

Examiners' Report
June 2018

GCSE Physical Education 1PE0 01

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Introduction

Although a new specification with much more theoretical content to cover both in this paper and, of course, in Paper 2, candidates' approach in terms of how to respond to the questions asked was not significantly different. The format of the paper was very similar.

The paper begins with multiple-choice questions designed to be fairly accessible for candidates. The main section of the paper is devoted to one, two, three or four part mark questions (the question total might be larger, but the allocation of marks will have been broken down within that).

The final section comprises the extended response questions. Although more marks are available for these questions, the demand on candidates is the same as in previous series'. Candidates need to demonstrate knowledge, application of knowledge, and analysis or evaluation of the topic being considered in the question.

A growing number of candidates are providing well-structured, well-organised responses even to the most challenging questions. For example, 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.

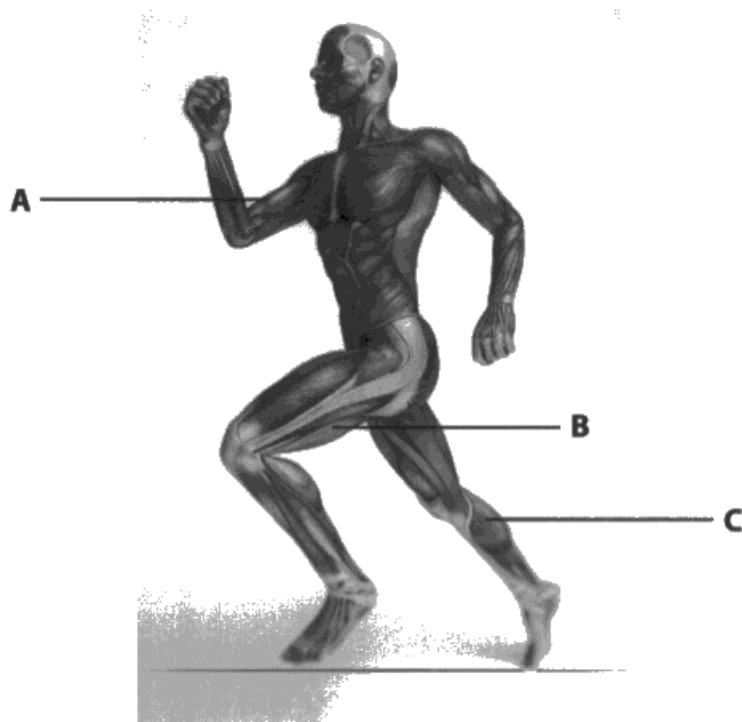
Candidates and centres should be congratulated on the preparation of the candidates for this examination. A full range of marks was achieved across each question.

Question 2 (a)

The question asked candidates to identify the muscles indicated on the diagram.

Most candidates identified at least two of the muscles correctly. 'Biceps' was very well known. Where candidates did not achieve all three marks, this tended to be due to confusion between the hamstrings and the quadriceps, or through not using appropriate technical terms – for example, stating 'calf' rather than 'gastrocnemius'.

2 **Figure 1** shows the muscular system while running.



(Source: © Sebastian Kaulitzki/Shutterstock)

Figure 1

Complete **Table 1** by:

- (a) Identifying the muscles labelled A, B and C in **Figure 1**.
- (b) Stating the role of each muscle.

	(a) Muscle
A	Biceps (1)
B	Hamstring (1)
C	Calf (1)

Table 1



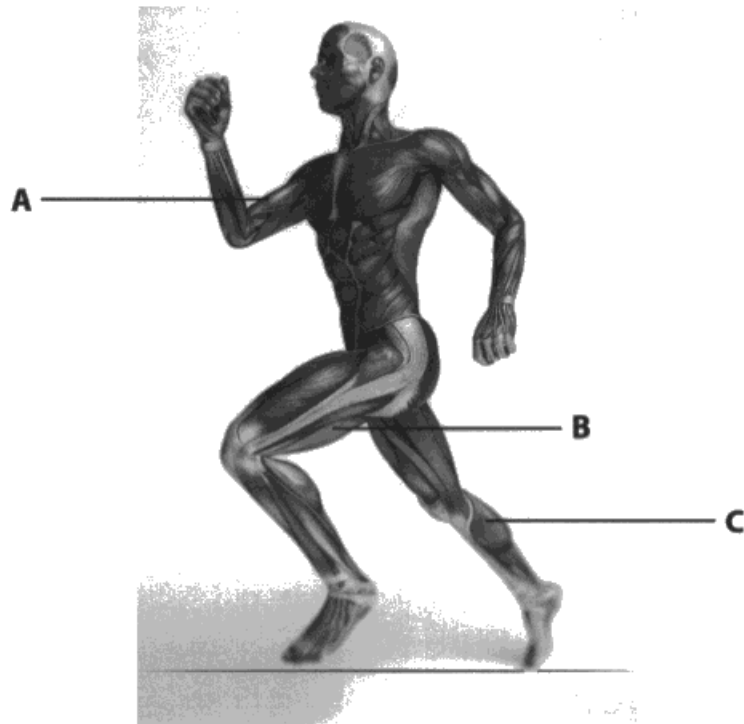
A mark is not awarded for the calf. At this level, candidates are expected to know the correct anatomical name for the muscles, therefore gastrocnemius was required.

2 marks



Make sure you use the correct technical name for the muscles

2 **Figure 1** shows the muscular system while running.



(Source: © Sebastian Kaulitzki/Shutterstock)

Figure 1

Complete **Table 1** by:

- (a) Identifying the muscles labelled A, B and C in **Figure 1**.
- (b) Stating the role of each muscle.

	(a) Muscle
A	Biceps Bicep (1)
B	Hamstring (1)
C	Gastrocnemius (1)

Table 1



It is appreciated that 'gastrocnemius' will be a challenging word to spell for some candidates, but provided this is phonetically accurate, credit is given.

3 marks



If you are not sure how to spell a word, spell it as it sounds: you will still gain the mark

Question 2 (b)

This question was more demanding of candidates than part 2(a) because having identified the muscle in 2(a), candidates had to state the role of the muscles shown in the figure.

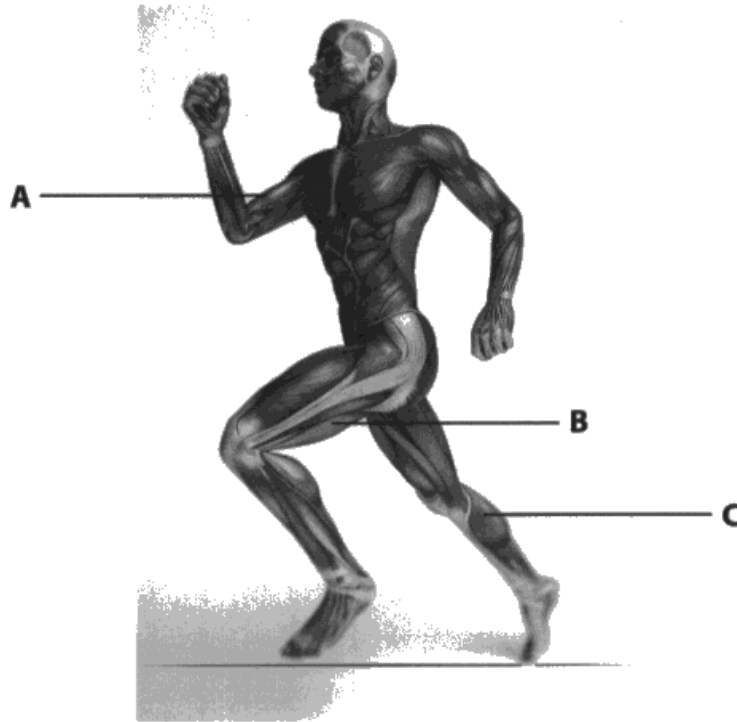
In terms of errors, some candidates identified the correct role but then went on to give the full range of movement possible at the joint. They included the movement caused by its antagonistic pair, e.g. the biceps allow flexion and extension at the elbow.

Other popular incorrect responses included statements without the correct terminology, e.g. the elbow bends. Some gave incomplete responses, not stating the joint at which the action occurred, e.g. the biceps cause flexion of the arm. This was not credited because flexion of the arm can occur at more than one joint.

Some candidates gave an example of the use of the muscle in physical activity, e.g. to lift a weight, misunderstanding the use of the word.

Despite the potential for error, many candidates still achieved maximum marks for this question.

2 **Figure 1** shows the muscular system while running.



(Source: © Sebastian Kaulitzki/Shutterstock)

Figure 1

Complete **Table 1** by:

- (a) Identifying the muscles labelled A, B and C in **Figure 1**.
- (b) Stating the role of each muscle.

(b) Role of the muscle	
A	To contract creating flexion (1)
B	To relax in the antagonistic pair with the quadriceps when running to also create flexion. (1)
C	To extend, to relax. (1)



Whilst flexion is identified correctly as the action caused by muscles A and B, the joint where this occurred is not included.

