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Examiners' Report
June 2019

GCE Physical Education 9PE0 01

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June 2019
Publications Code 9PE0_01_1906_ER

Introduction

Candidates demonstrated a broad range of knowledge in this exam paper, across a wide range of topics. There appeared to be a greater use of the Pearson resources available to support the specification. Those centres which are accessing topic guides and *Inside Track* are able to articulate greater focus in questions.

The newer content in the specification was less well-answered by some centres, for example, physiological determinants of running performance. Ensuring the resources are used to support centres in the delivery of new specification material is essential. For more examples of candidate work, please look at the online training and CPD packs in the Autumn term.

When answering questions, it is very important that candidates have both the knowledge-base to answer the A01 questions, and the ability to apply this and support the knowledge with application to a range of examples. Centres that encourage candidates to learn facts by rote with key words, definitions and flash cards will have their candidates achieve high marks on A01 questions, but to succeed in other types of questions the application must be practised. This must be linked tightly to the appropriate command words. 8-mark and 15-mark questions require a sustained response but focussed on a specific topic area. Sometimes, candidates adopt a 'write everything you know' approach, rather than linking their answer tightly to the focus of the question. Candidates need to understand the demands of each command word.

Question 1 (a)

In the early questions in each section A01 knowledge is often tested through definitions. Often, these are in the specification and will need to be learned as per the wording in the specification. If they are not in the specification, refer to the topic guide.

The majority of candidates had learnt this definition well. Those who had not, were not specific enough that this was the **main** or **primary** muscle causing the movement.

1 Define the following:

(a) agonist

(1)

The muscle that is primarily responsible for a given movement.

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Examiner Comments

This is a well-learnt definition.

1 mark

ResultsPlus
Examiner Tip

Learn all of the definitions in the specification

Question 1 (b)

For Q01(b) most candidates had some knowledge regarding the antagonist but sometimes answers lacked the detail required for the mark.

Some candidates stated that the muscle was relaxing, rather than linking it to its role opposing the agonist. Candidates achieved good marks in this question overall.

(b) antagonist.

(1)

The muscle that opposes the agonist of a given movement and prevents it from overstretching. They are relaxing.

ResultsPlus
Examiner Comments

A definition that has been learnt well.

1 mark

Question 2

Most candidates had some knowledge of Newton's second law, often linking knowledge to F=ma with a valid example. Frequently, the definition achieved a mark but the example was not always clear in support of it.

Ensure candidates know a clear example for each law that they understand. Candidates who did not gain high marks had vague answers or discussed Newton's other laws – most commonly, the Law of Inertia.

Sometimes F=ma was simply stated but the candidate did not provide a suitable explanation to support it.

2 Using a sporting example, summarise Newton's Law of Acceleration.

(2)

The law of acceleration states that the velocity and direction of the object is proportional to the amount of force applied. For example, if a football is kicked softly then it won't travel very fast nor will it go a long distance. If more force is applied then the ball will travel faster and go a further distance.

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Examiner Comments

This response gains maximum marks for the law and the example.

2 marks

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Examiner Tip

Know all three laws individually

Be able to explain each one
Have a good example for each law

Question 3

The stretch shortening cycle was generally well known.

Some candidates put the sequence in the wrong order and therefore were unable to access the marks.

Other candidates left this question blank and had not learnt this topic at all.

Omission of some topics has been more common with new areas on the specification. It is important that candidates are familiar with every term on the specification and can apply this knowledge to examples.

This candidate scores maximum marks: each stage is summarised in the correct order. A logical, straightforward, answer.

3 Summarise the stretch-shortening cycle.

(3)

Phase 1, eccentric phase where pre-loading of the muscle occur, storing potential energy. Phase 2 is ammortisation, a small period where the body becomes ready for phase 3. This is the concentric phase in which the contraction of the muscle takes place. Potential energy is released creating movement.

ResultsPlus
Examiner Comments

Check command words carefully – perhaps highlighting them in the question.

Do not only name each stage – summarise it, expressing the most important facts.

3 marks

Question 4

Most candidates were able to access marks on this question, 'trachea' and 'alveoli' being common answers used. These answers were well known.

A number of candidates referenced structures used in ventilation, rather than respiration, and so did not achieve full marks. Others did not state the function of the structures, they simply named them.

Use of the command words in exam preparation, and understanding what the question requires, is essential.

