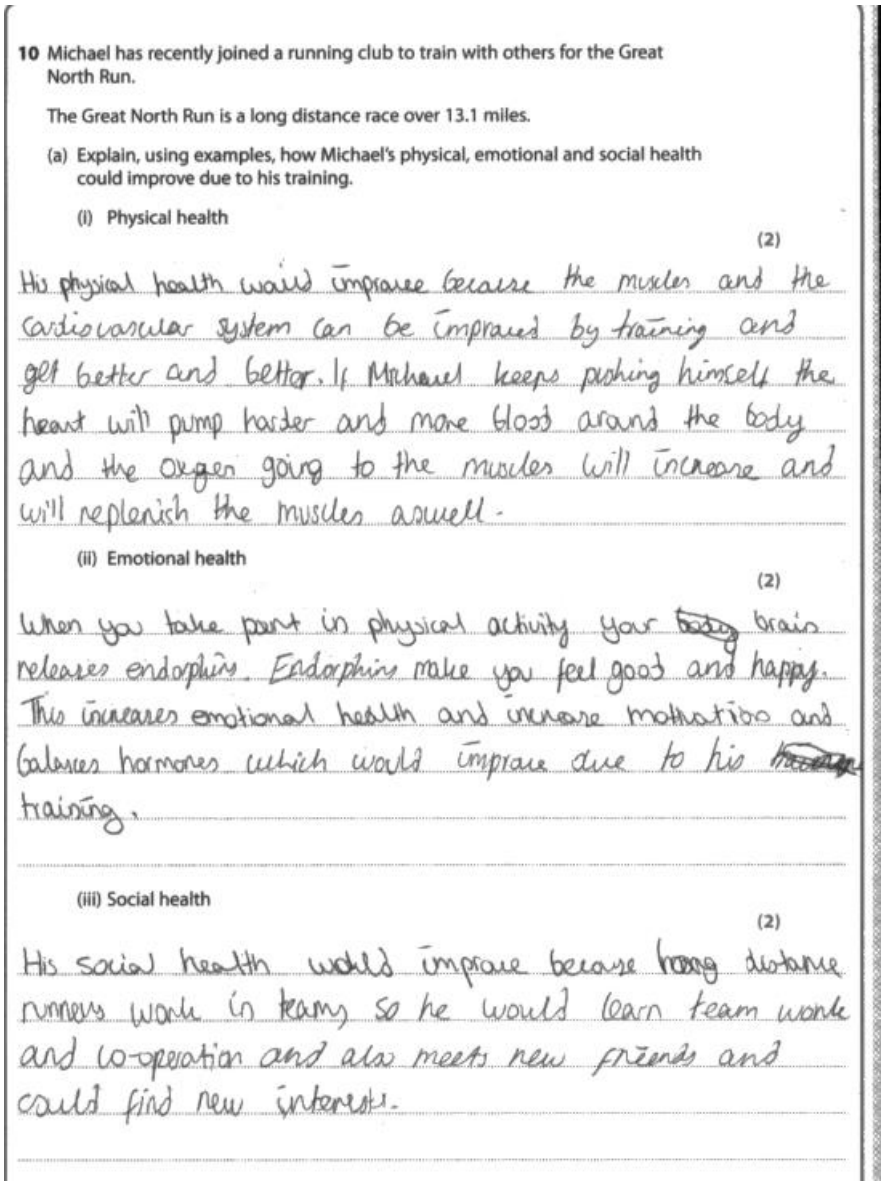
Alcohol can disrupt your sleeping pattern. Staying up late and drinking would make Mason very tired, it also limits the body's ability to sleep. If Mason doesn't sleep well, his readiness would effect his training and performance hugely, as sleep is vital for recovery and resting of your mind and muscles, so he wouldn't be able to train as much or at as high a intensity.

(Total for Question 9 = 4 marks)

Two other distinctive reasons for the sprinter not drinking alcohol are given in this response.
(i) Reason 1 - alcohol is correctly identified as a diuretic and therefore a reason why the sprinter should not drink alcohol. This is then linked to the potential for dehydration and subsequent impact on performance.
(ii) Reason 2 - disruption to sleep patterns is also a valid reason for a sprinter not to drink alcohol. The impact of this on the sprinter's ability to recover and subsequent quality of training is also clear.
Four marks

3PE0_01_Q10a

The context for this question was a long-distance runner who recently joined a running club so they could train with others before taking part in a half marathon.
This question required candidates to apply their knowledge of the effects of exercise on the three aspects of health: physical, emotional and social.
The question scenario is given to help candidates focus their knowledge. For example, running is a weight bearing activity, this can have a positive impact on physical health by reducing the risk of osteoporosis. Exercise such as running is a great way to relieve stress as your mind is taken off of normal day-to-day problems and therefore is good for emotional health. By joining a new club and training with others social health can be improved as there is opportunity to make new friends. Many candidates used the scenario to help inform their answers. Of the three aspects of health, physical health appeared to be least accessible, incorrect responses often focusing on physical fitness instead.