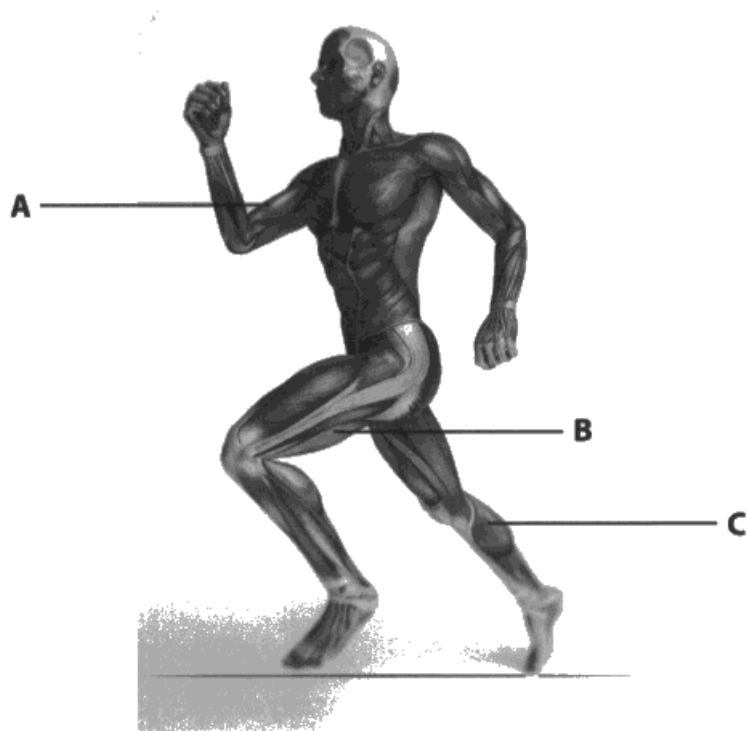
For muscle C, the incorrect joint action is stated and, again, no joint referenced.

0 marks



When asked about the role of a muscle make sure you state the **joint**, as well as the joint action

2 **Figure 1** shows the muscular system while running.



(Source: © Sebastian Kaulitzki/Shutterstock)

Figure 1

Complete **Table 1** by:

- (a) Identifying the muscles labelled A, B and C in **Figure 1**.
- (b) Stating the role of each muscle.

(b) Role of the muscle	
A	causes flexion at the elbow joint (1)
B	causes flexion at the knee joint (1)
C	causes plantar-flexion at the ankle. (1)

Table 1



This response gained maximum marks. The correct role of each muscle is stated clearly, and all essential information is given:

- the joint action
- the name of the joint
- correct use of technical language (ie flexion rather than bending)

3 marks

Question 3

This question asked candidates to analyse the movement occurring at the elbow and the hip during the leg shoot phase of the long-jump. The analysis was based on a supplied image of a long-jumper.

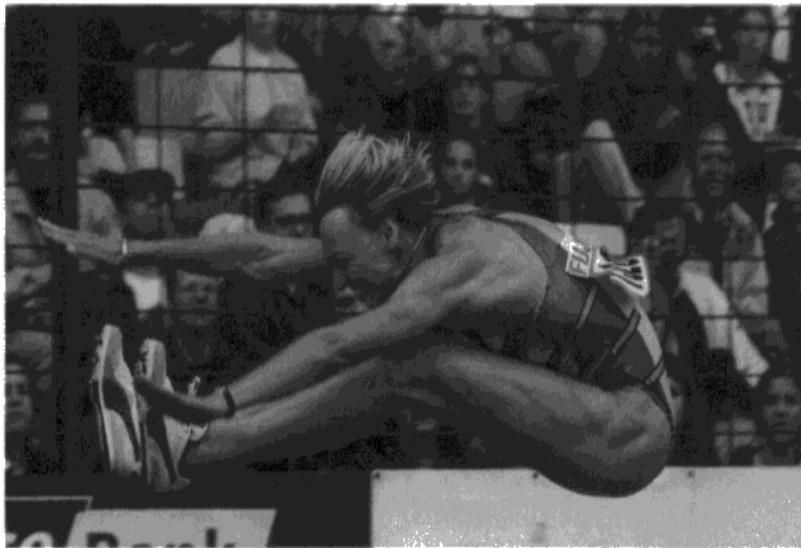
Three marks were available for each joint. In each case, one mark was awarded for stating the action taking place at the joint to achieve the position, one mark for the agonist causing the joint action and one mark for the antagonist that allowed the action to take place.

The full range of marks was accessed by candidates for this question. Whilst a few candidates did not attempt the question, most did. Some candidates only stated the action at the joints, some stated the action of the agonists and others referenced all required aspects correctly.

Of the two joints, the elbow was more well-known, with candidates often achieving maximum marks for this section of the question. Common incorrect responses did not use the correct terminology, for example referencing the triceps flexing (rather than contracting) or the arm straightening (rather than extending at the elbow). Some candidates gave contradictory responses, eg the triceps is the agonist as it is relaxing: this could not be credited.

However, many candidates did score well on this question, demonstrating a good knowledge of movement analysis at these two joints.

3 **Figure 2** shows a long jumper.



(Source: Photo by Tobias Heyer/Bongarts/Getty Images)

Figure 2

hip flexors.

Examine the antagonistic muscle action taking place at the elbow and the hip in **Figure 2** that allows the long jumper to achieve this position.

Elbow

(3)

at the elbow the antagonist is the bicep (relaxed)
thus the agonist is the tricep (contracted), this
causes extension at the elbow.

Hip

(3)

at the hip, hip flexors are contracted (agonists)
while the gluteus muscles are relaxed (antagonists),
this brings about flexion at the hip.

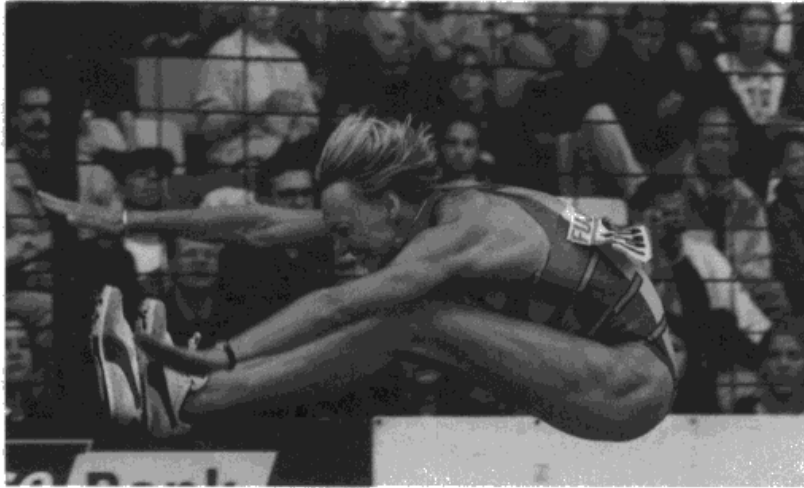


This response gains the six available marks for this question. All required elements are included in the response:

- the joint action occurring at the named joint
- the agonist during the movement
- the antagonist during the movement

6 marks

3 Figure 2 shows a long jumper.



(Source: Photo by Tobias Heyer/Bongarts/Getty Images)

Figure 2

Examine the antagonistic muscle action taking place at the elbow and the hip in Figure 2 that allows the long jumper to achieve this position.

Elbow

(3)

The two muscles working antagonistically is the bicep & tricep. Her biceps are the antagonist, whilst the triceps are the agonist. The extension of her elbow joint allows her to propel herself forward. The bicep is relaxing as the tricep is contracting.

Hip

(3)

The antagonistic pair is the quadricep & hamstring. The quadricep is the agonist, as the hamstring is the antagonist. The quadricep is contracting, whilst the hamstring is relaxing. The extension of her legs allow her to maximise the distance she covers, as the further her legs are extended the more distance she will make.



There is a good analysis of the action at the elbow joint. The antagonistic muscle pair is named, and their roles stated clearly. There is also reference to the joint action that is shown in the image.

However, the incorrect muscle pair has been identified working at the hip – instead, analysing the role of the muscles acting at the knee, therefore no marks are achieved for this part of the question.

3 marks

Question 4

The context for this question was a 3000m steeplechase. Candidates were given two images at two different points in the race, one during the running phase and one during the jumping phase.

This information was provided so that, regardless of a candidate's familiarity with this event, they could address the question. Candidates were asked to examine how two different muscle fibre types would be used during the different parts of the race. The muscle fibre types were not given because this will have been the most accessible part of the question, ie to match running and jumping with the relevant fibre type. For each fibre type, one mark was awarded for:

- linking the fibre type correctly to the relevant phase of the race
- examining the characteristic of the fibre type that made it most relevant
- the impact of the use of the fibre type.

Thus, a response that stated slow twitch during the running phase as the fibre type is fatigue-resistant, so the runner can maintain running performance without fatigue, would gain three marks.

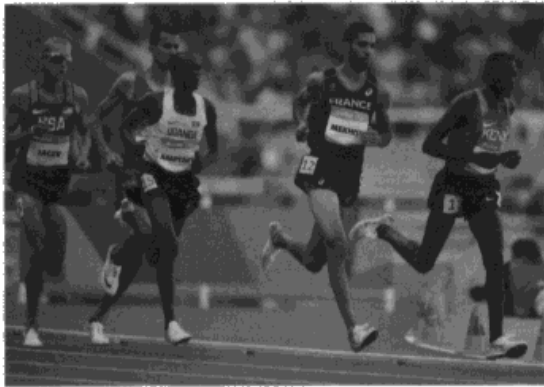
A recurring error was the linking of the fibre type with energy, eg type IIx being useful because they provided quick bursts of energy, rather than reference to the speed of force of contraction of the fibre type.

Many candidates accessed at least two marks for this question, linking the phases of the race correctly with the relevant muscle fibre type. Of the three aspects being assessed, the least well-known appeared to be the applied knowledge of relevant characteristics of the muscle fibre types.

Candidates should be encouraged to reference the muscle fibre types as type I, type IIa or type IIx.

4 **Figure 3** shows steeplechase athletes running a race.

The race involves running **3000m** and **jumping hurdles**.



