Examiners' Report
Lead Examiner Feedback

January 2021

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

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Introduction

Centres and candidates should be congratulated on their preparation for this assessment format, in some very challenging times. Overall, candidates performed in line with 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 candidates 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 candidates have performed overall in the exam. For each question there is a brief analysis of candidate responses. You will also find examples of candidate 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 candidates for future examination series.

Candidate performance varied throughout the paper. Whilst the extended response questions still provided the greatest challenge, most candidates gained some marks for these questions and it is encouraging to see that more candidates 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 candidates did not make full use of the stimulus material provided in the question, but this continues to get better series by series. 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.

As always the emphasis in this paper is on candidate'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 candidates to have the opportunity to practice this in their preparation for the assessment. Candidates 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 candidates 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 centre's stress to candidates 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 candidates are unable to apply the stimulus in their answer it will significantly restrict the number of marks candidates can receive. Generic responses will only gain limited credit.

Where the stimulus material uses a particular sport, it is not necessary for candidates 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.

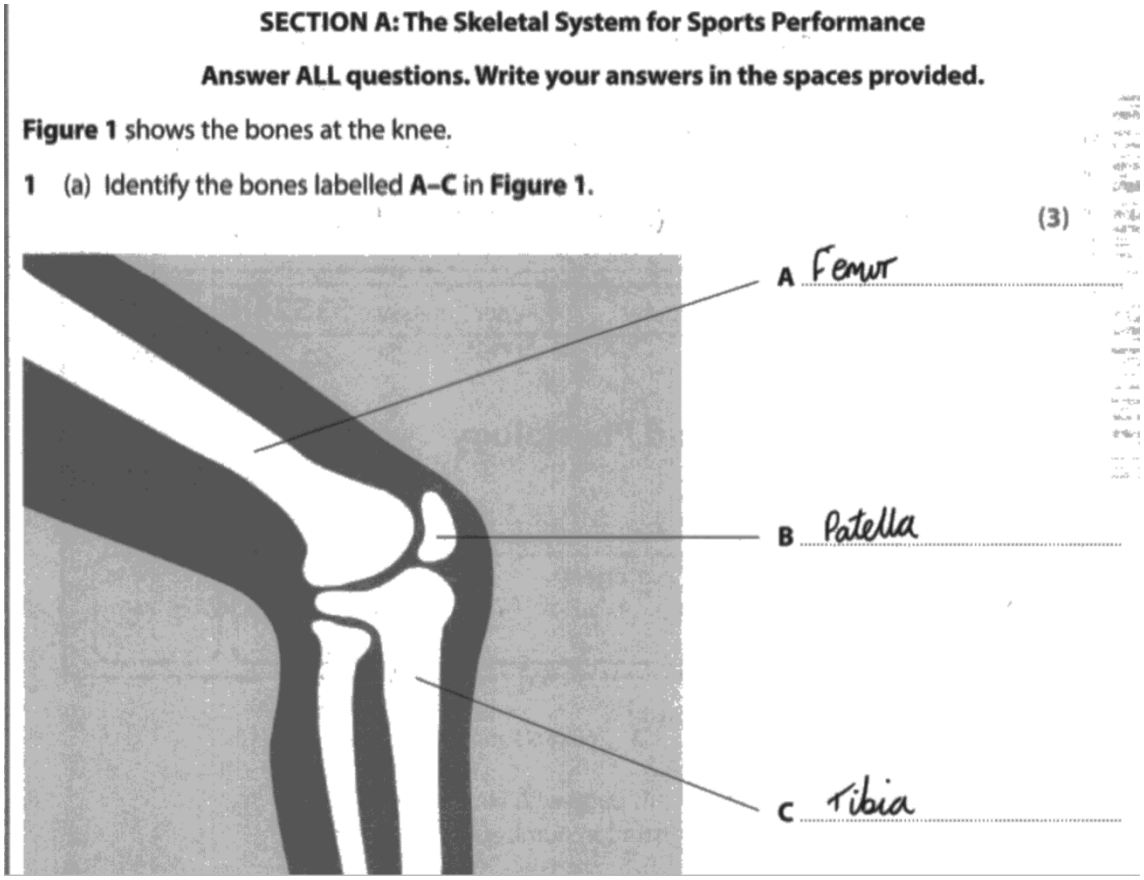
Individual Questions

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

Q1a

The majority of candidates performed as anticipated on this question, with many identifying the femur, patella and tibia as correct answers. It is important that technical terminology is used and phonetic spelling was credited. Common errors were labelling as tibia as fibula. Also, some candidates put tibula rather than tibia.

This response gained 3 marks.



SECTION A: The Skeletal System for Sports Performance

Answer ALL questions. Write your answers in the spaces provided.

Figure 1 shows the bones at the knee.

1 (a) Identify the bones labelled **A–C** in **Figure 1**.

(3)

A Femur

B Patella

C Tibia

This response gained 2 marks.

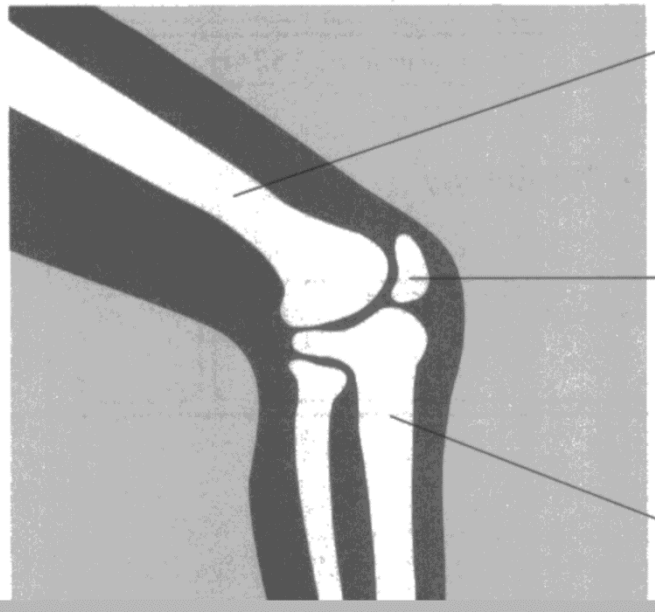
SECTION A: The Skeletal System for Sports Performance

Answer ALL questions. Write your answers in the spaces provided.

Figure 1 shows the bones at the knee.

1 (a) Identify the bones labelled **A–C** in **Figure 1**.

(3)



A Femur

B Patella

C Fibia

Q1b

Candidates were identified to provide an example of a cartilaginous joint. On the whole candidates performed found this question challenging. Common errors made were giving an example of synovial joints.

This response gained 0 marks.

Joints are classified according to the degree of movement they allow.
One classification is a cartilaginous (slightly moveable) joint.

(b) Give **one** example of a cartilaginous (slightly moveable) joint.

(1)

Hinge (knee)

This response gained 1 mark.

Joints are classified according to the degree of movement they allow.
One classification is a cartilaginous (slightly moveable) joint.

(b) Give **one** example of a cartilaginous (slightly moveable) joint.

(1)

tt Vertebrae

Q2a and Q2b

Candidates were required to look at the functions of the skeleton. Q2a required candidates to take the two functions of leverage and weight bearing and explain how these are used when running. Common errors were describing what the function is as opposed to how it is used, such as short bones are used for weight bearing, but no expansion of that point. Q2b was a recall question of two other functions of the skeletal system other than leverage and weight bearing.

This response gained 4 marks for correctly explaining how both functions are used when running.

Rose is a road runner. Two of the functions of the skeleton are to provide leverage and weight bearing.

2 (a) Explain how the skeletal functions of leverage and weight bearing are used when Rose runs.

(4)

Bones ~~pull against their~~ are pulled by muscles to create leaverage. This allows movement, for example when Rose is running a long bone acts as a leaver to create running movement in the leg.

The skeleton is weight bearing to keep the runner upright and supports their weight. When running, the skeletal system allows Rose to put all her body weight on the legs so that she does not fall over. Cartillage acts as a cushion to bear the weight and reduce friction.

This response gained 0 marks.

Rose is a road runner. Two of the functions of the skeleton are to provide leverage and weight bearing.

2 (a) Explain how the skeletal functions of leverage and weight bearing are used when Rose runs.

(4)

The skeletal [redacted] system has many different bones that are used during exercise. Short bone mainly are good for weight bearing activities as they provide little movements, joints are used to provide movement when running. Synovial fluid increases allowing the joints to become less sticky and having a better range of movement.

This response gained 0 marks.

The skeletal system has a number of functions other than leverage and weight bearing.