10 Michael has recently joined a running club to train with others for the Great North Run.

The Great North Run is a long distance race over 13.1 miles.

(a) Explain, using examples, how Michael's physical, emotional and social health could improve due to his training.

(i) Physical health

(2)

His physical health would improve because the muscles and the cardiovascular system can be improved by training and get better and better. If Michael keeps pushing himself the heart will pump harder and more blood around the body and the oxygen going to the muscles will increase and will replenish the muscles aswell.

(ii) Emotional health

(2)

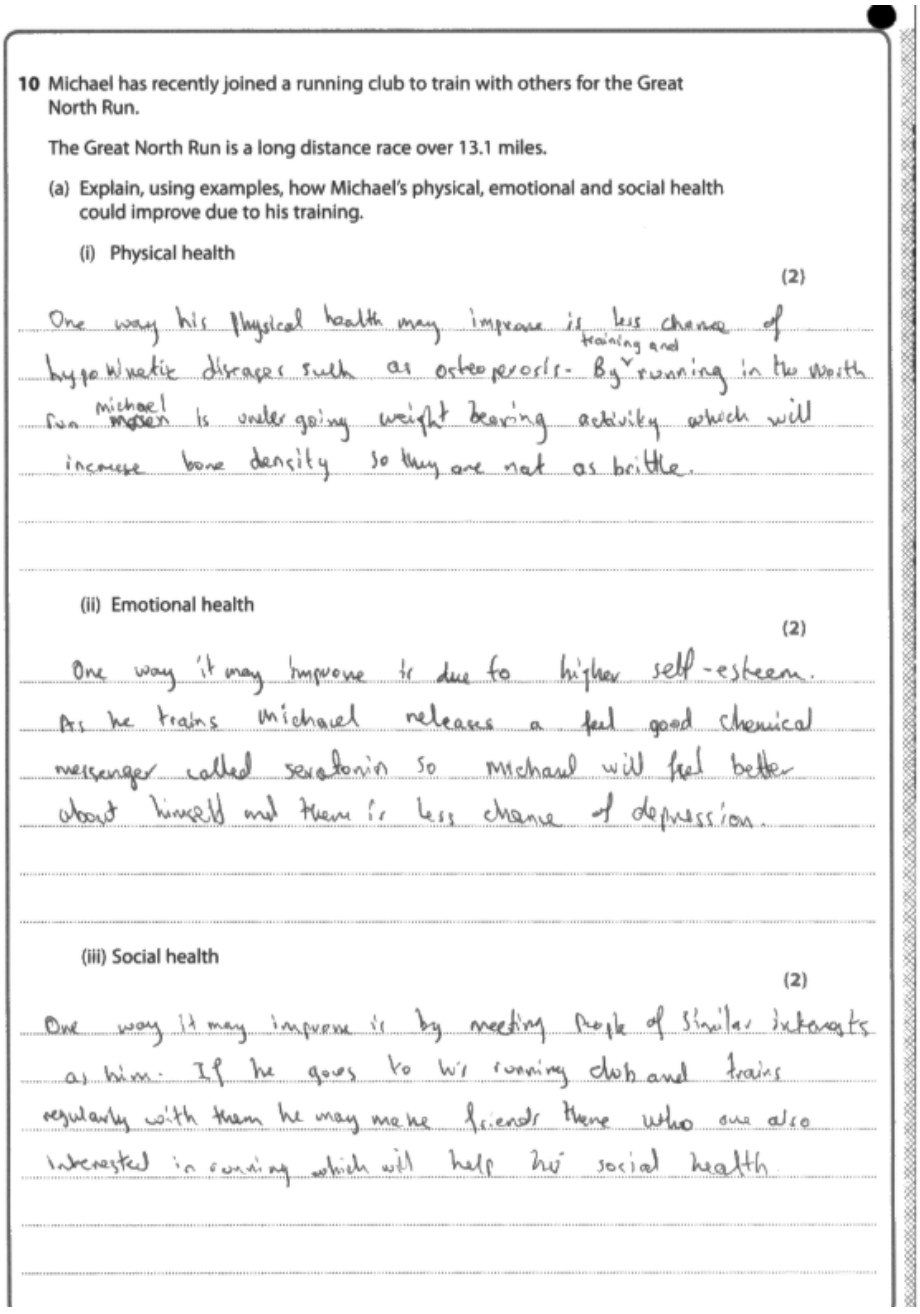
When you take part in physical activity your ~~body~~ brain releases endorphins. Endorphins make you feel good and happy. This increases emotional health and increase motivation and balances hormones which would improve due to his ~~training~~ training.

