Examiners' Report
Lead Examiner Feedback

January 2024

Pearson BTEC Nationals
In Sport (31524H)
Unit 1: Anatomy and Physiology

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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

Introduction

Centres and learners should be congratulated on their preparation for this assessment. Overall, learners performed better than previous series and it was obvious that they prepared for many of the specification topics covered in this assessment, to which they need congratulating for.

The question paper followed the format identified in the sample assessment materials and previous series. The paper was split into six sections. Each section 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. Each section is weighted in accordance to the specification design.

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 from the indicative content, 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 points-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.

Introduction to the Overall Performance of the Unit

This report has been written to help you understand how learners have performed overall in the exam. For each question there is a brief analysis of learner responses. You will also find examples of learner responses to the questions that have been well answered. These should help to provide additional guidance. We hope this will help you to prepare your learners for future examination series.

Learner performance varied throughout the paper. Whilst the extended response questions still provided the greatest challenge, this was the best series as regards to performance on these. Most learners gained some marks for these questions, and it is encouraging to see that more learmers are accessing to top mark boundaries. 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 writing questions account for just over 30% 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 answer questions but also the 'points-based' questions.

It was clear that some learners did not make full use of the stimulus material provided in the question, to reiterate, with explain command verb questions, there is an expectation that knowledge and understanding tested, is applied to the situation in context and expansion marks are awarded accordingly. Nevertheless, performance continues to get better series by series, with the mean mark increasing by 6 and the highest paper total was 79/80.

As always, the emphasis in this paper is on the learner's application of their knowledge to a variety of practical sports related situations. The higher marks, particularly in levelled response questions (Sections C-F), will always focus on the ability to demonstrate application rather than the ability to recall theory. It will be important for learners to have the opportunity to practice this in their preparation for the assessment. Learners that were able to access higher marks for these questions were able to apply their knowledge and understanding to the stimulus and provide realistic and appropriate responses.

As this is a vocational sports related subject, the external assessment seeks to put the learners in applied sporting related situations and asks them to respond to these: this method of questioning will continue in the future. It is therefore essential that centres stress to learners the need to read the stimulus information carefully before they answer questions, and be prepared to use this information within their responses, this also applies when graphical or statistical data is supplied.

Where learners are unable to apply the stimulus in their answer it will significantly restrict the number of marks learners can receive. Generic responses will only gain limited credit.

Where the stimulus material uses a particular sport, it is not necessary for learners to have an in-depth knowledge of this type of sport in order to answer the questions well, however, an awareness of the basic requirements of sports are expected which will have been covered in core curriculum PE lessons throughout KS3 and KS4.

Individual Questions

The following section considers each question on the paper, providing examples of popular learner responses. This section should be considered with the live external assessment and corresponding mark scheme.

Q1

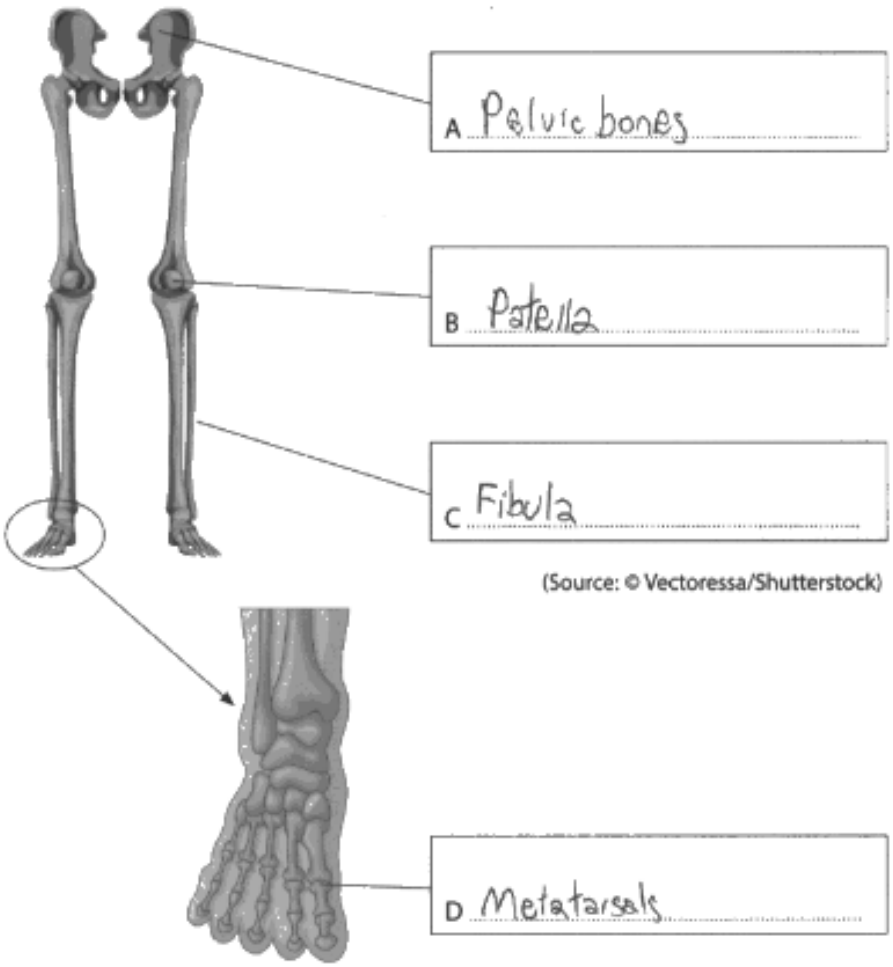
The majority of learners performed as anticipated on this question, with many identifying the correct answers. It is important that technical terminology is used, and phonetic spelling was credited. Common errors were identifying the fibula as tibia or 'fibia'.