(b) State **two other** functions of the skeletal system.

1 Delivering O_2 and nutrients

2 Removing waste products

This response gained 2 marks.

The skeletal system has a number of functions other than leverage and weight bearing.

(b) State **two other** functions of the skeletal system.

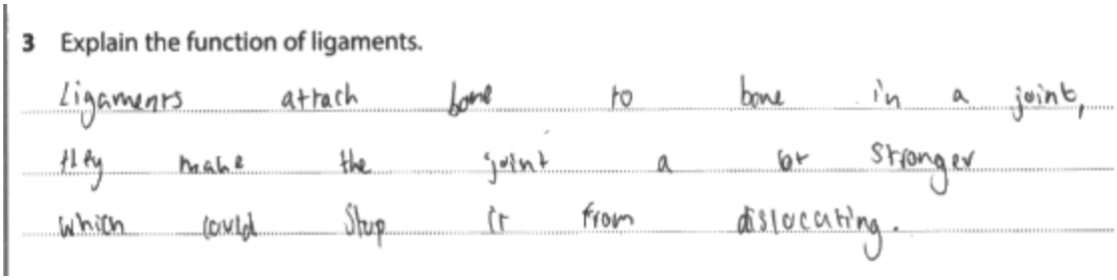
1 mineral storage

2 supporting framework

Q3

The majority of candidates answered this question well, with a number scoring full marks. Common errors that were made by candidates was to say ligaments connect bone to muscle, also describing other parts of a synovial join, such as synovial fluid.

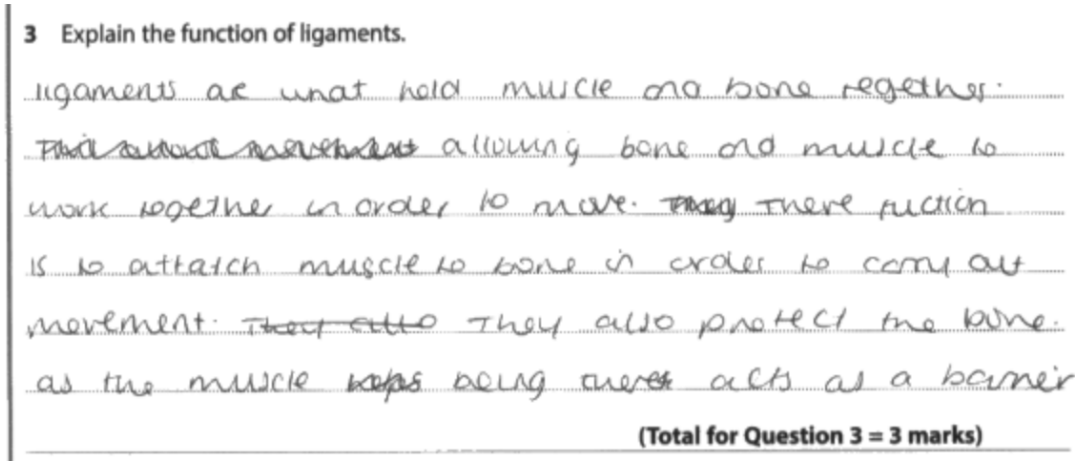
This response gained 3 marks.



3 Explain the function of ligaments.

Ligaments attach bone to bone in a joint, they make the joint a bit stronger which could stop it from dislocating.

This response gained 0 marks.



3 Explain the function of ligaments.

ligaments are what hold muscle and bone regether. ~~They attach nerves~~ allowing bone and muscle to work togethe in order to move. ~~They~~ There fuction is to attatch muscle to bone in order to carry out movement. ~~They also~~ They also protect the bone. as the muscle ~~helps~~ being there acts as a barrier

(Total for Question 3 = 3 marks)

Q4

The majority of candidates performed as anticipated on this question, with many identifying the gastrocnemius and tibialis anterior as correct answers, fewer candidates answered soleus correctly. It is important that technical terminology is used and phonetic spelling was credited. Common errors were labelling tibialis anterior as the soleus.

This response gained 3 marks.

Figure 2 shows the muscles in the lower leg.

4 Identify the muscles labelled **A–C** in **Figure 2**.

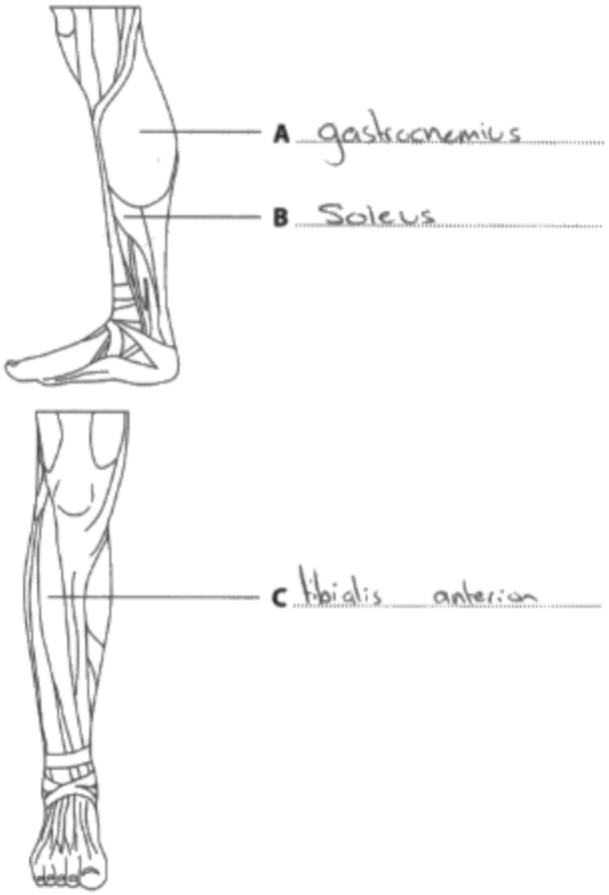


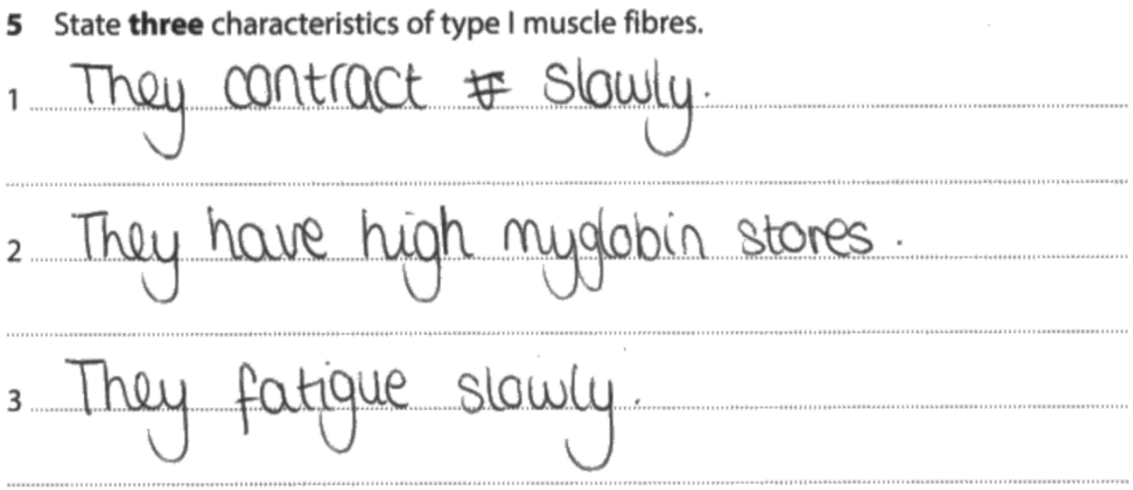
Figure 2

(Total for Question 4 = 3 marks)

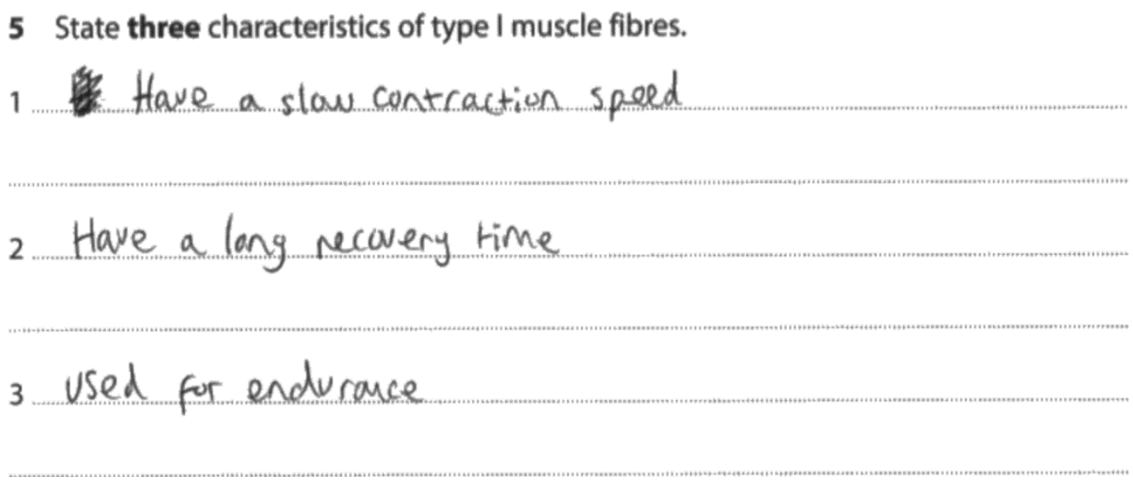
Q5

This question was a recall question that required candidates to identify three characteristics of Type I muscle fibres. On the whole candidates performed well and there was significantly less functions put down when compared to previous series, when a question of this style was asked. Common errors were giving characteristics of Type IIa or Type IIx fibre types.