(iii) Social health

(2)

His social health would improve because long distance runners work in teams so he would learn team work and co-operation and also meets new friends and could find new interests.

(i) Physical health - this part of the response focuses on the effects of exercise on body systems, linking to fitness rather than physical health therefore no marks are awarded for this section.
(ii) Emotional health - the explanation that exercise releases endorphins which improves emotional health by making the runner feel better/happier is credited.
(iii) Social health - the explanation that running in a team develops teamwork and cooperation and also provides an opportunity to meet new friends provides ample explanation of the social health benefits of exercise.
Four marks



10 Michael has recently joined a running club to train with others for the Great North Run.

The Great North Run is a long distance race over 13.1 miles.

(a) Explain, using examples, how Michael's physical, emotional and social health could improve due to his training.

(i) Physical health

(2)

One way his physical health may improve is less chance of hypokinetic diseases such as osteoporosis- By training and running in the north run ~~mosen~~ michael is undergoing weight bearing activity which will increase bone density so they are not as brittle.

(ii) Emotional health

(2)

One way it may improve is due to higher self-esteem. As he trains michael releases a feel good chemical messenger called serotonin so michael will feel better about himself and there is less chance of depression.

(iii) Social health

(2)

One way it may improve is by meeting people of similar interests as him. If he goes to his running club and trains regularly with them he may make friends there who are also interested in running which will help his social health

A health benefit is stated and explained for each aspect of health for maximum marks.
(i) Physical health - reduced risk of osteoporosis due to weight bearing activity
(ii) Emotional health - serotonin release due to exercise causing a feel good factor
(iii) Social health - meeting people of similar interests and making friends with them
Six marks

3PE0_01_Q10b

This question required the interpretation of data to gain maximum marks. Candidates were presented with a table of data showing the percentage of carbohydrates consumed by the long distance runner in the days leading up to his race. The table shows an increase in carbohydrate consumption as the race gets closer.
The question asks candidates to examine how the change in the runner's diet will affect his performance in the race.
Candidate's should recognise that there is an increase in carbohydrates. Knowing that carbohydrates provide a source of energy they should then link this to the event, what this means to the runner and the impact this would have on performance. Therefore, to gain maximum marks responses should make reference to the additional carbohydrates being stored in the body as glycogen or stored energy that the runner can use in the race so they can maintain a good pace throughout the race.

Table 3 shows the percentage of carbohydrates in Michael's diet for the five days before his race.

Days before the race	Percentage of carbohydrates in diet
5	35
4	70
3	80
2	85
1	85

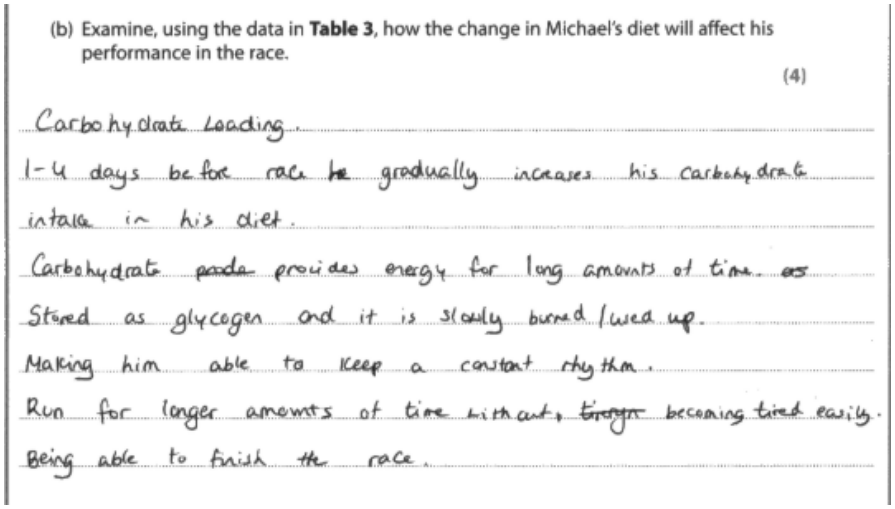
Table 3

(b) Examine, using the data in **Table 3**, how the change in Michael's diet will affect his performance in the race.