This response gained 4 marks.

Figure 1 shows the bones in the lower skeleton and the foot.

1 Identify the bones labelled **A–D**.

(4)



(Source: © Vectoressa/Shutterstock)

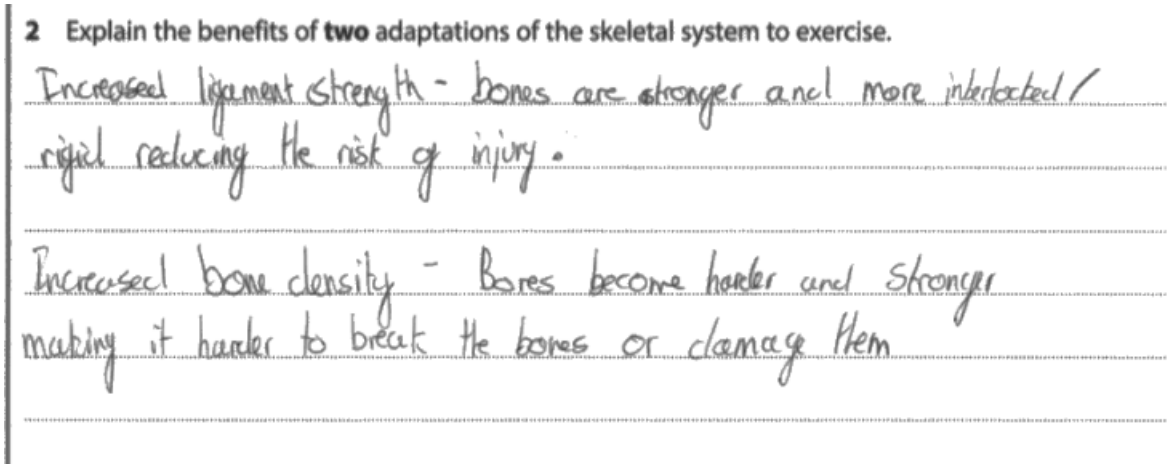
(Source: © Rendix Alextian/Shutterstock)

Figure 1

Q2

For Q2 learners were required to explain the benefits of two adaptations to exercise on the skeletal system, to achieve the application mark learners needed to identify the correct adaptation. Generally, this was answered well with a number of learners accessing full marks. Common errors were bringing in skeletal conditions such as osteoporosis/arthritis or repeating reduced injury for both responses, which can only be awarded once.

This response gained 2 marks.

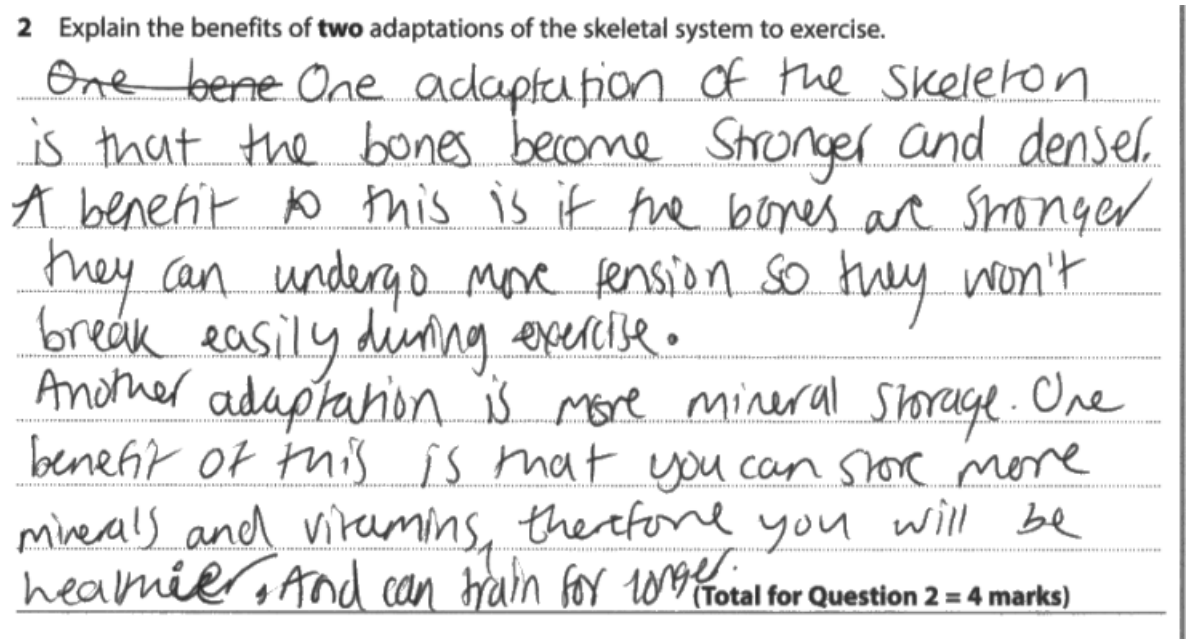


2 Explain the benefits of **two** adaptations of the skeletal system to exercise.

Increased ligament strength - bones are stronger and more interlocked / rigid reducing the risk of injury.

Increased bone density - Bones become harder and stronger making it harder to break the bones or damage them

This response gained 4 marks.