This response gained 3 marks.



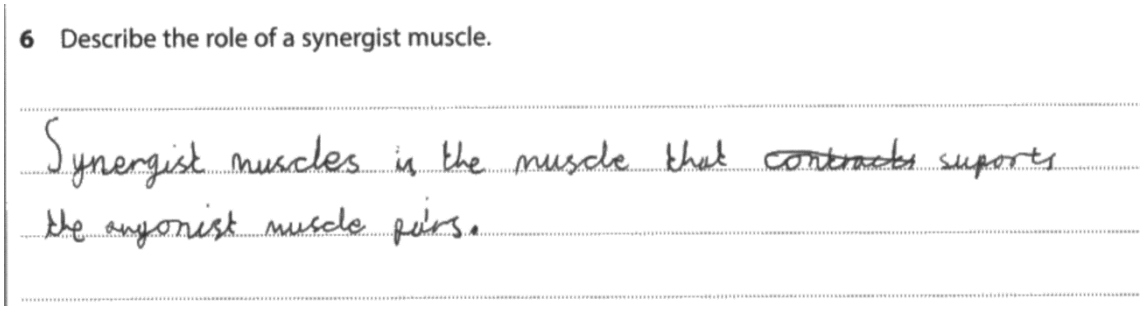
This response gained 1 mark.



Q6

The majority of candidates found this question challenging, a significant number correctly identified that the synergist supports or aids. Significantly fewer identified the expansion of this point, to it aids the agonist/prime mover in carrying out the movement or that it stabilises the joint. Common errors were providing a response around antagonistic muscle pairs.

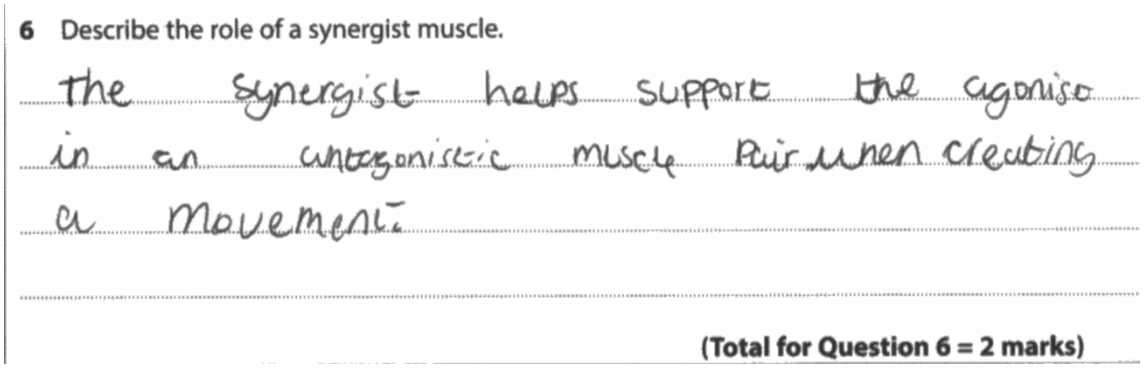
This response gained 1 mark.



6 Describe the role of a synergist muscle.

Synergist muscles is the muscle that ~~contracts~~ suports the agonist muscle pairs.

This response gained 2 marks.



6 Describe the role of a synergist muscle.

the synergist helps support the agonist in an antagonistic muscle pair when creating a movement.

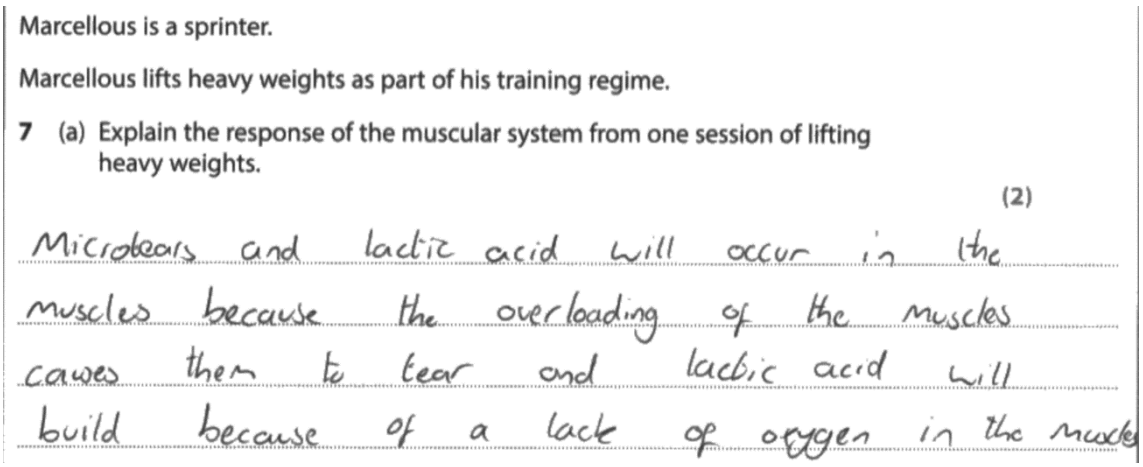
(Total for Question 6 = 2 marks)

Q7a

Although a clear specification point, candidates struggled to articulate a clear response to this question.

Many answered correctly that it causes microtears, and therefore scored one mark. The extension mark was awarded for the inference of overload or the muscle being put under stress, yet few achieved this. Common errors were including DOMS as the response.

This response gained 2 marks.



Marcellous is a sprinter.

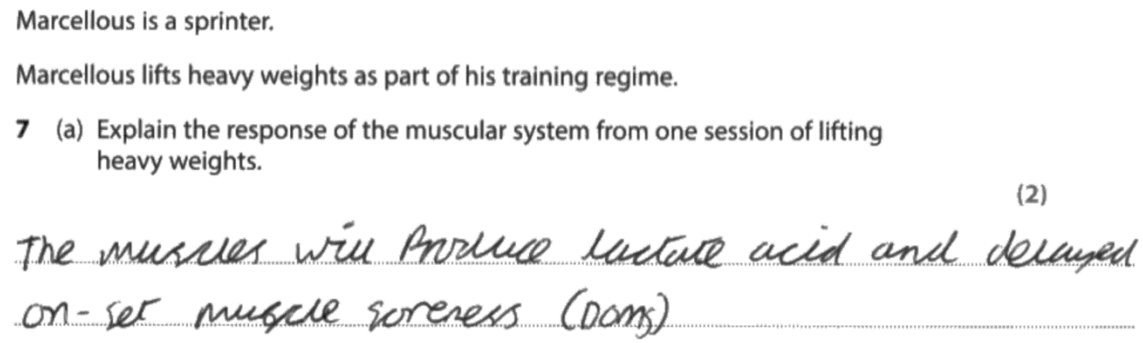
Marcellous lifts heavy weights as part of his training regime.

7 (a) Explain the response of the muscular system from one session of lifting heavy weights.

(2)

Microtears and lactic acid will occur in the muscles because the overloading of the muscles causes them to tear and lactic acid will build because of a lack of oxygen in the muscle

This response gained 0 marks.



Marcellous is a sprinter.

Marcellous lifts heavy weights as part of his training regime.

7 (a) Explain the response of the muscular system from one session of lifting heavy weights.