(4)

The closer he gets to the day of the race the more carbohydrates he is eating. This is because they will give him energy leading up to and for the ~~competition~~ race.

The candidate correctly identifies the increase in carbohydrates from the information provided in the table.
A link is correctly made between carbohydrates and their role in supplying energy.
No further development of the response is made.
Two marks



(b) Examine, using the data in **Table 3**, how the change in Michael's diet will affect his performance in the race.

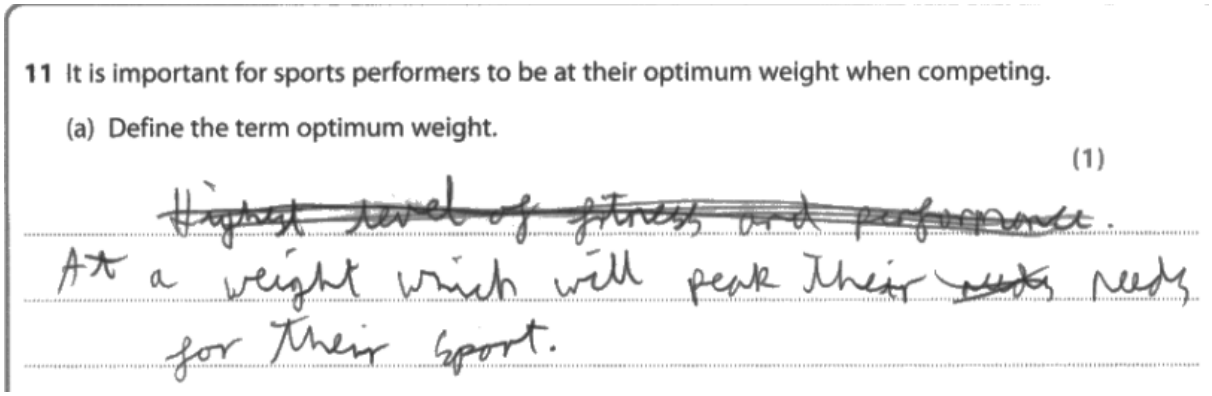
(4)

Carbohydrate Loading.
1-4 days before race he gradually increases his carbohydrate intake in his diet.
Carbohydrate ~~powder~~ provides energy for long amounts of time. as Stored as glycogen and it is slowly burned / used up.
Making him able to keep a constant rhythm.
Run for longer amounts of time without ~~tiredness~~ becoming tired easily.
Being able to finish the race.

The candidate identifies the process of carbohydrate loading and then briefly explains that this is the increase in carbohydrate consumption a few days before the race.
Carbohydrates are identified as a form of energy, this knowledge is then expanded on indicating how this type of energy will be stored in the runner's body for use in the race. The impact on the runner of this additional energy store is also given.
Four marks

3PE0_01_Q11a

This question required a definition of the term optimum weight. Candidates could take one of two approaches here. The first, that optimum weight is the weight someone should be based on their physique, the second that optimum weight is the ideal weight for a person's activity or role in their sport.
It was important that either physique, or an aspect of it, eg their height, or the activity was referenced rather than simply saying it is the best weight for someone. This was not credited as it only defines the word optimum.



11 It is important for sports performers to be at their optimum weight when competing.

(a) Define the term optimum weight.

(1)

~~Highest level of fitness and performance~~.
At a weight which will peak their ~~needs~~ needs for their sport.

The response refers to being a peak weight for the needs of the sport therefore gains credit.
One mark

11 It is important for sports performers to be at their optimum weight when competing.

(a) Define the term optimum weight.

(1)

Optimum weight is the weight that is classified to be a suitable weight for your hight and your gender to say that your healthy

The candidate makes reference to a suitable weight for their height and gender therefore gains the available mark.

One mark

3PE0_01_Q11b

This question continued the theme of optimum weight. Candidates were supplied with data about the weight and height of three different sports performers.
The candidates were asked to justify, using the data, why the high jumper has a different optimum weight to the other two sports performers (a rugby player and a jockey).
Most candidates accessed some marks for this question. Popular correct responses explained that the high jumper would have a higher optimum weight than the jockey as the jockey needed to be light so the horse could go faster, or that the rugby player needed to have a higher optimum weight than the high jumper because they needed more weight to be successful in tackles. The counter argument was also given that the high jumper needed a lower optimum weight than the rugby player, so they had less weight to lift over the bar. Some candidates correctly identified that the high jumper had a greater optimum weight than the jockey as they were taller as this made it easier to clear greater heights.