Typical incorrect answers were 'diaphragm' and 'intercostal muscles'.

4 Summarise the functions of **three** anatomical structures of the respiratory system.

(3)

There is alveoli which are tiny air sacs in the lungs. They are only one cell wall thick to allow a short diffusion distance and there is lots of them (large surface area to volume ratio) so diffusion of oxygen and carbon dioxide can happen more and quicker. Oxygen enters the alveoli and carbon dioxide exits them.

There is the trachea which can also be called the windpipe. It allows air to go through to the bronchus as it acts as a passageway. There are rings of cartilage around the trachea to stop it from collapsing.

There is also the bronchus which is the passageway for air to move from the trachea to the bronchioles in the lungs.

(Total for Question 4 = 3 marks)

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Examiner Comments

This candidate has chosen three anatomical structures of the respiratory system and has summarised each function clearly.

Setting it out as three distinct paragraphs makes the answer clear and it is straightforward to see how the candidate has approached the question.

Candidates are less likely to miss marks, or only cover two points, if they set out their answer in this way.

3 marks

ResultsPlus
Examiner Tip

Think about how to lay out your answer, based on the question. Eg if it asks for three points, use three separate paragraphs

Question 5 (a)

This definition was not known well.

In order to be able to apply knowledge to application questions, candidates first need the basic knowledge. There are always A01 knowledge-based marks on the exam paper, which should be straightforward to access.

This is another key word from the specification – all of which must be learnt. Common errors referred to pressure gradients, amounts or concentration or gases or diffusion.

5 (a) Define the term partial pressure.

(1)

The pressure exerted by one gas in a mixture of gases.

ResultsPlus
Examiner Comments

An example of a well-learnt definition.

1 mark

Question 5 (b)

In this question, there was some confusion between pressure gradients for ventilation and diffusion gradients for gas exchange.

Some candidates referenced partial pressure of oxygen, rather than general movement of air.

Incorrect references to movement of air in and out of the lungs as diffusion or concentration of gases, rather than pressure, meant that candidates did not always access all of the marks available.

(b) Explain the role of pressure gradients in ventilation.

(4)

During inspiration, the ribs and intercostal muscle move upwards and outwards and the diaphragm flatters moving downwards. This lowers the pressure in the lungs, creating a pressure gradient. The air then rushes into the lungs. During expiration, the ribs and intercostal muscles move downwards and inwards and the diaphragm forms a dome shape moving upwards. This decreases the size of the lungs therefore, increasing the pressure, creating a pressure gradient. The air then rushes out.

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Examiner Comments

A logical sequence of events, explained in order with correct technical terminology, achieves maximum marks.

4 marks

Question 6

In 'explain' questions, answers must form linked responses.

In this question, the link was between the characteristic and how it was suited to endurance activities. The most common answers referenced mitochondria, myoglobin and capillary density.

Often, marks were lost by not linking the points to their suitability to the endurance events.

6 Explain how **four** different characteristics of slow twitch muscle fibres (type 1) enable them to be better suited to endurance activities.

(4)

Slow twitch fibres have a large number of cappilaries meaning a greater amount of oxygen can be delived to the muscle. They have a large number of mithrocandria which enables them to create a large amount of ATP. They have thin diameter walls meaning a shorter dissusion distence for oxygen and carbon dioxide. Large number of myoglobin to deliver oxygen from the blood to the muscle.

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Examiner Comments

Here, linked points show how each characteristic enables them to be suited to endurance activities.

Four characteristics are covered, so this response achieves maximum marks.