Type 1
Running 3000m

(Source: © FABRICE COFFRINI/Getty Images)



Type 2x
Jumping hurdles

(Source: © PEDRO UGARTE/Getty Images)

Figure 3

Examine how **two different muscle fibre types** are used by the athletes in **Figure 3** during the different parts of the race.

(6)

During the 3000m running section of the race, the athletes would be using the type 1 muscle fiber. Type 1 muscle fiber is a slow twitch, which is ideal for a continuous exercise such as 3000m, and a marathon.

where as ~~is~~ during the jumping hurdles section of the ~~race~~ race, the athletes would be using the type 2x muscle fiber. Type 2x muscle fiber is a very fast twitch



This response gains two marks for correct identification of the use of slow-twitch muscle fibres during the running part of the race and type IIx for the hurdling part of the race.

No further expansion is provided concerning why those fibre types would be the type used. Candidates should explain the characteristics of the fibre type, or the impact of using the fibre types, eg slow twitch for running because it is resistant to fatigue, so the runner's muscles do not tire quickly.

2 marks

- 4 **Figure 3** shows steeplechase athletes running a race.
The race involves running 3000m and jumping hurdles.



Running 3000m

(Source: © FABRICE COFFRINI/Getty Images)



Jumping hurdles

(Source: © PEDRO UGARTE/Getty Images)

Figure 3

Examine how **two** different muscle fibre types are used by the athletes in **Figure 3** during the different parts of the race.

(6)

For running 3000m (prolonged), type I muscle fibres are used given that they have ~~low~~ high fatigue resistance meaning the athletes can run for prolonged periods of time without tiring, additionally due to the fact they have a rich blood supply meaning the muscles are highly oxidised meaning they can contract for longer without feeling fatigued. - so the runner can run for longer at a greater pace.

For jumping hurdles (explosive movement) type IIx muscle fibres are used given that they exert a high force and have a very fast contraction speed meaning this enables the runner to explosively jump over hurdles successfully.



This is an excellent response and gains maximum marks.

The candidate achieves the three available marks for the first part of the question in the first four lines of their response. They identify when the fibre type is used in the race, why it is used and its impact.

The second paragraph repeats this format in relation to fast-twitch muscle fibre type IIx.

6 marks

Question 5 (a)

This question asked candidates to explain why platelets were important to athletes such as boxers. Two marks were available, the first mark for identifying the role of platelets to clot the blood (or equivalent) and the second for applying this to sports such as boxing.

The image immediately above the question shows the boxer with blood from a cut to the face, which candidates could use to help them in their answer.

The majority of candidates achieved at least one mark for this question, identifying the role correctly. Responses that did not gain both marks tended to be because the response was not applied to the boxer, eg more theoretical knowledge was given about infection, rather than the importance in allowing the bout (or equivalent) to continue.

5 **Figure 4** shows a boxer who has a cut to the face.



(Source: Photo by Christian Fischer/Getty Images)

Figure 4

(a) Explain why platelets are important to athletes in contact sports such as boxing.

(2)

platelets heal open wounds such as a cut lip
or eye, therefore in sports like boxing ~~and~~ ~~ect~~ the
platelets seal the injury and make a scab.



One mark is awarded for the platelets helping to form a scab over the cut.

The importance of this to the boxer is not stated, therefore no further credit is given.

1 mark



For explain questions, try to apply your knowledge to the question context.

Here, it is important that blood flow is stopped so the boxer can continue to fight.

5 **Figure 4** shows a boxer who has a cut to the face.



(Source: Photo by Christian Fischer/Getty Images)

Figure 4

(a) Explain why platelets are important to athletes in contact sports such as boxing.

(2)

The platelets in the blood form a net like structure which forms over the cut. This stops the bleeding and repairs the cut so the boxer can keep fighting.



The candidate identifies the role of platelets correctly and explains why this is important to the boxer, ie so they can continue with the fight.

2 marks

Question 5 (b)

This question asked candidates to state a function of the plasma. To gain the mark, candidates needed to make reference to its role as a transport system, to maintain blood pressure or to regulate body temperature.

As a 'state' question there was no need for a description of the role or an explanation, but the role had to be clearly stated. For example, if a candidate stated that the function was to carry blood this was considered too vague. If no reference to the overarching function as a transport system was made then 'carried' could only be accepted if a specific named substance was given to compensate, eg 'carries red blood cells' would have been credited.

(b) State **one** function of plasma.

(1)

To carry all the blood to wear it is needed e.g. red blood cells, white blood cells.



One mark is awarded for identifying correctly a specific element that is transported in the plasma.

1 mark

(b) State **one** function of plasma.

(1)

This carries food, minerals and nutrients around the body.



Provided a relevant substance is stated, the mark is awarded. In this case, the response gains one mark for carrying nutrients.

1 mark

Question 5 (c)

This part of the question asked candidates to state the meaning of the term 'vasoconstriction'.

In their responses, it was important that candidates made reference to the narrowing of the lumen of the blood vessel. Simply saying the blood vessel became smaller or constricted was insufficient, because the whole vessel does not reduce in size.

Some candidates described the process of vasoconstriction or the reason for it, giving good descriptions, which unfortunately could not be credited, because this was not addressing the specific question being asked. This emphasises the need, especially under exam conditions, for candidates to take time to read questions carefully.

- (c) To ensure blood flow to the working muscles, vasoconstriction occurs in some of the boxer's blood vessels.

State the meaning of the term vasoconstriction.

(1)

The blood vessels lumens decrease in size
which ~~restricts~~ restricts the blood flow to other
vessels with a wider lumen.



This response gains one mark for the correct meaning of the term 'vasoconstriction'.

The specific type of blood vessel does not need naming.

However, the mark would not have been awarded had an incorrect statement such as 'the veins narrow' been stated.

1 mark

- (c) To ensure blood flow to the working muscles, vasoconstriction occurs in some of the boxer's blood vessels.

State the meaning of the term vasoconstriction.

(1)

Vasoconstriction is when the blood in the blood vessels are dispensed to parts of the body to muscles that need the glucose the most to keep them working and performing at their best.



This response gained no marks.

The candidate has described part of the redistribution of blood flow, rather than state the meaning of the term 'vasoconstriction'.

0 marks



Look at the command words and mark allocation. 'State' for one mark, will require a simple fact, not a description of a process or an explanation.

Question 5 (d)

This question tests candidates' knowledge of methods to reduce risk and their ability to apply this knowledge to a boxer during a boxing match. An image was given of a boxer earlier in the question to provide some context for students.

Candidates' application of knowledge was not judged on its 'correctness' to boxing, because boxing knowledge was not being tested (this would be outside the scope of the component content). For example, if candidates identified 'rules' or an official as a method to reduce risk, provided the rule was sensible and likely, credit would be given.

Many candidates achieved two marks for this question. A common error was to identify the same method twice. For example, protective clothing was often used twice and therefore could only be credited once. Popular correct responses gaining four marks often gave the methods of protective clothing and rules, with appropriate examples.

(d) State, giving an example for each, **two different** methods used to reduce the risk of injury during a boxing match.

(4)

Method and example 1

Guardrail: The boxers both wear guardrails to protect their teeth and to stop them from losing any from a powerful blow to the face.

Method and example 2

Weight Classes: Allows boxers to fight people of a similar weight to them ^{because} ~~therefore~~. ~~saving a serious~~ if a heavy weight fought a lightweight they would be much more powerful than them and could cause a large amount of damage to their opponent.



Four marks are awarded to this response.

Two marks are given for identification of an item of protective clothing and what it protects (gum shield and protection against loss of teeth).

Two marks are given for the use of weight categories to balance a competition and the example of heavyweight and lightweight classes.

4 marks

(d) State, giving an example for each, **two different** methods used to reduce the risk of injury during a boxing match.

(4)

Method and example 1

The use of gum shields allow no
real damage to the teeth

Method and example 2

Also the use of gloves allows less impact to
the cranium and also less damage to the
knuckles.



This response gains two marks. Four marks are not awarded because the method in each case is the same, just a different example, ie the method is to wear protective clothing/equipment.

2 marks



Pay particular attention to anything that is in 'bold': normally, this will be a specific instruction or further guidance about how to approach a question

Question 6 (a)

This question assessed candidates' ability to use data.

For this part of the question, candidates were given two pie charts and asked to analyse the data to identify the difference between the runner's inhaled and exhaled air. One mark was awarded for each 'difference', ie that there was a greater percentage of oxygen inhaled than exhaled and that there was a greater percentage of carbon dioxide exhaled than inhaled.

It is important in this type of question that candidates do not simply repeat the values in the diagrams. They need to make clear they are comparing the figures. This was designed as a very accessible data question.

6 Figures 5 and 6 show the percentages of oxygen, carbon dioxide and nitrogen in the air inhaled and exhaled by a long distance runner while training.