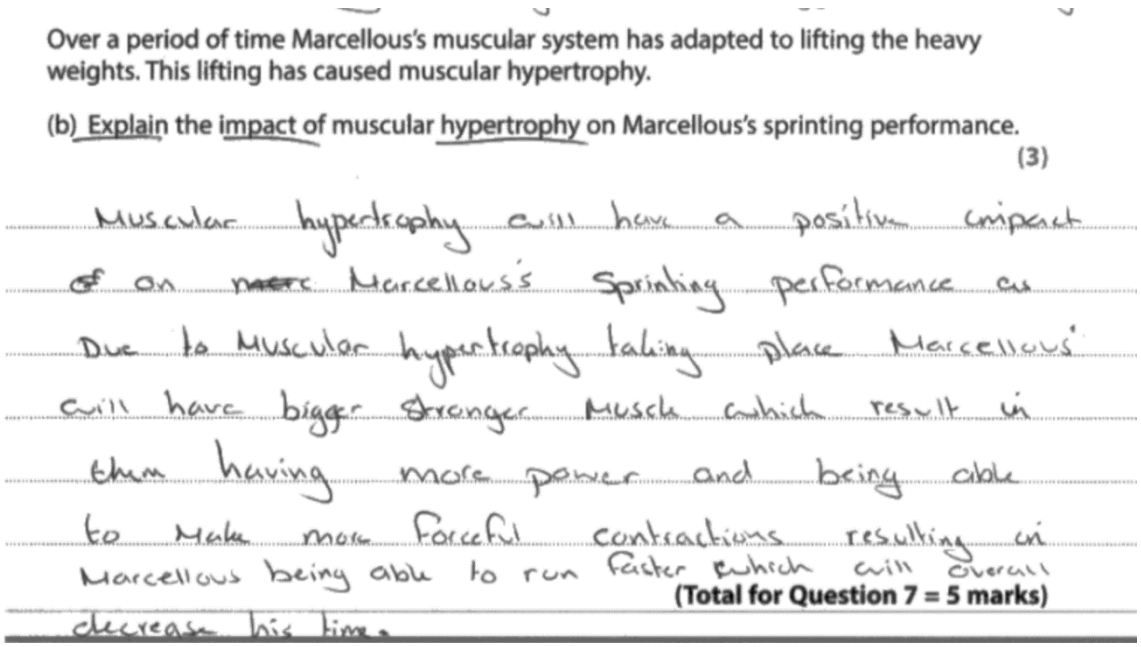
(2)

The muscles will Produce lactate acid and delayed on-set muscle soreness (DOMS)

Q7b

The vast majority of candidates achieved the mark for identification that hypertrophy is an increase in size or strength of a muscle. However, they struggled to articulate within their exemplification that it therefore generates more power and thus enabling the sprinter to run faster. Common errors made were that hypertrophy causes the muscle to weigh more and therefore will slow the sprinter down.

This response gained 3 marks.



Over a period of time Marcellous's muscular system has adapted to lifting the heavy weights. This lifting has caused muscular hypertrophy.

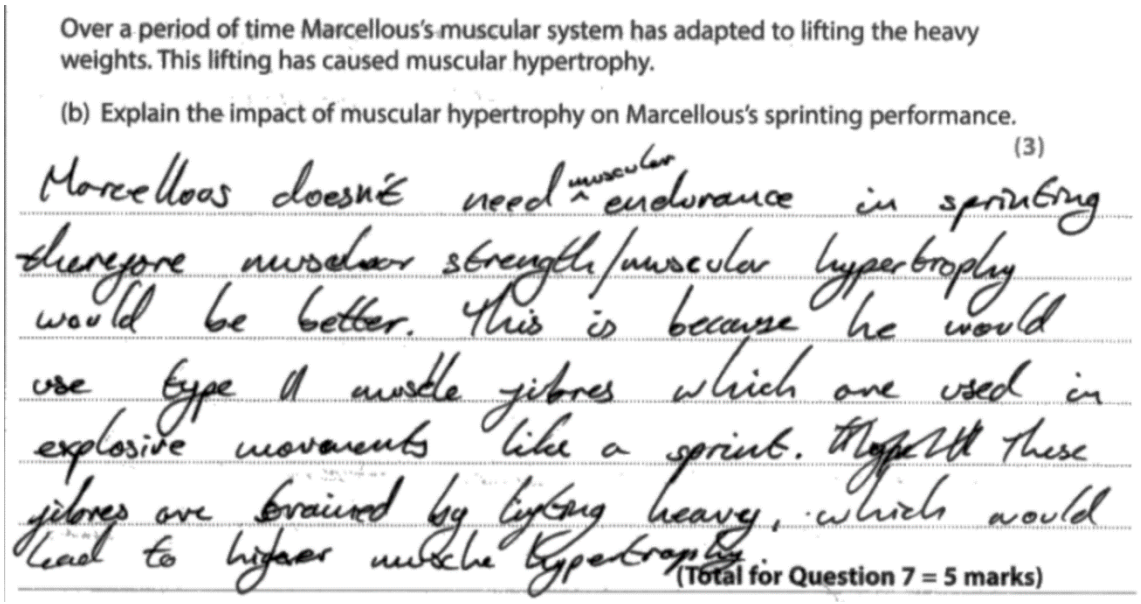
(b) Explain the impact of muscular hypertrophy on Marcellous's sprinting performance.

(3)

Muscular hypertrophy will have a positive impact of on ~~more~~ Marcellous's Sprinting performance as Due to Muscular hypertrophy taking place Marcellous' will have bigger Stronger Muscle which result in them having more power and being able to Make more forceful contractions resulting in Marcellous being able to run faster which will overall decrease his time.

(Total for Question 7 = 5 marks)

This response gained 0 marks.



Over a period of time Marcellous's muscular system has adapted to lifting the heavy weights. This lifting has caused muscular hypertrophy.

(b) Explain the impact of muscular hypertrophy on Marcellous's sprinting performance.

(3)

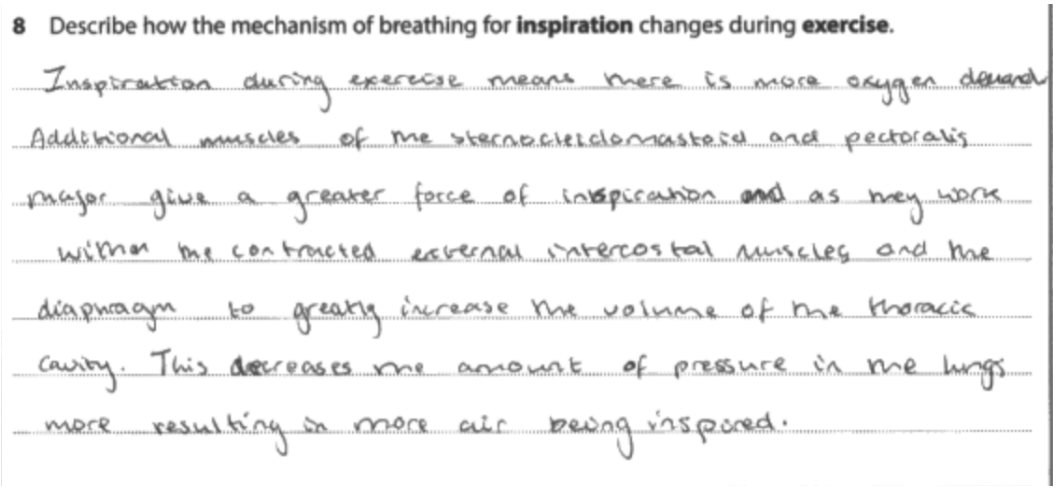
Marcellous doesn't need muscular endurance in sprinting therefore muscular strength/muscular hypertrophy would be better. This is because he would use type II muscle fibres which are used in explosive movements like a sprint. Plus these fibres are trained by lifting heavy, which would lead to bigger muscle hypertrophy.

(Total for Question 7 = 5 marks)

Q8 and Q9

These questions proved to be a good differentiator, evident through the spread of marks. In Q8, it was clear that those candidates who understood the mechanism of breathing at exercise and the implication that it happens on a graeter scale with more force scored highly. Common errors were not implying that more force, cavity size increased more, more air taken in. In Q9 many identifies that the internal intercostal muscle contracted, but few achieved the expansion to reduce the volume of the thoracic cavity quicker.