Table 4 states the weight and height of three different sports performers.

Sports performer	Weight (kg)	Height (m)
Rugby player	115	1.95
High jumper	77	1.95
Jockey	57	1.68

Table 4

(b) Justify, using the data in **Table 4**, why the high jumper has a different optimum weight compared to the other two sports performers.

(4)

Some one who is trying to jump high needs a lower optimum weight so it is easyer to lift him/her self off the ofground this is completly diffrent to a rugby player because they want to barge thro people and stay on the ground

(Total for Question 11 = 5 marks)

This response compares the optimum weights of the high jumper and the rugby player, justifying why each would need a different optimum weight. However, there is no comparison of the high jumper and jockey.
Two marks

(b) Justify, using the data in **Table 4**, why the high jumper has a different optimum weight compared to the other two sports performers.

(4)

A high jumper weighs ~~a~~ 38kg less than the rugby player. Since a high jumper wants to jump as high as possible, they want as little weight as possible holding them down, however the rugby player wants to be heavy so they can be powerful and strong when driving and tackling. The high jumper also weighs 20kg more than the jockey. This is because the high jumper is 27cm taller than the jockey. Since he is taller he has ~~more~~ more body mass and therefore weighs more, the jockey is also light so his horse can run as fast as possible whereas the high jumper has a higher muscle mass so he can jump with greater power and force.

(Total for Question 11 = 5 marks)

This response uses the data from the table and compares the optimum weights of the high jumper and the rugby player, clearly justifying why each would need a different optimum weight.
There is also a justified comparison between the high jumper and the jockey.
Four marks

3PE0_01_Q12a

Candidates were supplied with a graph that showed four students calorie input and calorie output. They were asked to use the data in the graph to identify the student who completes the most training.
To answer the question candidates needed to make the link between exercise and energy expenditure, the student with the greatest energy expenditure would be the one completing the most training.

12 Four students kept a record of the number of calories they ate (energy input) and the energy they used (energy expenditure).

Figure 5 shows the students energy input and energy expenditure.

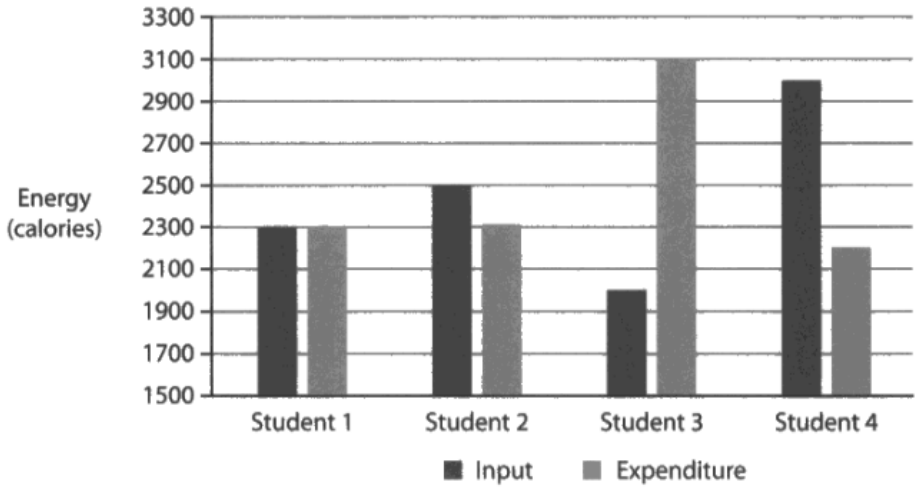


Figure 5

At the start of the training, each student is a healthy weight. The students take part in the same type of training but for different lengths of time.

(a) Identify, using the data in **Figure 5,** the student who completes the most training.

(1)

Student 4.

Student 4 was an incorrect choice as they do not have the greatest energy expenditure.
Zero marks

(a) Identify, using the data in **Figure 5,** the student who completes the most training.

(1)

Student 3

Student 3 is correctly identified.
One mark

3PE0_01_Q12b

This part of the question also uses the graph supplied for part (a). Candidates are asked to analyse the data to determine which student is most likely to maintain a healthy weight. In addition to the data the candidates are told that each student starts at a healthy weight.
To answer the question candidates needed to compare energy expenditure with energy input. The student who has the same energy input as output is the one most likely to maintain a healthy weight.
Most candidates correctly identified student 1 as most likely to maintain a healthy weight, with many candidates providing some justification for their answer. A few candidates opted for one of the incorrect student options.