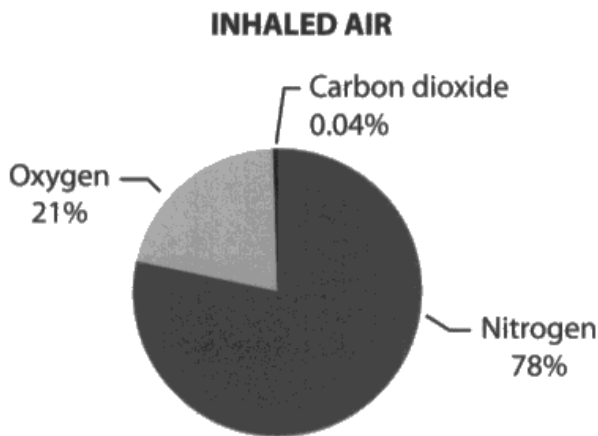


Figure 5

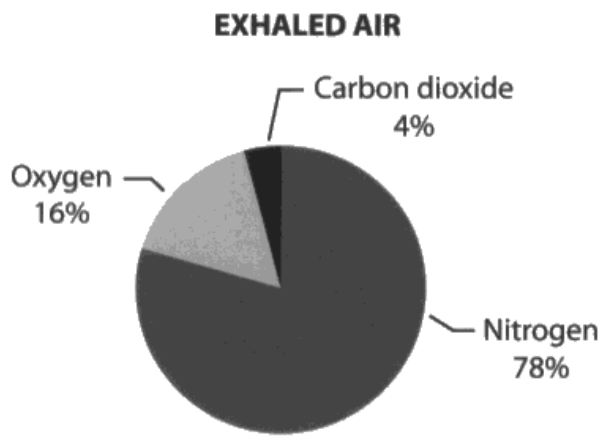


Figure 6

(a) Analyse, using the data in **Figures 5 and 6**, the difference between the runner's inhaled and exhaled air.

The difference between the runner's inhaled and exhaled air, is the ⁽²⁾ that ~~is~~ difference is when the runner inhaled air they only took in 0.04 ~~carbon~~ carbon dioxide whereas when they exhaled they had 4% carbon dioxide.



This response gains one mark because only one difference is considered: that of carbon dioxide levels. This is stated clearly, but can only access one mark.

1 mark



If asked to analyse the differences, make sure you include all of the differences in the data in your answer

6 **Figures 5 and 6** show the percentages of oxygen, carbon dioxide and nitrogen in the air inhaled and exhaled by a long distance runner while training.

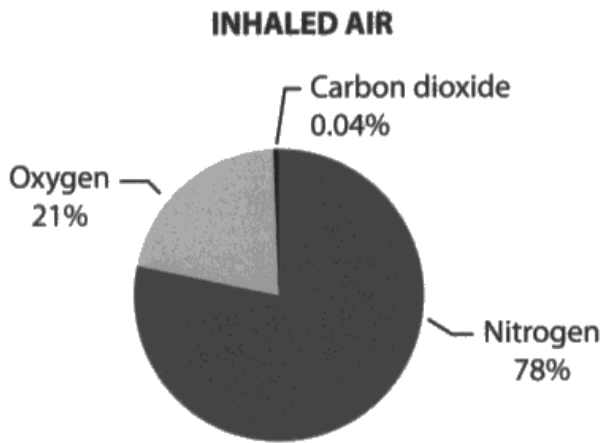


Figure 5

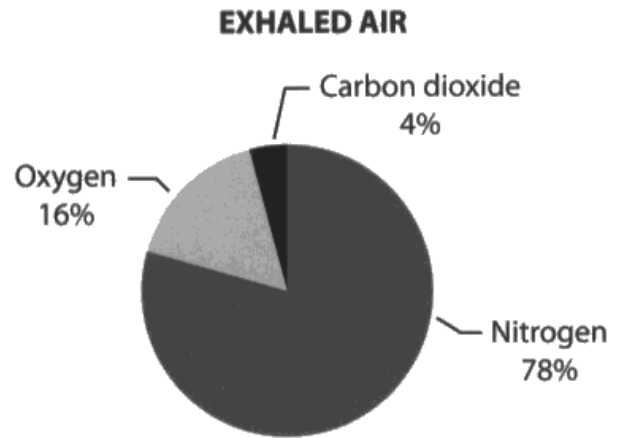


Figure 6

(a) Analyse, using the data in **Figures 5 and 6**, the difference between the runner's inhaled and exhaled air.

(2)

The runner inhales 21% oxygen and exhales 16% meaning less oxygen leaves the body than enters. The carbon dioxide exhaled is more than inhaled meaning more leaves the body. ~~No Nitrogen~~ is ~~is~~ The proportion of Nitrogen remains constant.



This response gains both available marks.

It is a very clear response indicating that oxygen decreases in exhaled air, yet carbon dioxide increases. There is no need for candidates to explain the data in this part of the question.

2 marks

Question 6 (b)

There were four marks available for this question. To gain maximum marks, candidates needed to explain the reasons for the differences in composition of inhaled and exhaled air.

Many candidates were able to access two marks, identifying that oxygen was reduced as it had been used but that carbon dioxide (CO_2) increased because it was produced as a by-product. Those candidates that recognised carbon dioxide was a by-product of aerobic respiration, or that the oxygen was used for energy production, gained further credit.

(b) Explain why there is a difference in the amount of oxygen and carbon dioxide in inhaled and exhaled air whilst the long distance runner is training.

(4)

The runner is exercising aerobically meaning they are using oxygen to oxidise the glucose which produces more energy. This is why oxygen decreases. During aerobic respiration carbon dioxide and water are waste products. This is why carbon dioxide increases.



This response gains four marks.

One mark is given for explaining that oxygen levels drop as oxygen is needed, and what it is needed for, ie to produce energy.

Two marks are given for identifying that CO_2 levels increase because it is a by-product created during aerobic respiration.

To gain the fourth mark, candidates had to link increased production to aerobic respiration (not just respiration, because it is not produced anaerobically).

4 marks

(b) Explain why there is a difference in the amount of oxygen and carbon dioxide in inhaled and exhaled air whilst the long distance runner is training.

(4)

The runner is inhaling oxygen because when training oxygen is needed to the working muscles so they produce the best performance. After the oxygen has been used it releases ^{carbon dioxide} out of the body. When exhaling the more amount of oxygen is being inhaled the more amount of carbon dioxide is being exhaled.



This response gains one mark.

The mark is awarded for recognition that oxygen is needed by the working muscles. There is no indication of why it is needed, eg to release energy, therefore the second mark is not awarded.

Whilst there is a reference to CO₂ levels increasing no mark is awarded for this, because this is credited in Q6(a). There is no explanation that CO₂ is produced during aerobic respiration.

1 mark

Question 6 (c) (i)

To address this question candidates needed to identify the lung volume indicated on a graph.

The y axis on the graph was labelled 'Air exchanged per breath (dm^3)'. From this information, or from recognition of similar graphs, candidates were expected to identify Tidal volume. The majority of candidates were able to recognise this lung volume.

Question 6 (c) (ii)

This was a four-mark question. Candidates were presented with two graphs. The first showed breathing whilst at rest, the second, during exercise. The candidates had to use the graphs, looking for differences between them, to explain why the stated graph represented the runner's breathing during exercise.

Whilst many candidates achieved two marks for this question, identifying that during exercise breathing rate and depth increased, they were unable to link this to the features of the graphs.

- (ii) Explain **two** reasons why **Figure 8** represents the runner's breathing during exercise.

(4)

Reason 1

figure 8 represents the runners breathing during exercise as it displays the runner is taking in more air this is needed for respiration to get more oxygen to the muscles to allow them to keep going.

Reason 2

Another reason is that the runner's breathing rate is higher - they are taking more breaths. This shows that the runner is working as when you exercise you breathe more so that more oxygen can enter your body to produce energy.



This response gains two marks.

The candidate identifies correctly in Reason 1 that the runner takes in more air: this is accepted as an equivalent to increased depth of breathing.

However, there is no indication of which feature of the graph indicates this, ie that the magnitude of the waves on the graph is much deeper in Figure 8 as compared with Figure 7.

Similarly, in Reason 2, a mark is awarded for noting the increased breathing rate. How this has been determined from the graph is not stated. The correct answer is that the waves on the graph in Figure 8 are much closer together.

2 marks

(ii) Explain **two** reasons why **Figure 8** represents the runner's breathing during exercise.

(4)

Reason 1

The height of the wave is longer

Reason 2

The waves are closer together



This example response also gains two marks.

It links with the graphs by noting that Figure 8 is during exercise because the height of the wave is longer, and they are closer together.

This response was unusual because if links to the graph were made, then reference was also normally given about increased breathing rate and depth of breathing.

2 marks

(ii) Explain **two** reasons why **Figure 8** represents the runner's breathing during exercise.

(4)

Reason 1

Their tidal volume increased. There was more air inhaled and exhaled in each breath. The air exchanged per breath increased from 0.5 dm^3 in figure 7 to 2 dm^3 in figure 8.

Reason 2

Their ~~rest capacity~~ ^{breathing rate} increased. The In figure 7, the graph shows 4 full breaths (in and out), whereas figure 8 shows 7 full breaths (in and out). Breathing rate increases when you start to exercise.



This response gains all four marks.

In Reason One, the candidate identifies an increased tidal volume (equivalent to increased depth of breathing) and explains the feature on the graph that indicates this, ie the increase in air exchanged per breath increases from 0.5 dm^3 to 2.0 dm^3 .

In Reason Two, the candidate identifies an increase in breathing rate indicated on the graph by an increase in the number of breaths from 4 on Figure 7 to 7 on Figure 8. The fact they used the correct number represented by the lines on the graph was sufficient to show they had used the graphs to come to their answer.

4 marks

Question 7 (a)

Candidates were presented with two statements and told that the first statement, Statement A, represented aerobic energy release. Armed with this information, the candidates needed to justify why Statement A did, in fact, represent aerobic energy release.

Most candidates gained at least one mark for this question, correctly making the link between oxygen and aerobic energy production. Because two marks were available, to gain the second mark candidates also needed to make reference to the products of aerobic respiration, ie CO₂ and water, rather than the product of lactic acid shown in Statement B.

Where candidates did not achieve both marks, this tended to be due to making reference only to oxygen, or by explaining the same point twice, eg statement A was aerobic due to the presence of oxygen, and B must be anaerobic because there was no oxygen in the statement.