2 Explain the benefits of **two** adaptations of the skeletal system to exercise.

~~One bene~~ One adaptation of the skeleton is that the bones become stronger and denser. A benefit to this is if the bones are stronger they can undergo more tension so they won't break easily during exercise.
Another adaptation is more mineral storage. One benefit of this is that you can store more minerals and vitamins, therefore you will be healthier, And can train for longer. **(Total for Question 2 = 4 marks)**

Q3a and Q3b

For Q3a learners were required to identify the movement occurring when serving in the image provided. The vast majority of learners performed as expected and got the question correct. Common errors were putting extension rather than flexion.

For Q3b learners were required to identify the joint found at the elbow. The majority of learners accessed the available marks for both of these questions.

This response gained 1 mark for Q3a and 1 mark for Q3b.

Figure 2 shows a tennis player about to take a serve.



(Source: © Kluva/Shutterstock)

Figure 2

3 (a) State the movement taking place at the elbow joint of the arm holding the racket.

(1)

Flexion of the arm (Extension to flexion)

(b) State the type of synovial joint found at the elbow.

(1)

Hinge

Q3c

For Q3c learners were required to explain how the bursa in the elbow helps the player to serve. Generally, this was answered well which was displayed through the spread of marks. Common errors were bringing in synovial fluid without referencing smoother movement.

This response gained 1 mark.

(c) Explain how the bursa in the elbow joint helps the player to serve.

(3)

The bursa keeps the synovial fluid around the joint which helps lubricate the joint, making the movement smoother.

This response gained 3 marks.

(c) Explain how the bursa in the elbow joint helps the player to serve.

(3)

The Bursa is to act as a shock absorber. So when the player serves moving from flexion to extension it reduces any friction between bones, which creates a smooth movement.

Q4 & Q5

Q4 and Q5 were both recall questions and learners performed as anticipated on this question, with the spread of marks clearly outlining the learners knowledge and understanding of muscle locations and antagonistic movements during a bicep curl.

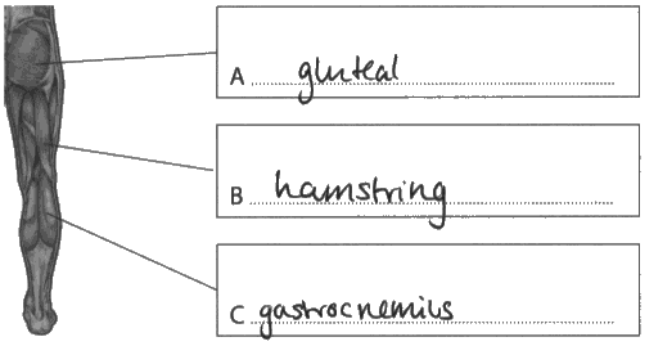
Common errors seen on Q5 were identifying the tricep as the muscle in the agonist when lowering the weight down.

This response gained 3 marks for Q4 and 3 marks for Q5.

Figure 3 shows the muscles in the lower body.

4 Identify the muscles labelled **A–C**.

(3)



(Source: © stihii/Shutterstock)

Figure 3

Figure 4 shows Phillip training.



(Source: © Lio putra/Shutterstock)

Figure 4

5 Complete **Table 1** by:

(a) stating the agonist muscle for each phase of movement

(2)

(b) stating the type of contraction when lowering the weight down.

(1)

Phase of movement	Agonist muscle	Type of contraction
Lifting the weight up	bicep (1)	Concentric
Lowering the weight down	bicep (1)	Eccentric (1)

Table 1

Q6

Q6 performed as anticipated. The question required learners to describe cramp and how it affects performance in a marathon, the vast majority of learners achieved 1 mark, for stating it would slow him down. Fewer learners gained the second marking point of it is an involuntary contraction. Common errors were stating that cramp is caused by lactic acid.

This response gained 2 marks.

Gareth is participating in his first marathon. He completes 20 miles and then he gets cramp.

6 Describe cramp and how it affects Gareth's performance.

Cramp is involuntary muscle contraction meaning he will get fatigued quicker meaning that he will finish the race slower

This response gained 0 marks.

Gareth is participating in his first marathon. He completes 20 miles and then he gets cramp.

6 Describe cramp and how it affects Gareth's performance.

The muscle tightens causing him pain and reduces mobility in that muscle as it becomes stiff

Q7a

Q7a was a recall question and learners performed as anticipated on this question, with the spread of marks clearly outlining the learners' knowledge and understanding of muscular system adaptations. Common errors were bringing in cardiovascular adaptations.

This response gained 2 marks.

Steph is a badminton player.

As part of her weekly training she participates in two gym-based sessions, mainly doing bodyweight exercises. Over a period, Steph's muscular system has adapted to the training programme.

An adaptation to this training is an increase in the number and size of mitochondria.

7 (a) State **two other** adaptations of the muscular system.

(2)

1 ~~Muscular Hypertrophy~~ Hypertrophy

2 ~~Fewer~~ ~~Increased Myoglobin & Myoglobin stores~~ Increased resistance to Lactate

Q7b

Learners found this question challenging to access all marks, the question required to explain the impact of an increased number and size of mitochondria on badminton performance. A significant number of learners achieved the mark for more energy and performance impact mark, however much fewer accessed the mark for more aerobic respiration.

This response gained 3 marks

(b) Explain the impact of an increased number and size of mitochondria on Steph's badminton performance.

(3)

Mitochondria are the ~~organelles~~ site of aerobic respiration in cells. Increased number and size of mitochondria in Steph's muscle ~~cells~~ cells means that aerobic ~~en~~ respiration can more efficiently take place meaning she will have more energy and greater aerobic respiration. For her badminton performance it means that she take longer to fatigue and maintain a high intensity for longer in a match.

This response gained 1 mark.

(b) Explain the impact of an increased number and size of mitochondria on Steph's badminton performance.