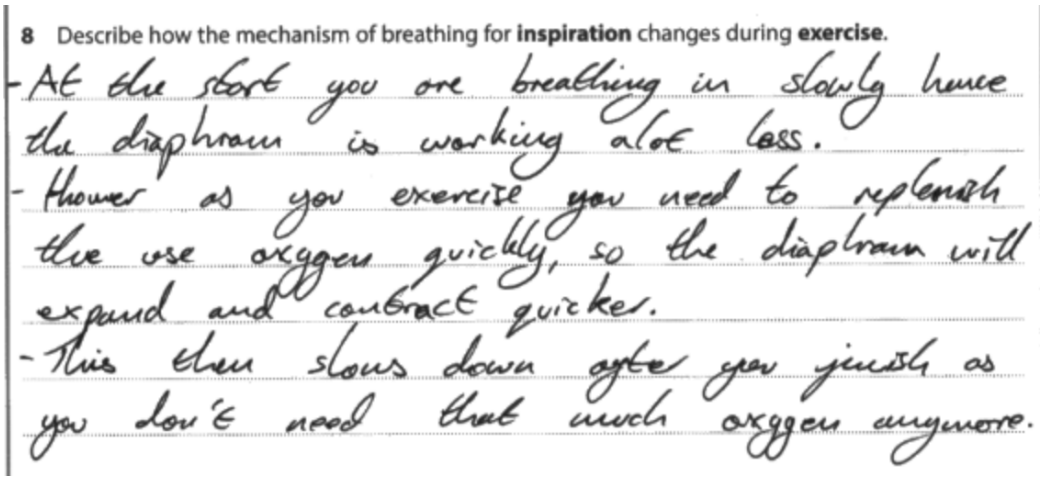
This response gained 4 marks.



8 Describe how the mechanism of breathing for **inspiration** changes during **exercise**.

Inspiration during exercise means there is more oxygen demand. Additional muscles of the sternocleidomastoid and pectoralis major give a greater force of inspiration and as they work with the contracted external intercostal muscles and the diaphragm to greatly increase the volume of the thoracic cavity. This decreases the amount of pressure in the lungs more resulting in more air being inspired.

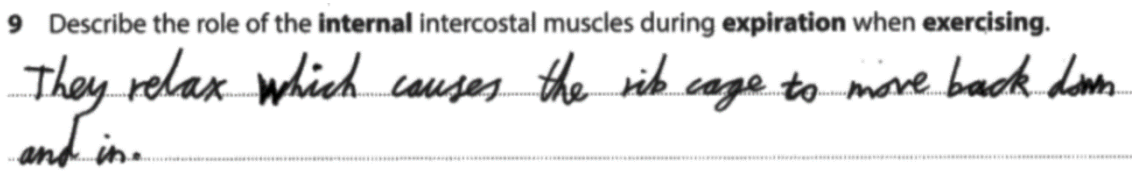
This response gained 0 marks.



8 Describe how the mechanism of breathing for **inspiration** changes during **exercise**.

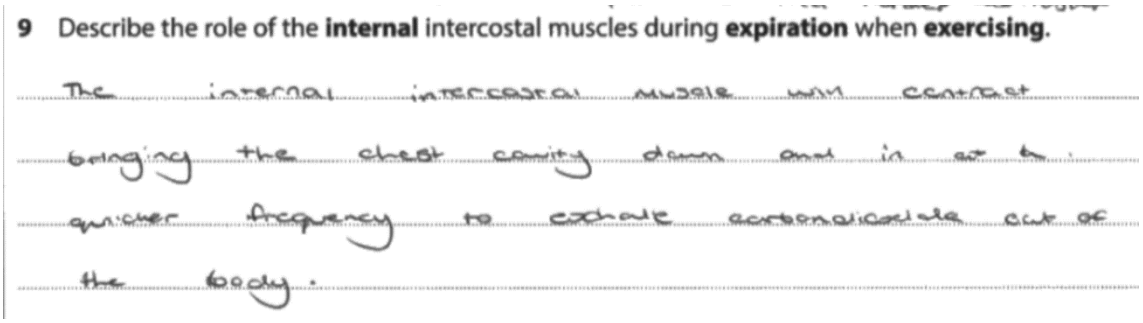
- At the start you are breathing in slowly hence the diaphram is working alot less.
- However as you exercise you need to replenish the use oxygen quickly, so the diaphram will expand and contract quicker.
- This then slows down after you finish as you don't need that much oxygen anymore.

This response gained 0 marks.


9 Describe the role of the **internal** intercostal muscles during **expiration** when **exercising**.

They relax which causes the rib cage to move back down and in.

This response gained 2 marks.


9 Describe the role of the **internal** intercostal muscles during **expiration** when **exercising**.

The internal intercostal muscle will contract bringing the chest cavity down and in at a quicker frequency to exhale carbondioxide out of the body.

Q10a

Candidates were required to explain why gaseous exchange of oxygen is faster at the alveoli during exercise. A number of candidates correctly identified that more oxygen is taken in or there is an increased breathing rate leading to oxygen moving quicker into the blood. Common errors were bringing in carbon dioxide to the answer and stating that the carbon dioxide exchanges with oxygen.

This response gained 4 marks.

Dave is a tennis player. During the match he needs to supply his lungs with oxygen.

10 (a) Explain why gaseous exchange of oxygen is **faster** at the alveoli during exercise than at rest.

(4)

Gaseous exchange of oxygen is faster at the alveoli during exercise than at rest because of the greater demand for oxygen for energy production meaning that there is a greater concentration gradient as oxygen in the blood is used quicker, therefore because the concentration of oxygen in the alveoli is high a greater volume diffuses into the capillaries where the partial pressure is low * this creates a steep diffusion gradient causing gaseous exchange to occur quicker to meet the increased demand for energy when playing tennis.

* due to the oxygen being used for energy production.

This response gained 0 marks.

Dave is a tennis player. During the match he needs to supply his lungs with oxygen.

10 (a) Explain why gaseous exchange of oxygen is **faster** at the alveoli during exercise than at rest.

(4)

gaseous exchange takes place in the alveoli and is the diffusion of oxygen and carbon dioxide, diffusion is when particles move from an area of high concentration to an area of low concentration. When exercising the process speeds up as the body needs to get more oxygen to the working muscles so that they can work for longer before fatiguing.

Q10b

This was the first extended response question of the paper and focused on the impact of a respiratory adaptations and the impact on tennis performance. Responses for the question required focus on the effects of an increased vital capacity, increased strength of respiratory muscles and increase in Oxygen and Carbon Dioxide diffusion rates. The indicative content was written accordingly to encompass this knowledge and application.

Like all of the extended response questions, the quality of candidates' responses varied. Some candidates were clearly very knowledgeable about the adaptations. Other candidates were unable to address the question fully due to confusion between the cardiovascular system and respiratory system.

Level 1 responses tended to focus on one area or provided a list with no development of the points within the indicative content or gave generalistic responses 'more oxygen to the working muscles', which is true for any respiratory adaptation. At level 3 candidates' responses provided accurate knowledge of the effects on performance of an increased vital capacity, increased strength of respiratory muscles and an increase in Oxygen and Carbon Dioxide diffusion rates, used technical terminology with clear development of the point.

Overall this was a challenging question and it was obvious from a number of responses that this knowledge was lacking, although a clear specification point.

Some candidates also discussed the impacts on the cardiovascular system, when it was in the respiratory section.

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 respiratory adaptations with appropriate development in reference to the question.