Popular correct responses identified the use of oxygen and the absence of lactic acid.

7 Statements A and B in **Table 2** show how energy is released aerobically and anaerobically.

Statement	Energy release	
A	Glucose + oxygen	→ carbon dioxide + water + energy
B	Glucose	→ lactic acid + energy

Table 2

(a) Justify why **Statement A** in **Table 2** shows aerobic energy release.

(2)

~~It involves oxygen ^{reacting} and to create energy and releases CO₂ and water as ^{reacting} byproducts~~

It involves oxygen to react with glucose to make the energy and doesn't produce lactic acid as a byproduct instead producing carbon dioxide and water as byproducts.

This response gains both available marks.

One mark is given for identification that oxygen is present in Statement A and is needed in aerobic energy release.

The second mark is given for identifying that lactic acid is not produced in aerobic respiration and this is not present in Statement A, only in Statement B.

2 marks

- 7 Statements A and B in **Table 2** show how energy is released aerobically and anaerobically.



Statement	Energy release	
A	Glucose + oxygen	 carbon dioxide + water + energy
B	Glucose	 lactic acid + energy

Table 2

- (a) Justify why **Statement A** in **Table 2** shows aerobic energy release.

(2)

Because ~~was~~ a by product of working anaerobically is lactic acid but statement A doesn't produce that therefore it's an aerobic energy release.



One mark is awarded for this response.

The candidate states correctly that because lactic acid is not produced during aerobic respiration, yet it is present in Statement B, Statement A must be aerobic.

Reference to use of oxygen would have been required to achieve both marks.

1 mark

Question 7 (b)

This question asked candidates to explain two functions of the cardiovascular system that enable a long-distance cyclist to perform well in their event. The question was worth 6 marks, 3 marks being available for each stated function.

To gain three marks for each function, candidates firstly needed to identify a function that would be relevant to the cyclist, eg oxygen transport. Then they needed to explain how this function would be used by the cyclist, eg so they could produce energy aerobically. Finally, candidates had to comment on the impact of this on performance, eg to delay fatigue.

Not all candidates were aware of the functions of the cardiovascular system, therefore found this question challenging. However, many did make reference to oxygen transport, possibly scoring two marks for this section of the response. In addition to the options in the mark scheme, another popular correct response was one of temperature regulation.

Marks were not awarded for a description of vasoconstriction or vasodilation unless linked to the correct function, ie increased oxygen delivery and associated points, or regulating body temperature and associated points.

(b) Explain **two** functions of the cardiovascular system that enable a long distance cyclist to perform well in their event.

(6)

Function 1

The cardiovascular system allow oxygen to reach muscles. This mean that when the cyclist is using the muscles in the longest part of the race the muscles have access to oxygen to respire an aerobically and release energy so the cyclist can maintain their performance throughout the event

Function 2

When the cyclist comes to the last lap they may need to increase speed rapidly. The cardiovascular system can convert aerobic to anaerobic respiration when needed, this is ~~rep~~ respiration without oxygen and it is a much quicker release of energy so the cyclist can have energy til the last lap and go much quicker

This response gains two marks for Function 1. A mark is awarded for oxygen transport and a second mark for linking this function to the event, ie the cyclist could therefore work aerobically.

The impact 'maintain their performance throughout the event' is too vague for credit. As a minimum, there should be reference to delaying fatigue, or maintaining a good pace (rather than performance), or maintaining pace for longer, or not needing to slow down.

No marks are awarded for the second function because the response is not related to the cardiovascular system accurately.

2 marks

(b) Explain **two** functions of the cardiovascular system that enable a long distance cyclist to perform well in their event.

(6)

Function 1

The heart is doing more pumping of oxygen around the working muscle to keep them warm and to keep them oxygenated which will decrease the likelihood of getting a build up of lactic acid.

Function 2

The lungs are intaking oxygen at speed and having to do gaseous exchange before the cyclist inhales again. the ~~lungs~~ diaphragm also expand in order to intake as much oxygen as possible.



This response gains two marks for Function 1.

One mark is awarded for transporting oxygen and one mark for the relevance to the cyclist, in that this would reduce the likelihood of lactate building in the muscle.

2 marks

(b) Explain **two** functions of the cardiovascular system that enable a long distance cyclist to perform well in their event.

(6)

Function 1

Regulation of body temperature. If cyclist begins to heat up, side effects such as dehydration and dizziness may occur, ultimately hindering performance. If this happens, blood vessels vasodilate and allow blood to the surface of the skin to let out heat. The cyclist will begin to sweat which will evaporate and remove heat and the hairs on the performer's arms lie flat. To not overheat is vital during a cyclist's event as the side effects may not allow them to perform to their optimum or not allow them to perform at all.

Function 2

red and white blood cells.
Transportation of ~~oxygen to the working muscles~~. This process allows the cyclist to resist fatigue of muscles and continue to perform to their optimum as oxygen will be delivered through red blood cells. Oxygen present will also work to break down any lactate accumulation which causes cramps and will hinder cyclist's performance. White blood cells are also a vital presence as they fight off any infection that enters the body to ensure the cyclist can continue with event without illness.



This response gains six marks.

Function 1 looks at the role of temperature regulation, how it is achieved, the effects if it is not and the impact on the cyclist, for all three marks.

Function 2 concerns oxygen delivery, allowing the cyclist to resist fatigue because lactate will be broken down.

6 marks



If asked to provide two functions make sure you choose different functions, as this candidate has done

Question 8 (a)

Question 8 focused on lever systems. In Q8(a) candidates were told that a lever system is made up of four parts, one part being the lever. They were asked to state the other three parts.

Most candidates were able to gain at least one mark for this question, making reference to the effort or load (or equivalent terms).

Question 8 (b)

This part of the question focused on mechanical disadvantage, asking candidates to explain the term for two marks. A one-mark question would have been phrased differently, for example *Give one reason why third class lever systems work at a mechanical disadvantage*. Had this been the question, then candidates would only need to state why there was a mechanical disadvantage, ie because the effort arm was shorter than the load arm (or equivalent). However, as an 'explain' question the impact of the mechanical disadvantage was also required. Candidates needed to explain what the disadvantage would be. In this case, that more effort was required to move a load.

A pleasing number of candidates scored a minimum of one mark for this question, normally for stating correctly that more effort was needed to move the load.

Third class lever systems work at a mechanical disadvantage.

(b) Explain the term mechanical disadvantage.

(2)

mechanical disadvantage is when the load arm is longer than the effort arm creating a mechanical disadvantage.



This response gains one mark for stating why the arrangement of the lever system causes a mechanical disadvantage, but it does not go on to state what this disadvantage is.

1 mark

Third class lever systems work at a mechanical disadvantage. - load arm > effort

(b) Explain the term mechanical disadvantage. FER

(2)

mechanical disadvantage is when the load/resistance arm (distance from load to fulcrum) is greater than the effort arm (distance from effort to fulcrum) meaning the lever requires a lot of effort to move only small loads



This response gains both available marks.

The candidate identifies why there is a mechanical disadvantage and then goes on to state the impact of this, ie that the load arm is longer than the effort arm therefore more effort is required to move a small load.

2 marks

Question 9 (a)

This question focuses on movement analysis. In part (a) candidates are asked to identify the plane and axis during the front somersault.

This was an accessible question because the movement used is stated directly in the component content for this qualification. Many candidates achieved both marks for this question.

Popular incorrect responses switched the plane and axis, stating incorrectly the plane as the frontal plane and the axis as the sagittal axis.


A few candidates gave alternative names for the planes and axes. Where these were correct known alternatives they were credited, but the terminology from this specification should be used in future examination series'.

9 Movement patterns occur in planes and around axes.

Complete **Table 3** by:

(a) Stating the plane **and** axis for the tucked somersault.

(b) Stating the plane **and** axis for the full twist.

	Movement pattern	Plane	Axis
(a)	 Tucked somersault	Sagittal	Frontal
		(1)	(1)




This response gains both available marks for stating correctly that the tucked somersault takes place in the sagittal plane about the frontal axis.

2 marks

9 Movement patterns occur in planes and around axes.

Complete **Table 3** by:

- (a) Stating the plane **and** axis for the tucked somersault.
- (b) Stating the plane **and** axis for the full twist.

	Movement pattern	Plane	Axis
(a)	 <p>Tucked somersault</p>	Frontal plane	Sagittal axis
		(1)	(1)



This response gains zero marks because the plane and axis have been confused.

The movement is in the sagittal plane about the frontal axis. Any movement involving flexion or extension, in this case flexion, occurs in the sagittal plane and in this example the somersault is around the frontal axis.

0 marks



Learn the basic types of movement possible in each plane:


- flexion and extension in the sagittal plane
- abduction and adduction in the frontal plane
- twisting movements in the transverse plane

Question 9 (b)

This question focuses on movement analysis.

In part (b) candidates were asked to identify the plane and axis during a full twist. As in part Q9(a), this movement is given as an example in the specification with the intention of making this first question on movement analysis using planes and axes accessible to candidates.

Of the two (Q9(a) and Q9(b)), this example movement appeared to be slightly more challenging for candidates, although many did identify the vertical axis correctly.

(b)	 <p data-bbox="438 981 558 1012">Full twist</p>	<p data-bbox="699 810 893 884">Sagittal</p> <p data-bbox="989 1025 1029 1057">(1)</p>	<p data-bbox="1101 721 1292 788">Sagittal</p> <p data-bbox="1125 810 1340 869">vertical</p> <p data-bbox="1364 1025 1404 1057">(1)</p>
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(Source: Photos by David Ramos/Getty Images, and Julian Finney/Getty Images)

Table 3



One mark is awarded for the correct identification of the vertical axis.