(3)

Mitochondria stores energy as well as helps respiration. An increased number and size of these mean that more respiration can occur. This also means that more oxygen is in the working muscles meaning that they have energy to do the activity.

Q8

The majority of learners performed as anticipated on this question, with a nice spread of marks, many could identify that the diaphragm contracts during inspiration and relaxes during expiration. Fewer learners identified that this would result in an increase and decrease in the thoracic cavity. Common errors were saying that the diaphragm domes/goes up when it contracts.

This response gained 4 marks.

8 Describe the role of the diaphragm during **inspiration and expiration**.

During inspiration the diaphragm contracts and flattens, ~~putting the lung~~ increasing the thoracic cavity (to allow oxygen in) and increasing pressure. During expiration the diaphragm relaxes and goes into a dome shape decreasing the thoracic cavity and decreasing the pressure, to force air out.

This response gained 2 marks.

8 Describe the role of the diaphragm during **inspiration and expiration**.

Inspiration is the action of breathing in. When this happens the diaphragm pulls down to allow air to come through. The expiration is when the diaphragm relaxes and pushes upwards.

Q9

On the whole learners performed as expected on this question, with the spread of marks clearly outlining their knowledge and understanding of respiratory volumes.

Many identified the tidal volume and minute ventilation correctly, with less identifying the residual volume. Common errors were identifying other respiratory volumes.

This response gained 4 marks.

9 (a) Complete **Table 2** by identifying each lung volume described **(A–C)** from the descriptions given.

(3

Description	Lung Volume
The maximum amount of air that can be forced out of the lungs after maximal inspiration	Vital capacity
The volume of air passing in or out of the lungs in 60 seconds	A Minute volume
The air that remains in the lungs after maximal expiration	B residual volume
The amount of air breathed in or out during a normal breath	C Tidal volume

Table 2

Q9b

The majority of learners found this question accessible, a significant number correctly identified that vital capacity would increase and then displayed the impact on performance.

Significantly fewer identified that the body would bring in more oxygen or produce and remove more carbon dioxide.

Common errors were not being specific enough by stating more oxygen or more carbon dioxide.

This response gained 3 marks.

Jess is a boxer who has been training for six months for a fight.

(b) Explain the impact of Jess' training on her vital capacity and how this affects her performance.

(3)

Jess vital capacity would increase. This would allow more carbon dioxide to be breathed out per breath. This would be beneficial to her performance as it would delay fatigue as its getting rid of the waste product faster. Allowing her to box at a high intensity throughout the whole fight, helping her to win the fight.

This response gained 1 mark.

Jess is a boxer who has been training for six months for a fight.

(b) Explain the impact of Jess' training on her vital capacity and how this affects her performance.

(3)

This will make her more fit ~~(illegible)~~ during her fight. Her stamina levels ~~are~~ ~~(illegible)~~ are high. This means she can last longer without getting fatigued. Because boxing is a very intense sport, so fighters ~~do get~~ can get tired quickly.

Q9c

This was the first extended response question of the paper and learners had to analyse the immediate and long term effects of training at altitude. The learners needed to articulate the impact this would have on performance. The indicative content was written accordingly to encompass this knowledge and application.

Like all of the extended response questions, the quality of learners' responses varied. Some learners were clearly very knowledgeable about impact of altitude. Other learners were unable to address the question fully and only highlighted the conditions of being at altitude without linking it to performance.

At level 3 learners' responses provided accurate knowledge of the effects of altitude on performance in the immediate and long term, used technical terminology with clear development of the point and linked to boxing performance.

Overall, learners performed well on this question, which was a pattern across all extended responses. However, for some this proved to be a challenging question and that this knowledge was lacking, although a clear specification point. Some learners also discussed the impacts on the cardiovascular system, when it was in the respiratory section and thus generated no credit.

This response was placed at Level 3 and given 6 marks. The answer clearly assesses a number of points from the indicative content, focusing on the effects with appropriate development in reference to the question.

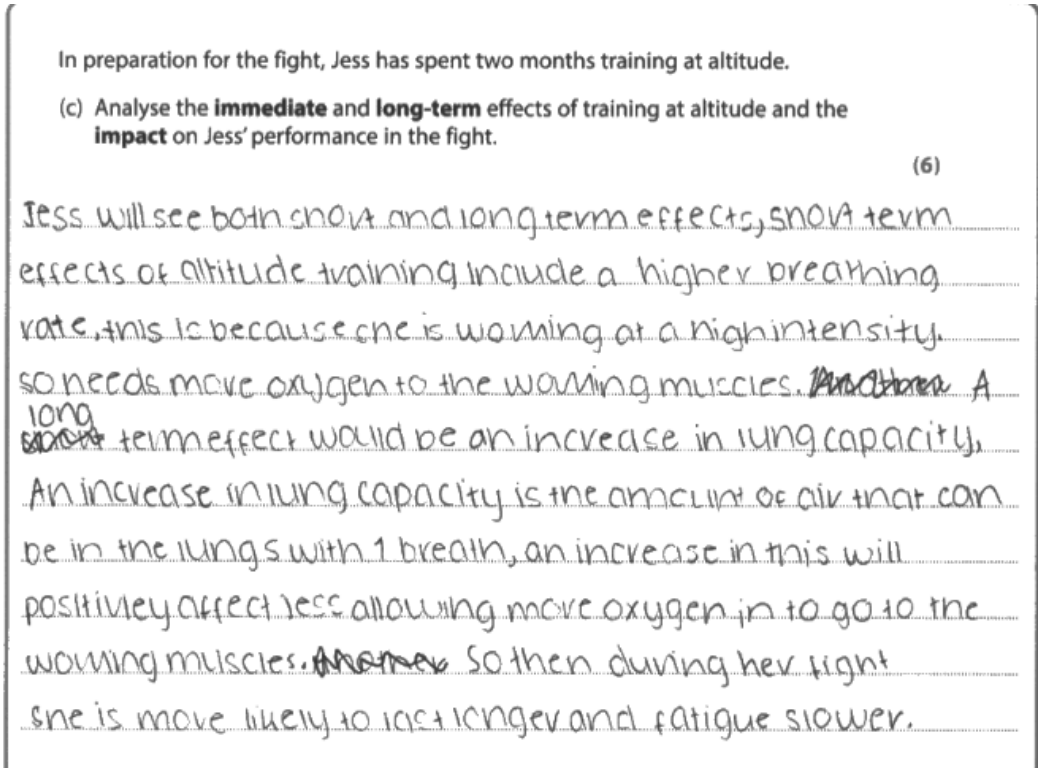
(c) Analyse the **immediate** and **long-term** effects of training at altitude and the **impact** on Jess' performance in the fight.