(b) Analyse the data in **Figure 5** to determine which student is most likely to maintain a healthy weight.

(4)

Student 1 is the student that is most likely to maintain a healthy weight because student 1 is burning some amount of calories that he takes which will make him stay at the same weight.

Student 1 is correctly identified and a justification is given, ie that they are burning off the calories they are eating.
Two marks

Student 1 is most likely to maintain a healthy weight. This is down to the fact that their energy input is exactly the same as their energy expenditure, which means that they don't have an excess of energy, which can turn to fat and they're also not using up energy they don't have. Student 3 is likely to be underweight due to the lack of input relative to his expenditure and vice versa for student 4 who is likely to be overweight. Student 2 may maintain a healthy wei but overtime could become overweight due to the fact that they have a greater input than output.

(Total for Question 12 = 5 marks)

Student 1 is correctly identified.

There is also detailed analysis of the data to support this judgement: ”energy input is the same as energy output, it can't be student 3 as they will be underweight as they expend more than they eat it can't be student 4 as they will be overweight as they eat far more than they use.” A valid comment is also made about student 2.
Four marks

3PE0_01_Q13

This is an extended-response question. Extended response questions use levels-based mark schemes. Each extended-response question is designed to address the different Assessment Objectives (AOs) by enabling candidates to demonstrate their knowledge (AO1), apply their knowledge to the question context (AO2) and then analyse or evaluate based on the information they have already supplied (AO3).

Each extended response is marked out of 9. The marks are allocated evenly for each assessment objective, AO1 – knowledge; AO2 – application of knowledge and AO3 – analysis and evaluation. This means that to achieve maximum marks, the response must address all aspects of the question.

A different set of command words is used for the extended response questions, for example, evaluate, discuss, assess. The exact requirements for these command words can be found in the specification, but they are used to provide opportunity for candidates to look in depth at the question so that they can meet each assessment objective (AO).

One AO is not more important than another. However, it is expected that before knowledge can be applied it will be stated, and before a reasoned judgement can be made there has to be some information on which to make that reasoned judgement.

Candidates should think about making a point, developing it through the use of an applied example, and then making a reasoned judgement. For example, Q13 asks candidates to examine the importance of the respiratory system at three different points in a tennis match, service, rallying and resting between games.

A good way to approach this type of question, adopted by many candidates, would be to:
take each phase of the match in turn and state a function of the respiratory system, for example, oxygen intake (AO1)

Link this to the phase in the match, for example by stating that during exercise oxygen demand increases so breathing rate increases during the rally (AO2).
Make a judgement about whether this is important to the performer, based on the information already provided, for example, if they did not supply extra oxygen the working muscles would not be able to generate energy aerobically meaning they would not be able to maintain the quality of their performance in the rally (AO3).

If discussing the recovery period, candidates might say that the respiratory system is also important at this point. Although resting, breathing rate remains high to help remove lactate, so that when the game restarts the muscles are not fatigued and can work at high intensity again. Some candidates also argued quite convincingly why the respiratory system was not critical during the service.

Marks awarded varied for this question, although many candidates did gain marks across each AO. AO1 knowledge marks were more readily gained for statements concerning the role of the respiratory system, e.g. oxygen in, carbon dioxide out, oxygen for energy and so on.

Incorrect responses, rather than incomplete, tended to occur where candidates confused the respiratory and cardiovascular systems, therefore their focus was on the wrong system. Despite this, some candidates still gained generic knowledge marks for linking oxygen to energy production.
These questions are designed to allow differentiation between responses. The serve was clearly the harder element of the question to deal with, but even so, many candidates still recognised that the serve was anaerobic and therefore provided limited relevance.

13 Tennis players will work at different intensities during a match.

Figure 6 shows three different phases of a tennis match.

During a serve | During a long intense rally | Resting between games

(Source: © Clive Brunskill/Getty Images)
(Source: © Julian Finney/Getty Images)
(Source: © Andrew Yates/Getty Images)

Figure 6

Examine the importance of the respiratory system during the different phases shown in **Figure 6**.