1 mark

(b)	 <p data-bbox="440 521 561 555">Full twist</p>	<p data-bbox="695 159 903 203">Transverse</p> <p data-bbox="995 568 1034 600">(1)</p>	<p data-bbox="1072 165 1206 210">Vertical</p> <p data-bbox="1369 568 1407 600">(1)</p>
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(Source: Photos by David Ramos/Getty Images, and Julian Finney/Getty Images)

Table 3



This response gains both available marks for identifying correctly the transverse plane and the vertical axis.

2 marks

Question 10 (a)

This question tested candidates' knowledge of some of the components of fitness. Candidates were asked to identify the relevant component of fitness from a given description.

Whilst the question was accessible with most candidates achieving at least one mark, a common error was the identification of muscular endurance, rather than cardiovascular fitness, from the description. The description did make reference to 'exercising for a long period of time' to direct candidates towards endurance, but cardiovascular in particular, because it stated 'to exercise the entire body' rather than just working the muscles.

10 Components of fitness help us to perform well in sport.

Complete **Table 4** by:

- Stating the component of fitness being described.
- Giving a specific example of how the component of fitness is used in a sport of your choice.

Description	(a) Component of fitness being described
The ability to exercise the entire body for long periods of time without tiring	muscular endurance Endurance (1)
The ability to change the position of the body quickly while maintaining control of the movement	agility (1)
The ability to retain the body's centre of mass above the base of support	Balance (1)

Table 4



This response gains two marks.

No mark is awarded for 'endurance'. Although muscular has been crossed out, cardiovascular has not been inserted, therefore it is still not clear that the candidate knows what type of endurance is being described.

Agility and balance are correct.

2 marks



Muscular endurance will **always** make reference to the muscles, whereas cardiovascular endurance will **always** make reference to the whole body.

10 Components of fitness help us to perform well in sport.

Complete **Table 4** by:

- (a) Stating the component of fitness being described.
- (b) Giving a specific example of how the component of fitness is used in a sport of your choice.

Description	(a) Component of fitness being described
The ability to exercise the entire body for long periods of time without tiring	muscular endurance cardiovascular fitness (1)
The ability to change the position of the body quickly while maintaining control of the movement	agility (1)
The ability to retain the body's centre of mass above the base of support	balance (1)

Table 4



This response gains all three available marks.

Initially, the candidate opts for muscular endurance but reconsiders, putting the correct response in its place.

3 marks

Question 10 (b)

Part (b) of the question asked candidates to apply their knowledge by linking the described component of fitness to a specific use in sport.

It is important when giving examples to make sure these are clear, unambiguous, so that they could not equally be applied to a different component of fitness. For example, if the response were 'to dribble past a player' this might mean agility, but could equally mean speed, therefore detail was required in the response to avoid this. A candidate might cite 'dodging' to avoid an opponent.

The only time this detail was not required was in the case of cardiovascular fitness, where marathon running/long distance running was acceptable because without this component, the run would not be possible.

Many candidates accessed a minimum of two marks on this question: popular correct responses were marathon running and a gymnast performing on the beam.

10 Components of fitness help us to perform well in sport.

Complete **Table 4** by:

- Stating the component of fitness being described.
- Giving a specific example of how the component of fitness is used in a sport of your choice.

Description	(a) Component of fitness being described	(b) Specific example of use in sport
The ability to exercise the entire body for long periods of time without tiring	muscle endurance (1)	marathon runner (1)
The ability to change the position of the body quickly while maintaining control of the movement	agility (1)	football rugby player (1)
The ability to retain the body's centre of mass above the base of support	balance (1)	gymnastics (1)

Table 4



One mark is given for this response, for the example of marathon running.

The other stated examples are too vague for marks to be awarded. It needs to be clearer at what point these performers would use the component of fitness.

1 mark



Cover up column (a) and look at the description - does the example clearly match that description? For example, with the description of agility does the example make clear that there is a quick change of direction?

10 Components of fitness help us to perform well in sport.

Complete **Table 4** by:

- (a) Stating the component of fitness being described.
- (b) Giving a specific example of how the component of fitness is used in a sport of your choice.

Description	(a) Component of fitness being described	(b) Specific example of use in sport
The ability to exercise the entire body for long periods of time without tiring	muscular endurance cardiovascular fitness (1)	running a marathon. (1)
The ability to change the position of the body quickly while maintaining control of the movement	agility (1)	performing a dodge in hockey whereby you have to get round your opponents (1)
The ability to retain the body's centre of mass above the base of support	balance (1)	an arabesque in ballet. (1)

Table 4



This response gains all three marks.

In each case, it is clear how the component of fitness is being used:

- running a marathon
- dodging in hockey
- holding a specific balance in ballet

All three are clear, concise examples.

3 marks

Question 11 (a)

To be successful in this question, candidates needed to identify two phases within a warm-up. All three potential answers were given with reasonable regularity, one phase appearing to be no more or less known than another. Candidates gained at least one mark for this question.

11 Warm-ups are an important part of preparing for activity.

Complete **Table 5** below by stating:

- (a) Two phases of a warm-up.
- (b) How each phase helps a performer prepare for their activity.

	(a) Phase
1	Pulse raiser exercise (1)
2	Specific Skill related exercise. (1)

Table 5



This response gains both available marks, identifying correctly pulse raiser and skills practice as two of the phases of a warm-up.

2 marks

11 Warm-ups are an important part of preparing for activity.

Complete **Table 5** below by stating:

- (a) Two phases of a warm-up.
- (b) How each phase helps a performer prepare for their activity.

(a) Phase	
1	Pulse raiser (1)
2	Stretching (static and dynamic) (1)

Table 5



This response also gains both marks, this time for pulse raiser and stretching as the two phases.

2 marks

Question 11 (b)

Having identified phases of a warm-up in Q11(a) candidates needed to state how each identified phase helped in preparation for the activity.

It is important, if pulse raiser had been identified as a phase in Q11(a), not simply to repeat this in Q11(b) eg by saying it is important to increase heart rate. It needs to be clear why heart rate needs increasing, eg to **increase** oxygen delivery. Popular incorrect responses referenced increased heart rate, increased flexibility or loosen muscle (rather than increased range of movement) or stated only that it was to help warm up. This part of the question was more challenging than Q11(a).

If candidates had not attempted to name the phase of a warm-up, then no corresponding mark was allocated for an answer in (b) because this part of the response needed linking to part (a). However, most candidates still gained one mark. Often, this was for linking correctly increased accuracy of skilled performance in the game with the skills/drills section in the warm-up, or to reduce the risk of tearing a muscle, through stretching.

11 Warm-ups are an important part of preparing for activity.

Complete **Table 5** below by stating:

- Two phases of a warm-up.
- How each phase helps a performer prepare for their activity.

	(a) Phase	(b) How phase helps a performer prepare for their activity
1	pulse raiser (1)	increases oxygen delivery to muscles and warms them up. enables footballer to have good good performance at start of a game. (1)
2	stretch (1)	increases elasticity of muscles therefore can reduce risk of injury. helps a gymnast have wide range of movement. (1)

Table 5

This response gains two marks. One mark is given for the pulse raiser increasing oxygen delivery to the muscles and one mark for linking increased elasticity of the muscles with the stretching phase of the warm-up.

2 marks

11 Warm-ups are an important part of preparing for activity.

Complete **Table 5** below by stating:

- (a) Two phases of a warm-up.
- (b) How each phase helps a performer prepare for their activity.

	(a) Phase	(b) How phase helps a performer prepare for their activity
1	dynamic stretches (1)	this allows the muscles to loosen up, therefore preventing possible sprains or pulled muscles (1)
2	skill phase (1)	this allows the performer to concentrate on their performance, and mentally prepare and practise skills they may apply in their performance (1)

Table 5



This response also gains two marks.

To loosen muscles would not have been awarded a mark but as the response continues and states that this reduces the risk of pulling a muscle, the mark is awarded for the link between this and the stretching phase of the warm-up.

The response in relation to the skill phase contains several credit-worthy points:

- concentration on future performance
- mental preparation
- physical practice

Any one of these would be an appropriate response and would therefore gain the available mark.

2 marks

Question 12

This is the first of two extended response questions. Extended response questions use levels-based mark schemes. These are used to allow examiners to assess the quality of the response; how well the answer to the question meets the question demands. Each extended response question is designed to:

- allow candidates to demonstrate their ability to demonstrate their knowledge (AO1)
- apply their knowledge to the question context (AO2)
- 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'. The exact requirements for these command words can be found in the glossary, 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 (AO2) it will be stated (AO1), and before a reasoned judgement (AO3) can be made there has to be some information on which to make the reasoned judgement. Candidates should think about making a point and then developing it through the use of an applied example and then making a reasoned judgement. For example, Q12 asks candidates to evaluate the effects of three different named training methods on 100m sprint performance.

A good way to approach this type of question, adopted by many candidates, would be to:

- take each training method in turn, describe it and the component of fitness it can improve (AO1)
- link this to 100m sprint performance, for example by stating how the developed component of fitness would be used by the 100 sprinter (AO2)
- make a judgement about whether this would be a sensible method of training for this performer, based on the information already provided (AO3)

For example, plyometrics involves depth jumping and bounding to develop power (AO1), which the performer can use for an explosive start (AO2). Without the ability to explode from the blocks the other sprinters will gain a head start and because it is a short race this will be difficult to make up, therefore plyometric training is very important to the sprinter (AO3).