(6)

The immediate effect of training at altitude is hypoxia. hypoxia is when there is a lack of oxygen in the body and is unable to keep up with the demand for oxygen. This means Jess may struggle to train as the body simply cannot keep up with the need for oxygen and will fatigue sooner. Jess may also suffer from altitude sickness and dizziness as the brain and body are not recieving the oxygen they need. A long term effect is an increase in red blood cells. This means the body has adapted to the higher altitude so it's produced more red blood cells meaning during a boxing match there will be more readily available oxygen so she can perform ~~are~~ aerobically for longer without fatiguing early. This will improve Jess' performance as she can now last more rounds in the boxing match.

(Total for Question 9 = 12 marks)

This response was placed at Level 2 and given 3 marks. The answer correctly identifies that breathing rate will be higher and in the long term more oxygen will be able to get to the working muscle, there is also an attempt to link this to performance outcomes (fatigue slower).



In preparation for the fight, Jess has spent two months training at altitude.

(c) Analyse the **immediate** and **long-term** effects of training at altitude and the **impact** on Jess' performance in the fight.

(6)

Jess will see both short and long term effects, short term effects of altitude training include a higher breathing rate, this is because she is working at a high intensity. so needs more oxygen to the working muscles. A long term effect would be an increase in lung capacity. An increase in lung capacity is the amount of air that can be in the lungs with 1 breath, an increase in this will positively affect Jess allowing more oxygen in to go to the working muscles. So then during her fight she is more likely to last longer and fatigue slower.

Q10

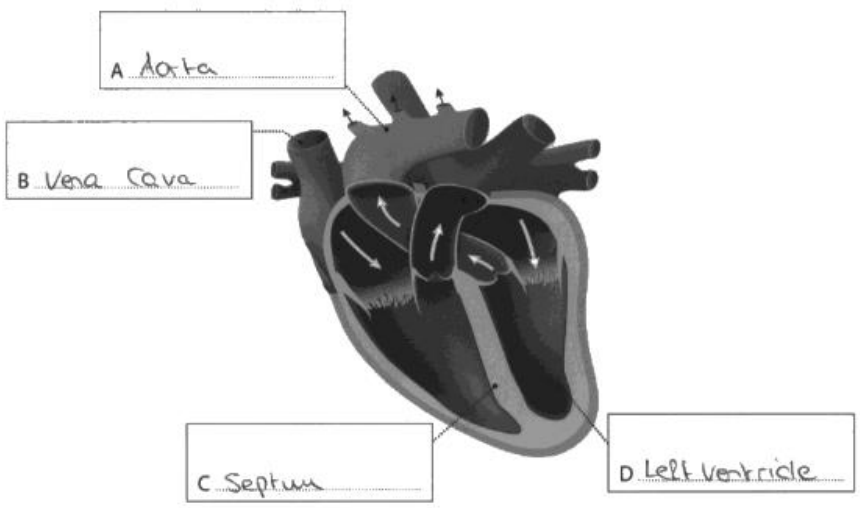
Q10 was a recall question and learners found it somewhat challenging to access all marks. It required them to name regions of the heart. Many correctly answered the left ventricle, with much fewer accessing the other three available mark points.

This response gained 4 marks.

Figure 5 shows the heart.

10 Identify the structures of the heart labelled **A–D**.

(4)



(Source: © Designua/Shutterstock)

Figure 5

Q11

The majority of learners found this question unexpectedly challenging to access all marks. Generally, responses were generally too vague, some learners achieved the impact mark during exercise, but much fewer stated the cause of this impact.

This response gained 2 marks.

11 Explain the effect of low blood pressure during exercise.

low blood pressure during exercise can cause extreme fatigue. ~~due to~~ This is due to the muscles not getting enough oxygenated blood whilst exercising.

(Total for Question 11 = 2 marks)

This response gained 1 mark.

11 Explain the effect of low blood pressure during exercise.

low blood preasure also know as hypotension can effect exercise by making them feel weak and fatigue faster causing them to not make progression as quickly. They might also feel sick and nausea when exercising.

(Total for Question 11 = 2 marks)

Q12

This question acted as a good differentiator, for how the cardiovascular system fights infection.

It was clear from the spread of marks that some learners found this question challenging. A significant number of learners accessed 1 mark for 'white blood cells'. However, much fewer learners accessed the other available mark points.

This response gained 2 marks.

12 Describe how the cardiovascular system fights infection.

The heart will produce more white blood cells ~~with~~ which will be sent towards the injection where they will attatch to it and in due course kill the bacteria/virus.