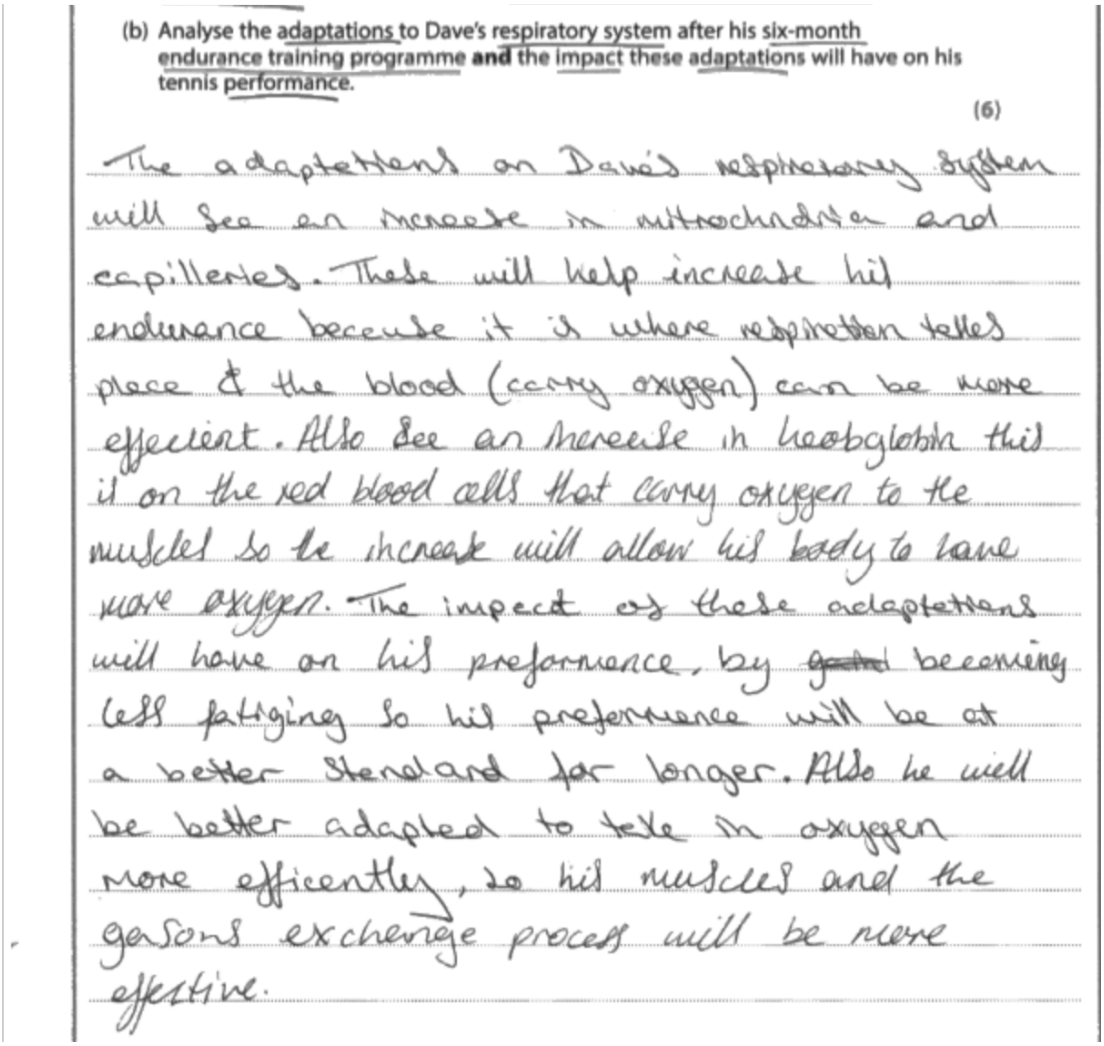
(b) Analyse the adaptations to Dave's respiratory system after his six-month endurance training programme **and** the impact these adaptations will have on his tennis performance.

(6)

The adaptations Dave would see are an increase in vital capacity, an increase in strength of respiratory muscles and an increase in diffusion rate of oxygen and carbon dioxide. Vital capacity is how much air is left in the lungs after maximum expiration. This would benefit Dave's tennis performance as by having air in the lungs after expiration, it means Dave can still play tennis without fatiguing. An increase in strength of the respiratory muscles would positively impact Dave's tennis performance as his muscles would be able to allow more air to enter and exit the body, so giving the working muscles more oxygen. as well as being able to resist fatiguing. An increase in diffusion rate of oxygen and carbon dioxide would benefit Dave's tennis performance as gaseous exchange would be happening at a higher rate and force, meaning the body would be able to work harder for longer without fatiguing.

This response was placed at Level 1 and given 2 marks.

The answer provides basic information true to any respiratory adaptation (more oxygen delivered to working muscles), with limited application on performance.



(b) Analyse the adaptations to Dave's respiratory system after his six-month endurance training programme **and** the impact these adaptations will have on his tennis performance.

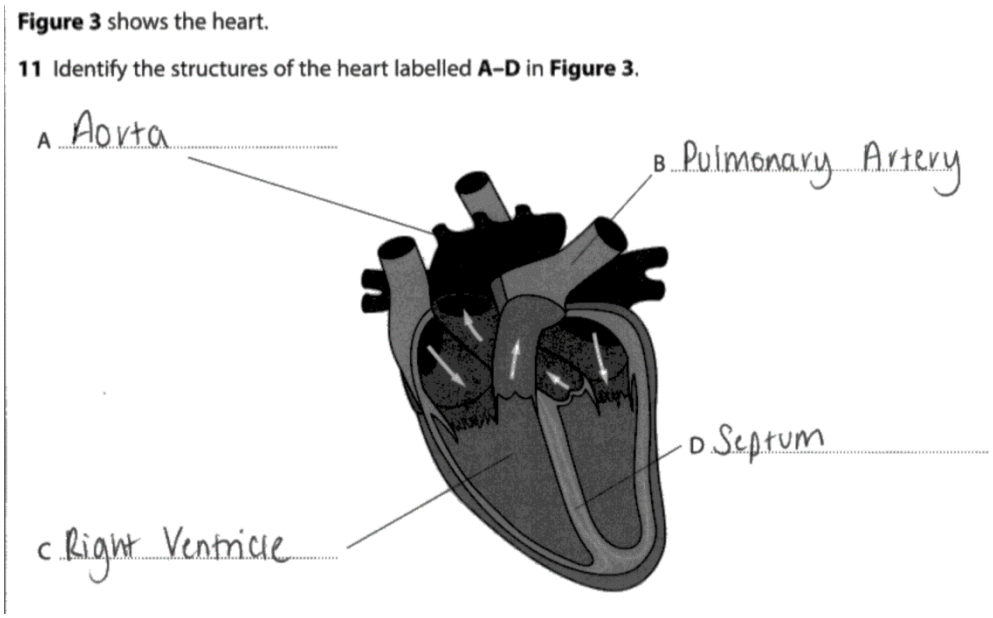
(6)

The adaptations on Dave's respiratory system will see an increase in mitochondria and capillaries. These will help increase his endurance because it is where respiration takes place & the blood (carry oxygen) can be more effecient. Also see an increase in haemoglobin this is on the red blood cells that carry oxygen to the muscles so the increase will allow his body to have more oxygen. The impact of these adaptations will have on his preformance, by ~~gain~~ becoming less fatiging so his preformance will be at a better standard for longer. Also he will be better adapted to take in oxygen more efficently, so his muscles and the gasons exchenge process will be more effective.

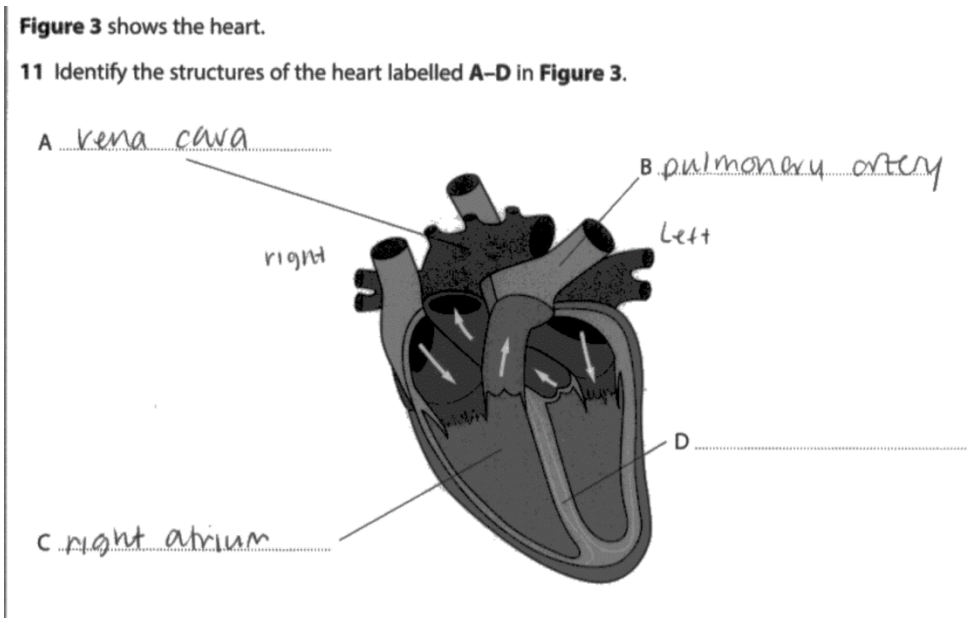
Q11

This was a recall question for identifying structural parts of the cardiovascular system from the diagrams. Generally candidates performed well on this question with the vast majority accessing at least one mark for the right ventricle. Common errors were stating right atrium rather than right ventricle, pulmonary vein or vena cava, instead of the pulmonary artery or aorta respectively.

This response gained 4 marks.



This response gained 1 mark.



Q12

The majority of candidates achieved 1 mark for preventing backflow. Significantly fewer identified the mark for controlling blood flow into the aorta or pulmonary artery.

This response gained 2 marks.