(9)

When he is serving respiratory system helps him to get oxygen for energy ~~when~~ ~~he~~ before he serve ~~at~~ he gets ~~oxygen~~ and as soon as he serve he ~~give~~ exhale ~~e~~ and during a long intense rally he need to ~~breath~~ inhale longer and faster so he can ~~get~~ the amount of oxygen he need, his respiratory system helps him to inhale ~~deep~~ and faster. when he is resting he need to use his respiratory system good so he can get the amount of ~~energy~~ energy he lost in the game so he need to inhale

The response begins by providing a relevant knowledge point about the role of the respiratory system in getting oxygen, and that this oxygen is needed for energy.
There is an attempt to apply knowledge where the candidate states that during the rally he will need to inhale 'longer and faster' to get the amount of oxygen he needs.
The response therefore demonstrates isolated elements of knowledge and understanding, with limited technical language used (AO1) and there is also a limited attempt to apply this knowledge, in particular to the rally. (AO2) There is no evaluation included.
This response is therefore placed at Level 1.

During long intense rally, the tidal volume and breathing rate as well as breathing depth increases to bring more oxygen into the lungs. This causes a steep concentration gradient between oxygen in alveoli and oxygen in blood and so oxygen diffuses from alveoli across ~~walls of capillaries~~ into capillaries. Blood is circulated around body to increase supply of oxygen to muscles. During intense rally, oxygen is vital to allow for aerobic respiration to occur for efficient muscle contraction and allowing tennis players to maintain the pace and level of their performance and delay fatigue as waste products in carbon dioxide and lactic acid are not allowed to accumulate. therefore respiratory system is important during long intense rally to allow tennis player to maintain their pace allowing them to come out on top in the rally, which Roger Federer usually does.

This extract clearly demonstrates the difference in quality expected at level 3.
This paragraph is also referring to the rally. Appropriate technical language is used, e.g. tidal volume and breathing rate. AO1, AO2 and AO3 are all present in this paragraph. The candidate explains that tidal volume increases during the rally to bring more oxygen into the lungs (AO2), there is knowledge of the effect this will have on the diffusion gradient and where diffusion occurs. There is also knowledge that oxygen is needed for aerobic respiration, that it prevents lactate accumulating (AO1) and that the impact of this is that the tennis player will be able to maintain the pace and level of performance, delaying fatigue (AO3). This is a reasoned judgement, i.e. it is based on knowledge already supplied about the importance of oxygen to the performer.
Level 3 response

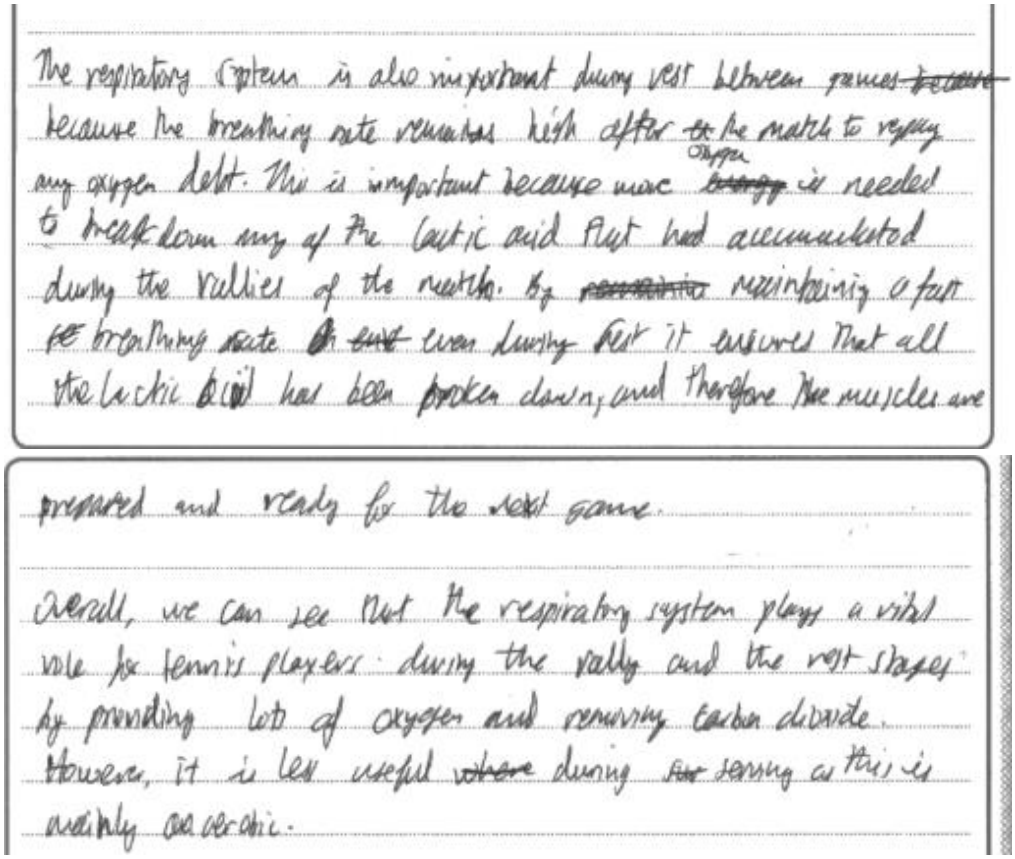
Examine the importance of the respiratory system during the different phases shown in **Figure 6**.