This response gained 1 mark.

12 Describe how the cardiovascular system fights infection.

The cardiovascular system fights infection by developing more white blood cells to protect the body.

Q13a

Q13a was a recall question and learners performed as anticipated on this question, with the spread of marks clearly outlining the learners knowledge and understanding of the cardiovascular system adaptations. Common errors were bringing in other body system adaptations.

This response gained 2 marks.

Billie is a tennis player. Over the years of playing and training her cardiovascular system has adapted. Two of these adaptations are cardiac hypertrophy and increased blood volume.

13 (a) State **two other** adaptations of the cardiovascular system.

(2)

1 Decrease in working and resting heart rates

2 ~~Greater haemoglobin stores~~ Increased capillerisation of Skeletal muscle.

This response gained 1 mark.

Billie is a tennis player. Over the years of playing and training her cardiovascular system has adapted. Two of these adaptations are cardiac hypertrophy and increased blood volume.

13 (a) State **two other** adaptations of the cardiovascular system.

(2)

1 Increased [illegible] muscle ventilation

2 Increased mitochondria

Q13b

This was the second extended response question of the paper and focused on the impact that cardiac hypertrophy and increased blood volume will have on tennis performance, the indicative content was written according to encompass this knowledge and application.

Like all of the extended response questions, the quality of learner responses varied. Some learners were clearly very knowledgeable about these adaptations and performance impacts, but some learners struggled to express this beyond transferring more oxygen to working muscles.

Level 1 responses generally only included that the heart gets stronger and to transport oxygen and provided limited application to performance.
At level 3 learners charted accurately impacts on performance of the adaptations.

This response was placed at Level 3 and given 6 marks.
The answer clearly assesses a number of points from the indicative content, focusing on the impact that cardiac hypertrophy and increased blood volume will have on performance, with effective use of technical terminology and appropriate development in reference to the question.

(b) Analyse the impact that cardiac hypertrophy and increased blood volume have on Billie's tennis performance.

(6)

Cardiac hypertrophy is the increase in strength and size of the ~~heart~~ cardiac muscle (the heart). This is beneficial to Billie as it means that he can have more blood pumped out of his heart per beat and therefore per minute. Subsequently, the amount of oxygen transported around the body will increase, therefore, this means that Billie can create more energy. This means that more carbon dioxide ~~one~~ can be removed quicker. This will allow Billie to work harder for longer and be able to delay the onset of fatigue.

Increased blood volume means that more oxygen and nutrients can pass through the arteries at once. This can therefore enhance the delivery of the oxygen allowing Billie to create more energy aerobically so that he can perform more powerful shots against his opponent more often as he is now able to delay lactate accumulation due to the increased ~~amount~~ rate of removal of the waste products. Giving him a better chance of winning the tennis match.

This response was placed at Level 2 and given 4 marks.
The answer assesses some of the points from both areas of the indicative content but included less impacts on performance.

(b) Analyse the impact that cardiac hypertrophy and increased blood volume have on Billie's tennis performance.

(6)

Cardiac hypertrophy is the increasing in size of the muscle. This would help Billie in her tennis performance as she would be provided with more blood to her working muscles. This is due to the fact that her left ventricle would increase in size due to cardiac hypertrophy which means the heart would need an increase amount of blood volume to travel to the body. An increase amount of blood volume would be beneficial in Billie's tennis performance due to the fact that oxygen to her working muscles so she can remove the waste products. Billie having an increase in blood volume would mean that the waste products in her muscles would be removed quicker, She would be provided with oxygen (and energy) quicker which would allow her to perform for a longer duration before she experiences fatigue and needs to recover.

Q14

This was a recall question for identifying the amount of ATP yield for the Aerobic energy system stage. From the spread of marks, it was clear that learners either knew this or did not.

This response gained 3 marks.

14 Complete **Table 3** by giving the amount of ATP produced by **each** stage of the aerobic energy system.

(3)

Aerobic energy system stage	Amount of ATP produced
Aerobic glycolysis	2 (1)
Krebs cycle	2 (1)
Electron transport chain	34 (1)