Marks awarded varied for this question: whilst many candidates did gain marks across each AO, not surprisingly, the knowledge marks were more readily gained. When describing a method of training, as with other areas of knowledge, it is important that the description includes the key features of the training method and does not leave the examiner wondering if the description is referring to a different method of training. For example, whilst Fartlek does involve working at different intensities, this alone is insufficient to differentiate this training method from interval training, therefore this description would be considered incomplete.

Whilst some candidates displayed extensive knowledge, many candidates' knowledge of these

training methods appeared limited, restricting the marks achieved for this question.

12 Eric is a 100m sprinter. He trains regularly using Fartlek training, plyometrics and sprint interval training.

Evaluate the likely effects of these training methods on Eric's fitness for sprinting and his sprinting performance.

(9)

Fartlek training is an activity that includes a certain amount of time walking, jogging and ~~running~~ ^{sprinting}. For example walk for 10 seconds, jog for 20 seconds then sprint for 15 seconds which is repeated for a certain amount of time chosen. Plyometrics is working at a high intensity including power. Sprint interval training is sprinting with rests in between which is done for a certain period of time. All three training methods would be useful to help Eric's fitness and sprinting performance. Fartlek training would have a good effect on his fitness as it will increase his fitness levels and body composition. Many athletes make sure they also have a good diet as it has a big impact on performance. Lots of athletes therefore do carbohydrate overloading which is when a few days before they will take in loads of carbohydrates (e.g. pasta) to give them more energy. Plyometrics would be useful as you need strength and power so then you can achieve a



This is a Level 1 response.

Note how the descriptions of the training methods are a little vague: would the reader know what the training method is, from the description? Could it be confused with another training method?

The response also covers content outside of the context of the question (diet and carbohydrate loading). This will not gain credit.

2 marks



Make sure your descriptions are clear - could they equally be applied to a different training method?

12 Eric is a 100m sprinter. He trains regularly using Fartlek training, plyometrics and sprint interval training.

Evaluate the likely effects of these training methods on Eric's fitness for sprinting and his sprinting performance.

(9)

~~Fartlek~~ ~~training~~ ~~is~~ ~~a~~ ~~form~~ ~~of~~ ~~continuous~~ ~~training~~ ~~where~~ ~~the~~ ~~athlete~~ ~~can~~ ~~change~~ ~~the~~ ~~intensity~~ ~~or~~ ~~terrain~~ ~~on~~ ~~which~~ ~~the~~ ~~activity~~ ~~occurs~~.
Fartlek training can be used to increase cardiovascular fitness and the body's aerobic capacity. Fartlek training requires no equipment or facilities, however sometimes high intensity work is avoided by the athlete. Fartlek training is less useful for Eric because sprinting is a powerful and explosive activity that works at a high intensity for a short duration, whereas Fartlek training requires training for longer durations at a lower intensity. However, the higher intensity sections of the training will develop his power and anaerobic capacity but can not be used as a training method on its own for Eric. ~~The~~ ~~benefits~~ ~~are~~ ~~not~~ ~~clear~~ ~~enough~~ ~~to~~ ~~justify~~ ~~the~~ ~~extra~~ ~~training~~ ~~time~~ ~~spent~~ ~~on~~ ~~it~~.

Plyometric training is a form of training usually including jumping or bounding movements to increase leg strength or push ups and throwing a medicine ball to increase arm strength. Plyometric training can be used to increase the power, strength and speed of a performer as well as the anaerobic capacity. Plyometric training also requires little to no equipment, however it can lead to injury due to explosive movements which could lead to a break in training and therefore, ~~reversibility~~ reversibility. Plyometric training is more useful for Eric because it involves explosive activity which can increase the power and speed needed for a sprint. Increased power in the legs will also lead to a more powerful and therefore a quicker start from the blocks, giving



This is an extract from a response scoring maximum marks on this question.

The extract describes Fartlek training in detail, suggests how this training might be applied to the sprinter, but then makes the judgement (explaining why) this method of training would not be particularly useful to the sprinter.

Each AO is clearly addressed within the developed response.

9 marks



In each paragraph that you write, think about

- writing a fact
- applying it to the question and then
- explaining the impact (again in relation to the question context)

12 Eric is a 100m sprinter. He trains regularly using Fartlek training, plyometrics and sprint interval training.

Evaluate the likely effects of these training methods on Eric's fitness for sprinting and his sprinting performance.

(9)

Fartlek training is a form of training method which is done using several terrains and speed. It allows for the athlete to change between different speeds and terrains which helps Eric ~~change the way~~ use his training method to suit his 100m sprint. For example, Eric could do high intensity sprints on an inclining terrain such as a hill. This allows Eric to improve his speed due to the high intensity as well as his muscular endurance because he is running up a hill. This will result in a hypertrophy of his fast twitch muscle fibres which means that he will be able to ~~can~~ improve his speed and endurance which allows him to perform in the 100m without slowing down towards the end due to fatigue. This improves his performance as he can perform at a top level for the entire duration of the race.

Plyometrics training is training that is done using short burst of explosive power such as jumping. This training method allows Eric to improve his power of the legs, especially the quadriceps, hamstrings and gastrocnemius. This improvement in power will help Eric's 100m sprint as he will be able to accelerate much harder and faster which helps to increase his momentum. This improves his sprinting performance as his starts in the 100m will be more powerful and more forceful, allowing Eric to

take the lead earlier on in the race which improves his chances of winning.

~~By using Sprint interval training,~~ Sprint interval training is a training method which consists of high intensity training followed by short rests for recovery. Eric can use this training method by doing a 30m or 50m sprints followed by short rests in between. This affects his sprinting as his speed will ~~impro~~ improve meaning that he will be able to complete the 100m sprint in a shorter duration of time which helps improve his sprinting performance.



This is a level 3 response.

Note how Fartlek training is described: 'different terrains and speeds' separates this training method from others. Thus, the description includes the key features of the training method.

Note also the attempt to apply the training method to the sprinter's needs, ie increasing intensity by using hill sprints to develop sprints.

Plyometric training is also described: whilst not as clearly as Fartlek training, reference is made to power and jumping – just enough to make it clear which method is being described.

There is good application to the sprinter, making reference to the specific muscles used and then the impact of this on the sprinter's performance.

In the final section on sprint interval training there is good application. The response demonstrates:

- knowledge of the training method
- how a sprinter may use this type of training
- the effect this type of training could have on the performer

7 marks

12 Eric is a 100m sprinter. He trains regularly using Fartlek training, plyometrics and sprint interval training.

Evaluate the likely effects of these training methods on Eric's fitness for sprinting and his sprinting performance.

(9)

Fartlek training involves ~~continuous~~ running at different speeds, over different terrains, without stopping. It usually aims to improve cardiovascular endurance. Therefore, by doing this training, Eric will improve his cardiovascular endurance, which allows him to work for a long amount of time without fatiguing and improves his ability to process oxygen and nutrients. You could argue that this is useful in his ^{other} training so he can work for longer periods of time before rest.

However, fartlek trains you for aerobic events which last a long period of time, ~~and~~ but Eric is a 100m sprinter - his event is anaerobic so there is no oxygen to process and it lasts a short period of time. Therefore, Fartlek is virtually useless for Eric's sprinting performance apart from the short period of faster running in his Fartlek training. Fartlek is more suited to longer distance events and he would be better off choosing a different method of training to help improve his sprinting performance.

Plyometric training involves explosive movements where the muscle is quickly shortened and lengthened e.g. box jumping. It improves power, which will be useful for Eric if he improves the ~~of~~ power in his legs because it will allow him to have a stronger push off the ground at the start of the race and also in each stride. Therefore, he will be able to start quickly and maintain his strong pushes off the ground throughout the 100m, ~~which~~ which means he can start and stay ahead of all of his opponents and be more likely to win the race. As a result,

I think that plyometrics will be beneficial for Eric's sprinting performance and fitness for sprinting, as it allows him a stronger push off the ground which will allow him to cover more ground in a shorter time and win the race - it is much more important than Fartlek training.

Sprint interval training is intense periods of exercise followed by short periods of rest. It aims to improve speed, which is crucial for Eric because he needs to cover the 100m as quickly as he can to have the best chance of winning the race. By improving his speed, he will be able to run faster than his opponents and stay ahead of them for the 100 m in order to win the race. I think that this is the most suitable for Eric to improve his fitness for sprinting and his sprinting performance because it almost ~~mimics~~ mimics his sprinting event - it is a short distance (100m) followed by a period of rest. Therefore, it is best for improving his speed and prepares him well for the race.

Overall, I think that plyometrics is important for Eric to improve the power in his legs but interval training is the most important as it is the most like his race and improves the component of fitness (speed) that is the most important for sprinting.



This is an example of a very good response. This response was also placed in Level 3.

The response is well-organised, taking each method of training in turn, by:

- providing a clear and detailed description of the training method, often citing how the improved component of fitness would aid the sprinter
- explaining why this makes this method of training useful, or not, in the case of Fartlek



A good approach to these questions is write a developed paragraph about each point you want to make

Include knowledge, apply your knowledge to the question (maybe through an example) and then talk about the impact this will have on performance

Question 13

The second extended response question was based around fitness testing. The candidates were presented with an image of two canoeists. The candidates were told that to be good at canoeing the performers needed good strength, flexibility and speed. They were then told that the canoeists carried out three fitness tests.

The question asked candidates to discuss the suitability of each of the tests for assessing the canoeists' fitness. Two of the tests had some relevance to the stated components of fitness, one did not: this should have been reflected in the discussion.

Those candidates achieving Level 3 tended to recognise that strength was not being tested, and therefore the unsuitability of the one-minute-press-up test (given the question context). They were also able to make a judgement that the 30m sprint, whilst a test of speed, was not relevant to the canoeists because they required speed in the arms when paddling.