(9)

The respiratory system is an important system for a tennis player as it brings in oxygen and removes carbon dioxide from the body and by this role it helps the tennis player in most of the stages.

In the first stage, during the serve, the tennis player will be respiring aerobically to provide the short, sharp, release of energy that is need for a serve. As this is such a short and rapid movement, it not possible for the oxygen breathed into the body to reach the respiring muscles and that is why the muscles revert to anaerobic respiration. Furthermore, as the product of anaerobic respiration is lactic acid and not carbon dioxide it can not be removed by the respiratory system but requires the circulatory system instead to transport the lactic acid to the liver where it is broken down. Therefore, we can see that the respiratory system is not that important in the tennis serve stage.

However, the respiratory system is much more important during the long intense rally. Tennis matches can be very long and rallies require a lot of movement from the tennis player. Therefore to provide the energy needed for sustained muscular contraction the body requires lots of oxygen. This is where the respiratory system is really important because during the rally the breathing rate and volume increase. This maximises the amount of oxygen that diffuses into the blood stream from the alveoli in the lungs. Furthermore, this increase in the tidal volume also increases the rate at which carbon dioxide, a waste product of aerobic respiration is removed from the body by exhalation. This is very important because it prevents muscle fatigue and prevents the muscles reverting to anaerobic respiration. The respiratory system makes the diffusion of oxygen and carbon dioxide efficient by maintaining a steep concentration gradient in the alveoli.



The respiratory system is also important during rest between games because the breathing rate remains high after the match to repay any oxygen debt. This is important because more oxygen is needed to breakdown any of the lactic acid that had accumulated during the rallies of the match. By maintaining a fast breathing rate even during rest it ensures that all the lactic acid has been broken down, and therefore the muscles are prepared and ready for the next game.

Overall, we can see that the respiratory system plays a vital role for tennis players during the rally and the rest stages by providing lots of oxygen and removing carbon dioxide. However, it is less useful during serving as this is mainly anaerobic.

This response receives full marks. The first paragraph contains some knowledge points about the role of the respiratory system:

- AO1 – the respiratory system brings in oxygen
- AO1 – the respiratory system removes carbon dioxide

The second paragraph examines the serve. This paragraph repeats an AO1 statement, and develops AO2 and AO3, for example:

- AO1 – the respiratory system breathes in oxygen
- AO2 – during the serve the tennis player respires anaerobically
- AO3 – as it is such a short and rapid movement there is no time for the oxygen to be used and no carbon dioxide is produced, we can see that the respiratory system is not important during the serve.

This paragraph is well-written and whilst not 100% accurate (reference to lactate accumulation during the serve), some inaccuracies are allowed provided they do not detract from the overall quality of the response.

The second paragraph on page 2 focuses on the rally where knowledge points are developed, linked to the activity and used to make an informed judgement about the importance of the respiratory system during a rally. The same is also true in the third paragraph. This time, it is the importance during the rest period between games.

Level 3 - Nine marks

Paper Summary

Based on their performance in this examination, candidates are offered the following advice:

- Use appropriate technical language when answering anatomy or movement analysis questions, for example, muscles contract and relax rather than flex and extend (Q02)
- Use the command words and number of marks available to help you decide the depth required in your response, for example, ‘state’ questions do not need descriptions or explanations (Q4(a))
- Do not repeat question words if asked to state the meaning of something, for example try to avoid the use of ‘to monitor’ if asked why it is important to monitor a training programme (Q08).
- Make sure you read questions carefully, for example, do not explain when you need to describe, or describe when you should be explaining (Q03(b)/Q03(c)).
- If asked to provide two of something make sure you use clearly different types of examples, for example the joint action at two different joints is still an example of joint action (Q02(c)).
- If asked to 'use examples' make sure they are included in your response, there will be marks specifically for these examples (Q09).
- If asked for examples make them clear, for example, a 'sprint start' rather than just 'sprinting' (Q05(b)).