12 Describe the role of semi-lunar valves.

Pulmonary Semi-lunar valve is responsible in transferring blood from the right ventricle into the pulmonary artery. Aortic Semi-lunar valve is responsible for transferring blood from the left ventricle into the Aorta. They also prevent backflow.

(Total for Question 12 = 2 marks)

This response gained 1 mark.

12 Describe the role of semi-lunar valves.

The semi-lunar valves stop backflow ~~into the ventricles~~ of blood into the ventricles and pushes the blood into the arteries.

Q13a & Q13b

Question 13a acted as a good differentiator, generally candidates achieved two marks for the concept of more oxygen delivery and more carbon dioxide removed which is the first two points on the mark scheme. Following this fewer candidates accessed the extension mark points linked to the impacts on performance. Q13b required candidates to state it increase and the vast majority correctly did this.

This response was awarded 4 marks.

Steph is a hockey player. She has been playing for several years and there have been cardiovascular adaptations in her body. One of these adaptations is an increase in blood volume.

13 (a) Explain how an increase in blood volume impacts on Steph's hockey performance.

(4) Q13a

Increase in blood volume means that her ~~body~~ working muscle have high supply of oxygenated blood. This is important as it helps in removing waste products & providing nutrients to muscle. As a result, while playing hockey the build up of lactic acid & CO_2 will be oxidised more frequently at faster rate. This benefits Steph as her muscle will not fatigue during the intense runs she makes to score. As a result, it improves her performance as she will be able to work at higher intensity for long duration.

This response was awarded 2 marks.

Steph is a hockey player. She has been playing for several years and there have been cardiovascular adaptations in her body. One of these adaptations is an increase in blood volume.

13 (a) Explain how an increase in blood volume impacts on Steph's hockey performance.

(4)

An increase in blood volume means more blood will be present in the body ready to be supplied to the working muscles. This increase will boost Steph's performance as her working muscles will become slow to fatigue. ~~Also with an increase of blood volume it will allow the heart~~ This also means that Steph can then work harder for a longer period of time.

This response was awarded 1 mark.

(b) State what happens to Steph's stroke volume when she is playing hockey.

increases

Q13c

This was the second extended response question of the paper and focused on the impacts on hockey performance due to cardiac hypertrophy and capillarisation of skeletal muscle and alveoli, the indicative content was written according to encompass this knowledge and application.

Like all of the extended response questions, the quality of candidate responses varied. Some candidates were clearly very knowledgeable about the impacts on performance of cardiac hypertrophy and capillarisation of skeletal muscle and alveoli, but some candidates struggled to express this in the context of performance.

Level 1 responses used the information in the question to identify what hypertrophy or capilliarisation was, but not both and technical terminology was used sporadically. At level 3 candidates charted the effect of the hypertrophy and capillarisation of skeletal muscle and alveoli and how that impacted on performance.

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 of the cardiac hypertrophy and capillarisation, with effective use of technical terminology, appropriate development in reference to the effects on performance.

Steph's cardiovascular system has adapted as a result of playing hockey.

(c) Analyse how cardiac hypertrophy and capilliarisation of skeletal muscle and alveoli affect Steph's performance in a hockey match.

(6)

Cardiac hypertrophy will affect Steph's performance by increasing the amount of oxygenated blood pumped around the body per heartbeat. this is due to an increase in size and power of the heart. This will mean her heart won't have to work as hard to give the muscles the resources they need for respiration. Capilliarisation of skeletal muscle and alveoli will do a number of things. Firstly the alveoli capiliarisation will allow more blood due to more capillaries to undergo gaseous exchange at a more ✓ meaning more oxygenated blood per pump. Also skeletal muscle capilliarisation will increase the efficiency and amount of diffusion of Oxygen and glycogen from the blood to muscles as there is more places to do so as capillaries are built for that and there is more of them. Both Adaptations work to increase the volume of oxygenated blood getting to Steph's muscles meaning that they will be able to a game with less fatigue. work for the 60+ minutes of

(Total for Question 13 = 11 marks)

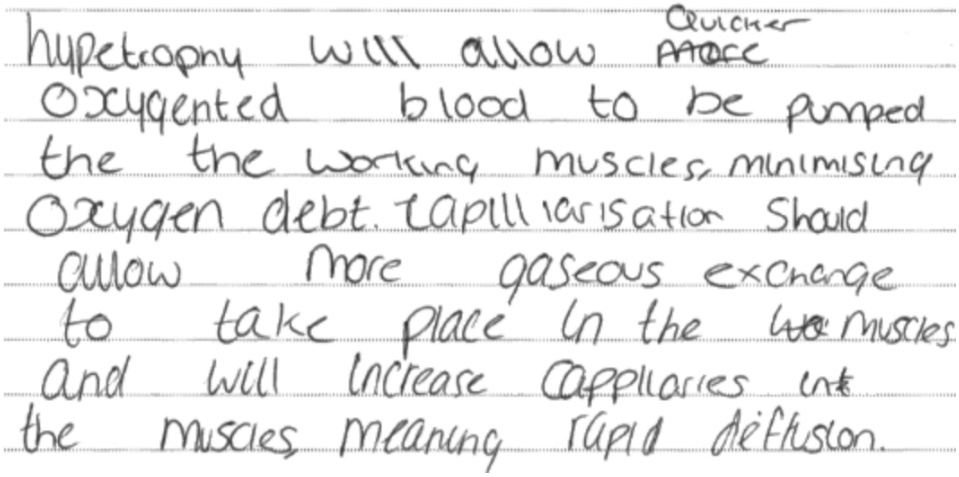
This response was placed at Level 1 and given 2 marks.

The answer provides the correct identification of more blood being pumped to the working muscles and faster diffusion rates.

Steph's cardiovascular system has adapted as a result of playing hockey.

(c) Analyse how cardiac hypertrophy and capilliarisation of skeletal muscle and alveoli affect Steph's performance in a hockey match.

(6)



Q14

This was a recall question for identifying energy systems from the graph. The majority of candidates performed well and achieved at least 2 marks, with many accessing all marks. Common errors were labelling all three stages of the aerobic system, identifying events and activities as opposed to the systems.

This response was awarded 3 marks.

Figure 4 shows a graph of energy system contributions to exercise.

14 Identify the energy systems labelled **A–C** in **Figure 4**.

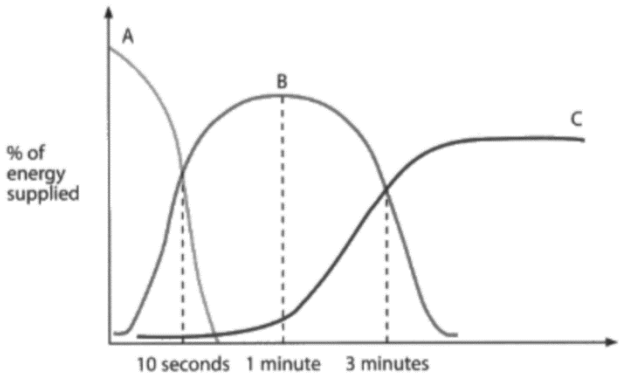


Figure 4

A Atp-pc

B lactate

C aerobic

This response was awarded 1 mark.

Figure 4 shows a graph of energy system contributions to exercise.

14 Identify the energy systems labelled **A–C** in **Figure 4**.

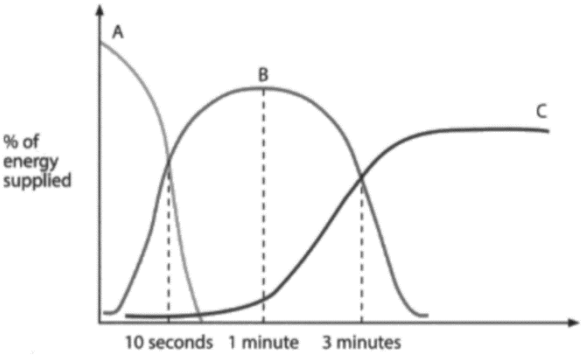


Figure 4

A anaerobic

B anaerobic

C aerobic

Q15

This question proved to be a good differentiator, evident through the spread of marks. It was clear that those candidates who understood the aerobic energy system adaptations and effects on performance scored well. Some candidates found this question difficult to access any of available marks, due to lack of knowledge and understanding. Common errors were discussing through the aerobic system process, although the question clearly states the adaptations of the aerobic system on performance.

This response gained 4 marks.

Crystal is a long-distance cyclist. Crystal's aerobic system has adapted during her training regime. One of these adaptations is that Crystal can now use fats as an energy source more quickly.