This question appeared slightly more accessible to candidates than Q12. The demands and structure of the questions were same, therefore this must have been due to knowledge of the topic areas.

As with Q12, a good way to approach this type of question, adopted by many candidates, would be to take each fitness test in turn and:

- determine if it matches a stated fitness requirement of the canoeists (AO1)
- link this to how the component of fitness would be used by the canoeist (AO2)
- make a judgement about whether this would be a sensible fitness test for this performer, based on the information already provided (AO3)

For example, the 30m sprint is a test of speed, which is required by the canoeist, (AO1), it is important they have speed in their arms so they can move the paddle quickly to control the canoe, (AO2). However the test is a running test, measuring speed of the legs, so is **not** suitable because it will not measure the type of speed required by the canoeists (AO3).

Candidates should be reminded that fitness tests are not used to **improve** fitness.

13 **Figure 9** shows two canoeists during a competition.

To do well in competition, canoeists need good strength, flexibility and speed.



(Source: Photo by technotr/Getty Images)

Figure 9

Table 6 shows the fitness tests these canoeists used to assess their fitness.

sit and reach test	30m sprint	one-minute press-up test
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Table 6

Discuss the suitability of using the fitness tests shown in **Table 6** to assess the fitness of the canoeists for their sport.

The (9)
~~The~~ Sit and reach test would be done to test flexibility, this is the range/ amount of movement at a joint. ^{the} 30m sprint ^{test} is used to test speed - but testing ~~the~~ how fast the body can travel over ~~a~~ a short distance on feet. ^{the} One minute press up test would be used to test muscular endurance - the use of voluntary muscles for a long period of time without tiring.

The canoeists need good muscular strength in their arms - most importantly their bicep and tricep muscles. They need good flexibility in the elbow, and hip joints, and also their shoulder joints. ~~Therefore~~ Additionally, they need good speed

in their arms to row as fast as possible. Good muscular strength, enables them to ~~overcome~~^{overcome} the resistance of the water when paddling. Good flexibility enables more movement around a joint when twisting and turning.

The sit and reach test is specific to identify the range of movement at the shoulder joint which will give a good representation of how flexible they're are as it is specific to canoeing. However, the canoeists need good speed in their arms in particular so I don't necessarily believe the 30m sprint is a good test to assess their speed for canoeing. To make it more specific, a 30m rowing test will be more specific and representative of their speed. Moreover the one-minute press up test is used to test the muscular endurance of the abdominal muscles, yet again I don't think this is specific to the ~~canoeists~~ canoeists. It doesn't necessarily mean that muscular endurance is needed for a canoeist at the start, but I believe it is important for the athlete to have good muscular endurance in the bicep and tricep muscles - a 2-minute bicep curl test will be representative of their muscular endurance in their arms. There isn't a test mentioned for strength as none of the tests mentioned or suited to muscular strength. The test of the hand grip dynamometer would be good to assess their muscular strength.

Overall, I believe the sit and reach test is a good test to assess the flexibility of the canoeists. However, the 30m sprint won't be able to assess the speed in their arms so this test must be adapted to a 30m rowing sprint. The one-minute press up test, tests muscular endurance in the arms and not strength. The hand-grip dynamometer test would be suitable to assess muscular strength.

Finally

I would suggest a reaction-time test and muscular test in the biceps could be taken to assess these essential components of fitness for the athlete

~~the test~~ (reacting to stimulus - beep sound or gun)



This is a Level 3 response.

The candidate uses a slightly different approach to address the question, providing a different section within the essay to address each of the AO's.

The first paragraph demonstrates their knowledge of the tests, matching each test to the appropriate component of fitness.

The second section relates to AO2. The candidate applies their knowledge, linking each component of fitness to its potential use by the canoeist.

The final section is the AO3 section of the response: note the length of this section compared with the remainder of the essay.

It is this length because some content has had to be repeated to give the 'argument' the correct context. This is an issue with such an approach, rather than expanding each point in turn - thus making developed paragraphs about one point as we saw in the responses to Q12, and in the example response below.

This candidate uses this format successfully, thus it is clearly a good approach for them, although this might be more time-consuming and easier to forget a particular link in the AO3 section. The response is not flawless, but it does not need to be, in order to achieve Level 3.

8 marks

13 **Figure 9** shows two canoeists during a competition.

To do well in competition, canoeists need good strength, flexibility and speed.



(Source: Photo by technotr/Getty Images)

Figure 9

Table 6 shows the fitness tests these canoeists used to assess their fitness.

sit and reach test	30m sprint	one-minute press-up test
Flexibility	Speed	Strength

Table 6

Discuss the suitability of using the fitness tests shown in **Table 6** to assess the fitness of the canoeists for their sport.

The fitness tests shown in ⁽⁹⁾table 6 are very suitable for the canoeists. To do well in competition, canoeists need good strength, flexibility and speed. Sit and reach test is for flexibility. 30m sprint is for speed and the one-minute press up test is for strength. So this covers all the things that they need to do.

To make this even better
why they can do an 100m
sprint and maybe do a
two-minute press up test.

The strength test is suitable but
not as ~~suitable~~ suitable as the
other two as it is mainly
focusing on chest and triceps but
a decent sized will also need
decently sized biceps it he
wants to go the fastest then
he can.



ResultsPlus
Examiner Comments

This is a Level 1 response.

Relevant knowledge (AO1) is demonstrated through correct linking of the fitness tests to the components of fitness for two of the tests.

The one-minute press-up test is linked incorrectly to strength to match the components needing testing, rather than identifying that there is not an appropriate test for strength amongst the tests being used. To make that kind of judgement demands a higher level of skill.

There is an attempt on the second page to discuss the suitability of the one-minute press-up test but unfortunately, this is still in the context of it being a test of strength.

2 marks

13 **Figure 9** shows two canoeists during a competition.

To do well in competition, canoeists need good strength, flexibility and speed.



(Source: Photo by technotr/Getty Images)

Figure 9

Table 6 shows the fitness tests these canoeists used to assess their fitness.

sit and reach test	30m sprint	one-minute press-up test
--------------------	------------	--------------------------

flexibility **Table 6** *speed* *muscular endurance*

Discuss the suitability of using the fitness tests shown in **Table 6** to assess the fitness of the canoeists for their sport.

(9)

The sit and reach test is the test for flexibility. This is suitable for the canoeists because you would need good flexibility to help you lean from side to side, to help change the direction of the canoe, and to lean forwards and backwards to help maximise the distance the oar is pushed through the water per stroke. This fitness test is ideal for testing the fitness of the canoeist because the sit and reach test tests for flexibility in the upper body, which is what you need to have in order to be a good canoeist and win races.

The 30m sprint test is the test for speed.

This is suitable for the canoeists because you will need good speed to help increase the amount of strokes you can do in one minute, which will enable the canoeists to travel a further distance in a shorter time. However, this fitness test is not the best test for a canoeist to assess their speed as the 30m sprint test, tests for speed in the legs whereas in canoeing, you need speed in your arms.

The one-minute press-up test is the test for muscular endurance. This is quite suitable for the canoeists because you would need good muscular endurance to help use your muscles effectively through out the competition without them fatiguing by pushing the oar through the water to make the canoe move without them fatiguing quickly. This fitness test is ideal for testing the canoeists' muscular endurance because the one-minute press-up test, tests muscular endurance in the arms, which is what you need to have in order to be able to keep the canoe moving for a long period of time.

In conclusion, I believe that even though the one-minute press-up test is ideal for testing the canoeists

muscular endurance, it should be changed to the one rep max test. This is because, in order to do well in the competition, canoeists need good flexibility, speed and strength, and the one rep max test, tests for muscular strength which is more suitable for a canoeist than muscular endurance.



This is an example of a Level 3 response.

Each component of fitness is matched to the correct fitness test and then there is a good discussion about the use of each component of fitness by the canoeist. There is also an attempt to provide reasoned justifications about the suitability of each test.

For example, the component of fitness tested by the 'sit and reach' test is correctly identified as flexibility and there is discussion of the use of flexibility to lean forward in the canoe to help maximise the distance the oar can move through the water.

The candidate has taken the trouble to link the movements in the test with the possible movements in the canoe, thus applying their knowledge of the test. Whilst there is an attempt to justify why this is a good test for the canoeists, this lacks real evaluation.

Compare this to the section on the 30m sprint test. Again, there is correct identification of the component of fitness tested and the use of speed by the performer.

There is then a good, reasoned argument of why the test would not be suitable. A similar pattern is followed for the discussion of the one-minute press-up test, and on the final page an appropriate justification for not using this test, linking back to the original question scenario.

8 marks

Paper Summary

Based on their performance on this paper, candidates are offered the following advice.

- Identify key words in a question– sometimes these can be in bold to draw attention to them but this is not always the case
- Candidates should use appropriate technical language when answering anatomy or movement analysis questions, for example, gastrocnemius rather than calf (Q2), or extension at the elbow (Q3)
- Use the command words and question marks to help you decide the depth required in your response. For example, 'state' questions do not need descriptions or explanations (Q5b)
- Do not repeat question words if asked to state the meaning of something. For example, use 'constrict' if asked to give the meaning of the term vasoconstriction (Q5c)
- Make sure you read questions carefully. Some candidates described the process of vasoconstriction or the reason for it, rather than stating what the term meant (Q5c)
- If asked to provide two of something make sure you use two clearly different types of examples. For example, boxing gloves and mouth guards are two examples of the same thing – protective clothing (Q5d)
- If asked for examples, make them clear. For example, passing a player could mean speed or agility (Q10b)

Grade Boundaries

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<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>