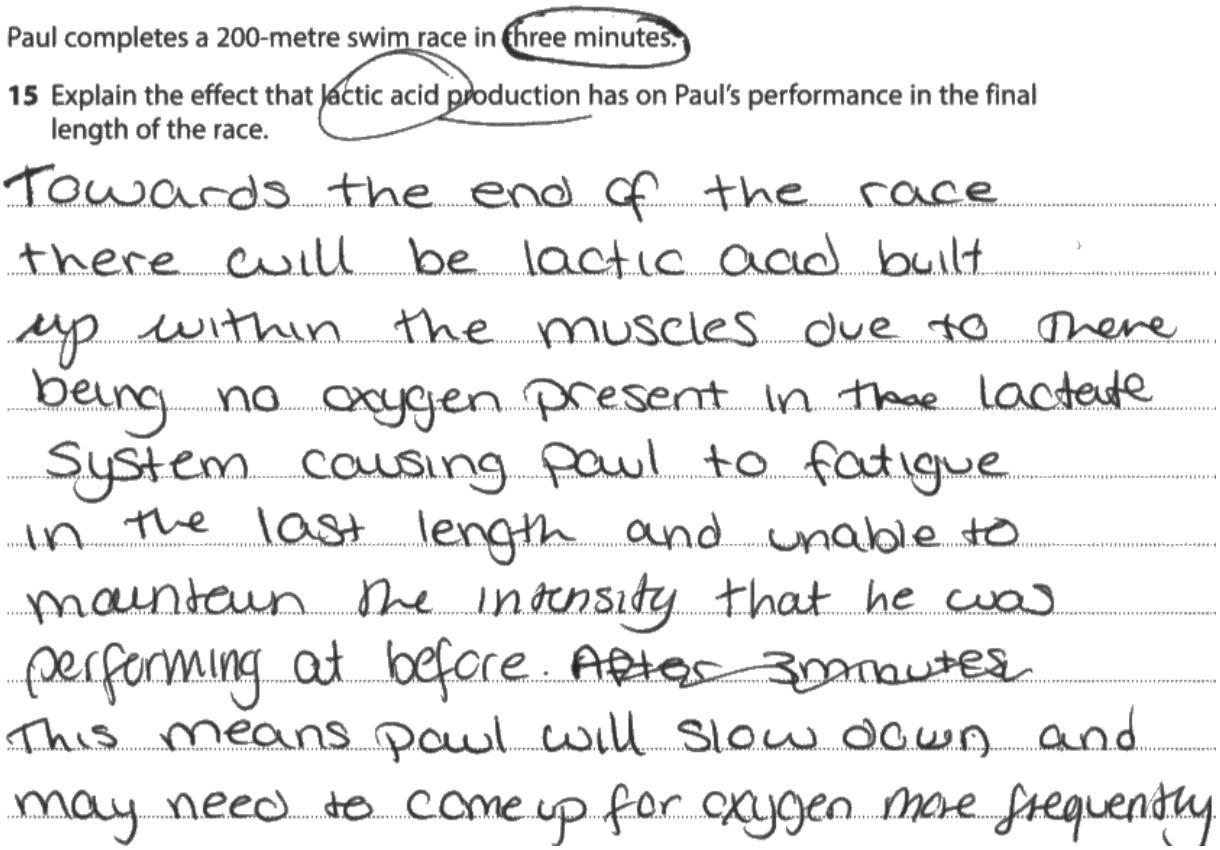
Table 3

Q15

This question acted as a good differentiator, it was clear from the spread of marks that some learners found this question challenging and this area of knowledge for some was missing. Those who did display knowledge of the effect that lactic acid production has on performance, achieved the majority of the available marking points.

Common errors were bringing in general information about the energy systems into the answer, which is irrelevant when the question is based around the lactic acid production.

This response gained 3 marks.

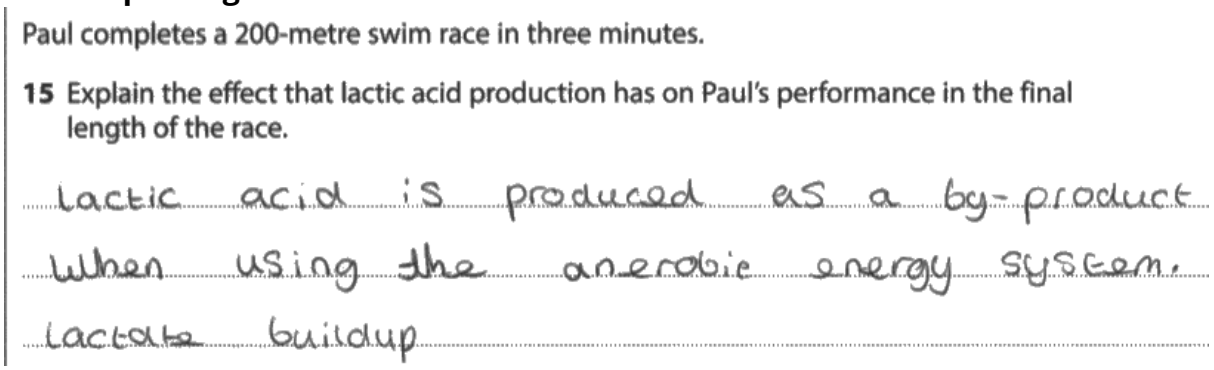


Paul completes a 200-metre swim race in three minutes.

15 Explain the effect that lactic acid production has on Paul's performance in the final length of the race.

Towards the end of the race there will be lactic acid built up within the muscles due to there being no oxygen present in the lactate system causing Paul to fatigue in the last length and unable to maintain the intensity that he was performing at before. ~~After 3 minutes~~ This means Paul will slow down and may need to come up for oxygen more frequently

This response gained 1 mark.



Paul completes a 200-metre swim race in three minutes.

15 Explain the effect that lactic acid production has on Paul's performance in the final length of the race.

Lactic acid is produced as a by-product when using the anerobic energy system. Lactate buildup

Q16

The final question of this section required the learners to analyse the role of the ATP-PC system in creating energy for exercise.

Like all of the extended response questions, the quality of learner responses varied. Some learners were clearly very knowledgeable about the ATP-PC in relation to the reactions that take place, intensity, duration and could articulate how it creates energy. Other learners were unable to address the question fully by writing everything they knew about the energy systems in general rather than answering the specific question.

Level 1 responses came from those learners who identified around time or intensity for the system, with limited or accurate links to performance.
Level 3 responses were those who assessed all how energy is created through the various stages of the process and used technical terminology accurately throughout.

This response was placed at Level 3 and given 6 marks.
The answer analyses the clearly how the ATP-PC creates energy and develops a number of points from the indicative content.

16 Analyse the ATP-PC system and its role in creating energy for exercise.

The ATP - PC system starts with creatine and phosphate inbetween is a strong bond. The enzyme creatine kinase clashes inbetween the bond cause creatine to be by itself as well as phosphate. As phosphate is on its own 1 ATP is produced in the whole system. The ATP system lasts around 3-10 secs and system lasts around 3 mins. As the phosphate is by itself it then goes into ADP as ATP had lost its phosphate. This system is used for anaerobic activities such as a ~~fr~~ winger running as fast as he can in a counter attack in football. The ATP - PC system takes place in the sceptum of the body.