15 Explain **two other** adaptations there have been in Crystal's aerobic energy system **and** the impact of these adaptations on her performance. Q15

One other adaptation is increased store of glycogen & number of mitochondria. This means that due to high number of mitochondria glycogen is converted to energy more quicker and efficiently. As more reactions are taking place, This means that she will be able to cycle at higher intensity during steep slopes and at finish as her body is able to produce with energy aerobically (mitochondria) and anaerobically (glycogen stores) allowing her to over take opponents easily

Another adaptation is improved aerobic system, this means that her cardio vascular system is able to pump more oxygenated blood to her working muscles i.e lower half of body. allowing her to conduct faster + powerful movements without fatigue as waste products are removed at faster rate. Total for Question 15 = 4 marks Q15_1

- Mitochondria & glycogen storage
- Improved aerobic system.

This response gained 1 mark.

Crystal is a long-distance cyclist. Crystal's aerobic system has adapted during her training regime. One of these adaptations is that Crystal can now use fats as an energy source more quickly.

15 Explain **two other** adaptations there have been in Crystal's aerobic energy system **and** the impact of these adaptations on her performance.

- She will be able to refill ~~make~~ her ATP stores more efficiently. This will improve her performance as she will have more energy.

Q16

The final question of this section required the candidates to analyse the role of the ATP-PC system in producing energy in the long jump.

Like all of the extended response questions, the quality of candidate responses varied. Some candidates were clearly very knowledgeable about the ATP-PC energy systems in relation to intensity and duration and could clearly articulate why it was the dominant system used in the long. Other candidates were unable to address the question fully by writing everything they knew about the energy system in general rather than answering the specific question.

Level 1 responses came from those candidates who identified it was a high intensity or short time, therefore ATP-PC was used more. Common mistakes were explaining how ATP-PC breaks down energy. Level 3 responses those who assessed the energy system and articulated using technical terminology why the ATP-PC system is the predominant system used.

This response was placed at Level 3 and given 6 marks.

The answer analyses why the ATP-PC system is used rather than the other two energy systems. It discusses the response in relation to time, intensity and regeneration, fully linked to performance throughout.

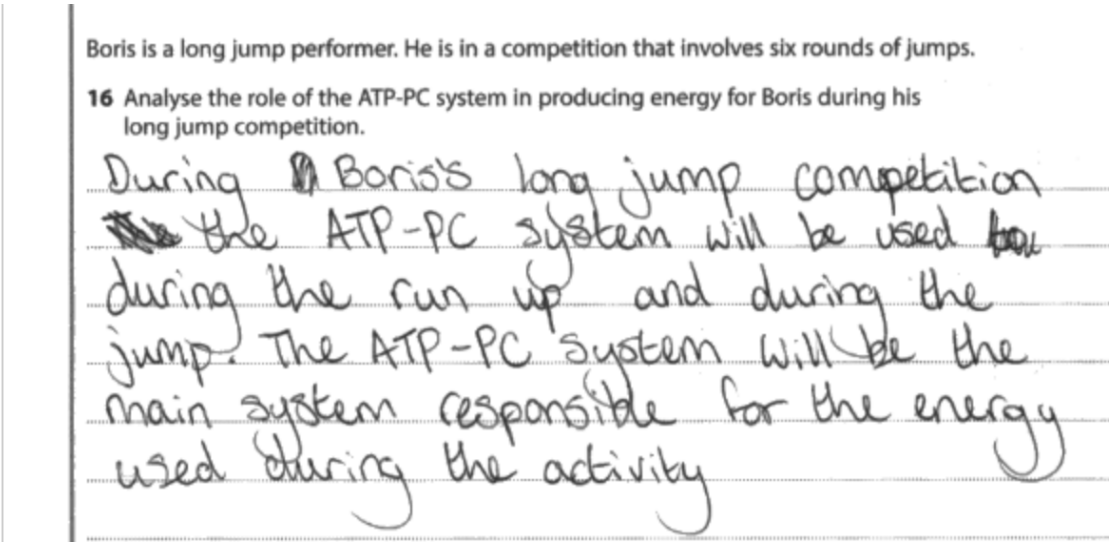
Boris is a long jump performer. He is in a competition that involves six rounds of jumps.

16 Analyse the role of the ATP-PC system in producing energy for Boris during his long jump competition. → anaerobic → short bursts of energy

The ATP-PC system produces energy anaerobically ~~aerobically~~. ~~The~~ Phosphate - creatine is broken down and releases 2 molecules of ATP. The process is quick and therefore Boris will have ~~enough~~ enough energy immediately available for short bursts of high intensity. Like performing the long jump. The system also doesn't produce waste products so no lactate will accumulate, decreasing the chances of muscle fatigue. The system will give Boris up to 10 seconds of energy, enough time to perform a long ~~jump~~ jump. The ATP-PC system takes around 2-3 minutes to recover. This is enough time inbetween the rounds for Boris' PC stores to be replenished. So he has fuel to provide energy for his next jump. However, the stores of PC are limited so Boris will have to give his body enough time to ensure that the stores can be replenished for the ~~for~~ next jump.

This response was placed at Level 1 and given 2 marks.

The answer generates credit through the identification of ATP used during the run up and the ATP-PC system being the main system used.



Boris is a long jump performer. He is in a competition that involves six rounds of jumps.

16 Analyse the role of the ATP-PC system in producing energy for Boris during his long jump competition.

During Boris's long jump competition the ATP-PC system will be used during the run up and during the jump. The ATP-PC system will be the main system responsible for the energy used during the activity

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. Candidates 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 candidate responses varied. Some candidates were clearly very knowledgeable about how the cardiovascular and muscular system responses work together. Some candidates 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 skeletal or respiratory responses or adaptations so irrelevant in the context of this question.

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.

Level 1 responses tended to focus on isolated elements that make general assertions and did not reference impact. Level 4 responses provided accurate knowledge of both the cardiovascular and muscular systems and how they work together throughout the warm up. Like any levels of response based question, it is not 1 point equals 1 mark, the indicative content is extensive for candidates 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 the how the systems work together. Each system is visited and application to the warm up and interrelationships are developed throughout.

The warm up is a fundamental part of a team's preparation that takes place before a game. Theo is a netball coach and his team warm up before every game. In their warm up, team members do some light jogging around the court, dynamic stretching and more intense drills with the ball.

17 Analyse the responses of the muscular system and cardiovascular system to the netball warm up **and** how these responses impact on performance.

(8)

A response of the muscular system and the cardio-vascular system is vascular shunt, the redirection of oxygenated blood to respiring muscle tissue. This ensures that the players muscles are able respire continually, meaning they will be able to sustain their performance over time. Another response of the muscular system is increased muscle temperature and pliability. This reduces the players risk of injury, as it allows the muscles to stretch with minimal risks of tearing which could occur for example whilst players are Pivoting quickly. Again, these responses are ~~worked~~ affected by the cardiovascular system, which responds to the increased muscle temperature with vasodilation in the venules and arterioles about the site of respiration. This bring blood closer to the surface, meaning the body is able to lose excess heat to it's surroundings.

Another important response of the cardiovascular

This response below was placed at Level 2 and given 4 marks.

The answer identifies isolated elements of knowledge and understanding, however some of the information (e.g. stretch the muscle) is too vague on its own. Some attempt to link to impact on performance.

The warm up is a fundamental part of a team's preparation that takes place before a game. Theo is a netball coach and his team warm up before every game. In their warm up, team members do some light jogging around the court, dynamic stretching and more intense drills with the ball.

17 Analyse the responses of the muscular system and cardiovascular system to the netball warm up **and** how these responses impact on performance.

(8)

The warm up before a game is very important to do and can be key to a good performance. The warm up will be beneficial to the muscular system as it will stretch out the muscles. Before putting strain and tension upon the muscle it is good to stretch as it can prevent you from any injuries to the muscles. The light jogging will be more beneficial to the cardiovascular system as it will start to increase the heart rate. By doing this the blood will be pumped to the working muscles

before the game as started. Started meaning by the time the game has started the muscles will already have a good amount of oxygen. This meaning the players heart won't have to work as hard at the beginning + meaning the players will be able to perform at a high intensity for longer. The intense drills will be more beneficial to the muscular system as it will replicate game scenaria getting their muscles ready for the match. This will have a good impact upon the performance.

(Total for Question 17 = 8 marks)

Summary

Based on their performance on this paper, candidates should:

- Use appropriate technical language throughout their responses,
- Tailor their response based on the command word in the question, e.g. 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, e.g. short-term responses (immediate, due to the exercise/sport), adaptations (long term).
- Only address the correct body system within this section, e.g.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 Centre's 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.