This response was placed at Level 2 and given 3 marks.
The answer generates credit through the attempt to link the ATP-PC through timings, intensity and recovery, but no information was provided regarding the chemical reactions that take place, therefore displayed some accurate knowledge and understanding.

16 Analyse the ATP-PC system and its role in creating energy for exercise.

ATP-PC is split into 3 bonds that attach the phosphate molecules and when they are broken they release energy

ATP-PC System is used for short and high intense training an will last between 10 and 15 seconds in activities such as sprints etc

When it runs at there is a need for a new energy System, ATP-PC system takes 3 minutes to replenish and be able to use this System again

Q17

The final question in the paper is a synoptic analysis. I urge centres to read the guidance under AO5 (page 20) of the specification to see the combinations between body systems. This question will always be a maximum of two systems. Learners should look to synthesise their writing and make connections between the systems where possible demonstrating the inter-relationship.

Like all of the extended response questions, the quality of learner responses varied. Some learners were clearly very knowledgeable about how the cardiovascular and muscular systems work together. Some learners were unable to address the question fully.

Low level responses demonstrated some knowledge and understanding of the indicative content and often lacked balance or coverage. Common errors were bringing in adaptations so irrelevant in the context of this question. Other errors were bringing in respiratory responses rather than cardiovascular.

High level responses displayed synoptic coverage from both areas as well as making link to how these systems work collectively. High-level responses displayed coverage from both areas as well as clearly relating this to the movement taking place.

Like any levels of response-based questions, it is not 1 point equals 1 mark, the indicative content is extensive for learners to demonstrate a breadth of knowledge and generate credit.

This response below was placed at Level 4 and given 8 marks.
The answer clearly analyses how the systems work together. Each systems responses visited and application to rowing performance and interrelationships are developed throughout.

17 Analyse the impact of both the muscular **and** cardiovascular systems' responses during Claire's training session.

impact

(8)

~~The mus~~ A response to exercise in the muscular system can be an increase in blood supply to the working muscles. This allows the working muscles to have more readily available oxygen to use resulting in delaying onset of fatigue and Claire is able to perform aerobically for longer. This increase in blood supply is supported by an increase in heart rate in the cardiovascular system. This means during training the heart is pumping more blood around the body to keep up with the demand for oxygen and aid with the removal of carbon dioxide, delaying lactic acid build up therefor delaying fatigue so she can

maintain intensity through the training session. The increase in blood supply is also done via vascular shunt mechanism. This means blood is redirected to active areas via vasodilation and ~~restricted~~ blood is restricted to inactive areas via vasoconstriction. This allows the working muscles to have a more efficient blood supply and available oxygen. Due to more blood flowing around the body, muscular pliability increases meaning muscles are able to stretch and become more flexable, reducing the risk of injury. This also increases muscular temperature ~~and~~ which can make muscles more flexable and pliable, making training easier and less risk of injury. In the cardiovascular system, stroke volume and cardiac output increase to allow ~~to~~ the heart to keep up with the demand for oxygen by allowing more blood to be ~~pup~~ pumped out of the heart more frequently.

This response below was placed at Level 1 and given 2 marks.
The answer identifies isolated elements of knowledge and understanding, however these points are not developed and no links made to performance. There is a lot of irrelevant information included in the question because these are adaptations and not responses.

Claire is a rower.

Claire's muscular and cardiovascular systems both respond to the demands of a high intensity training session.

(long)
Muscular:
- hypertrophy
- tendon strength
- glycogen
- myoglobin



cardio:
- blood pressure
- heart Rate
- blood volume

(Source: © anka77/Shutterstock)

Figure 6

17 Analyse the impact of both the muscular **and** cardiovascular systems' responses during Claire's training session.

(8)

Both muscular and cardiovascular system responses affects claire's training session by long term and short term, the long term affects for muscular would be hypertrophy, tendon strength, glycogen and myoglobin all these would impact claires training for the long term affects for example claires tendon strength will start to increasure during the exercise due to how long she would be rowing for this is because the muscular system responds to the demands of a high training intensity. There are also short term affects for muscular to so when claire starts to get roving her blood pressure and heart rate will already start to increase

due to how intense her rowing training session is. On the other hand the cardiovascular system also has short and long term affects, the short term affects would also be that when training a high intense training session both her blood pressure and heart rate increase this is due to the fact that claires training session is at a high intensity. Hypertrophy will be an example of a long term affect, one other example would be blood volume both will take longer over a longer period of time due to react in claires body.

Summary

Based on their performance on this paper, learners should:

- Use appropriate technical language throughout their responses.
- Tailor their response based on the command word in the question, eg for an explain question there will always be marks available for expansion points and relevance to the scenario.
- Be clear about terminology used in the specification as these words will be repeated in the exam paper, eg short-term responses (immediate, due to the exercise/sport), adaptations (long term).
- Only address the correct body system within this section, eg in Section A 'The Skeletal System' credit will only be awarded for responses from the specification of the skeletal system. No marks will be available for reference to any other body system.
- I urge centres to read the guidance under AO5 (page 20) of the specification to see the combinations between body systems.
- Use the question scenario to demonstrate their ability to apply their knowledge and not write general impacts, but relate this to performance.
- Check their paper carefully for any missed questions and attempt and read everything.
- Please click here for the specification and SAMS.

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