4 marks

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Examiner Tip

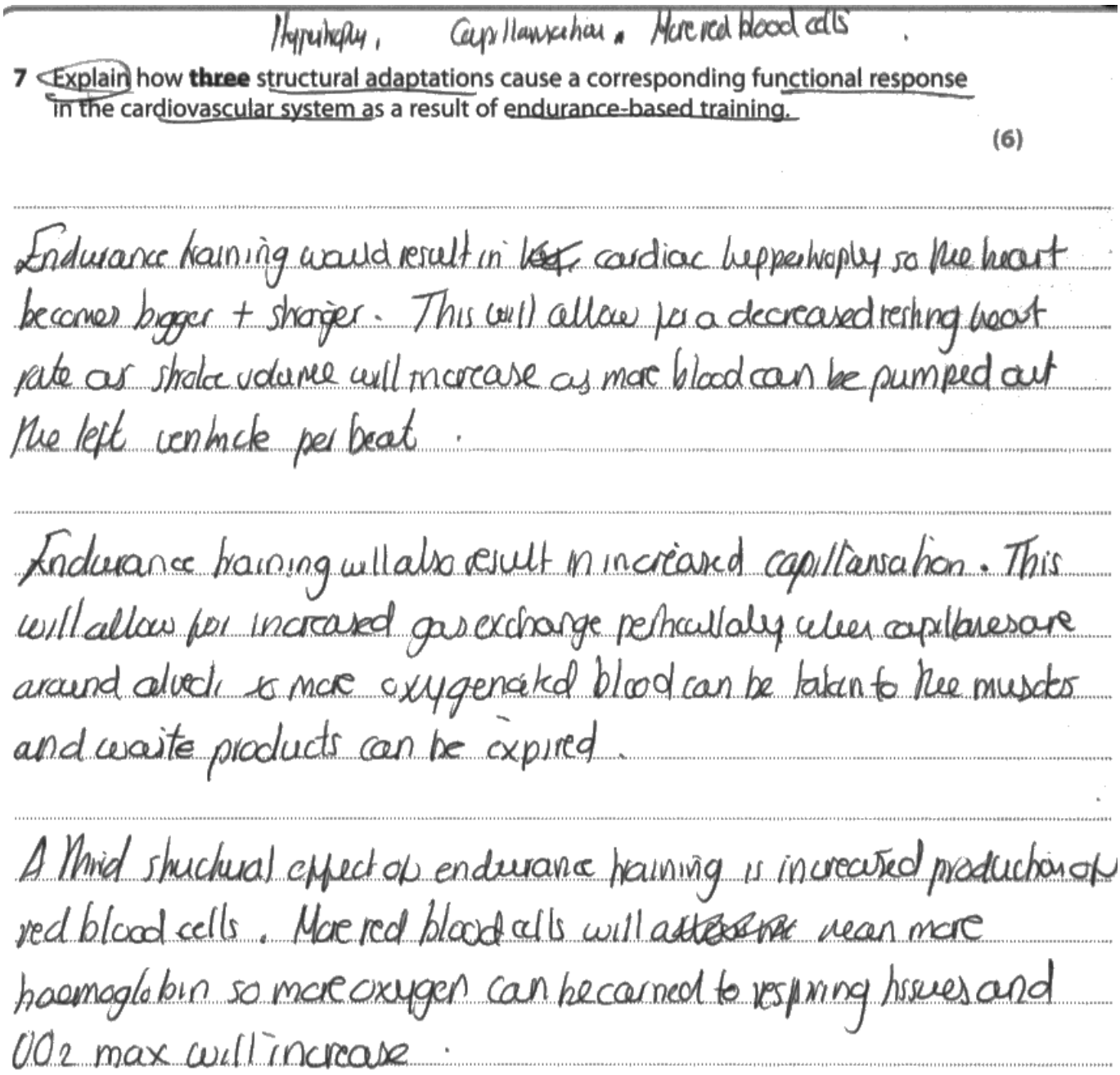
Remember: 'Explain' questions require linked points

Question 7

As an 'explain' question, responses needed to be linked points. In this question, 'structural' was linked to 'functional'.

The most frequent answers here were cardiac hypertrophy, capillarisation and red blood cells.

Most commonly, marks were lost for not providing the linking from structural adaptation to a correct functional response.



Hypertrophy, Capillarisation, More red blood cells

7 Explain how **three** structural adaptations cause a corresponding functional response in the cardiovascular system as a result of endurance-based training.

(6)

Endurance training would result in left cardiac hypertrophy so the heart becomes bigger + stronger. This will allow for a decreased resting heart rate as stroke volume will increase as more blood can be pumped out the left ventricle per beat.

Endurance training will also result in increased capillarisation. This will allow for increased gas exchange particularly when capillaries are around alveoli so more oxygenated blood can be taken to the muscles and waste products can be expired.

A third structural effect of endurance training is increased production of red blood cells. More red blood cells will also mean more haemoglobin so more oxygen can be carried to respiring tissues and VO2 max will increase.

ResultsPlus
Examiner Comments

This candidate structures the answer in three paragraphs.

The points are linked with clear explanations that allow 'functional' to link to 'structural' in a very straightforward response.

6 marks

Question 8

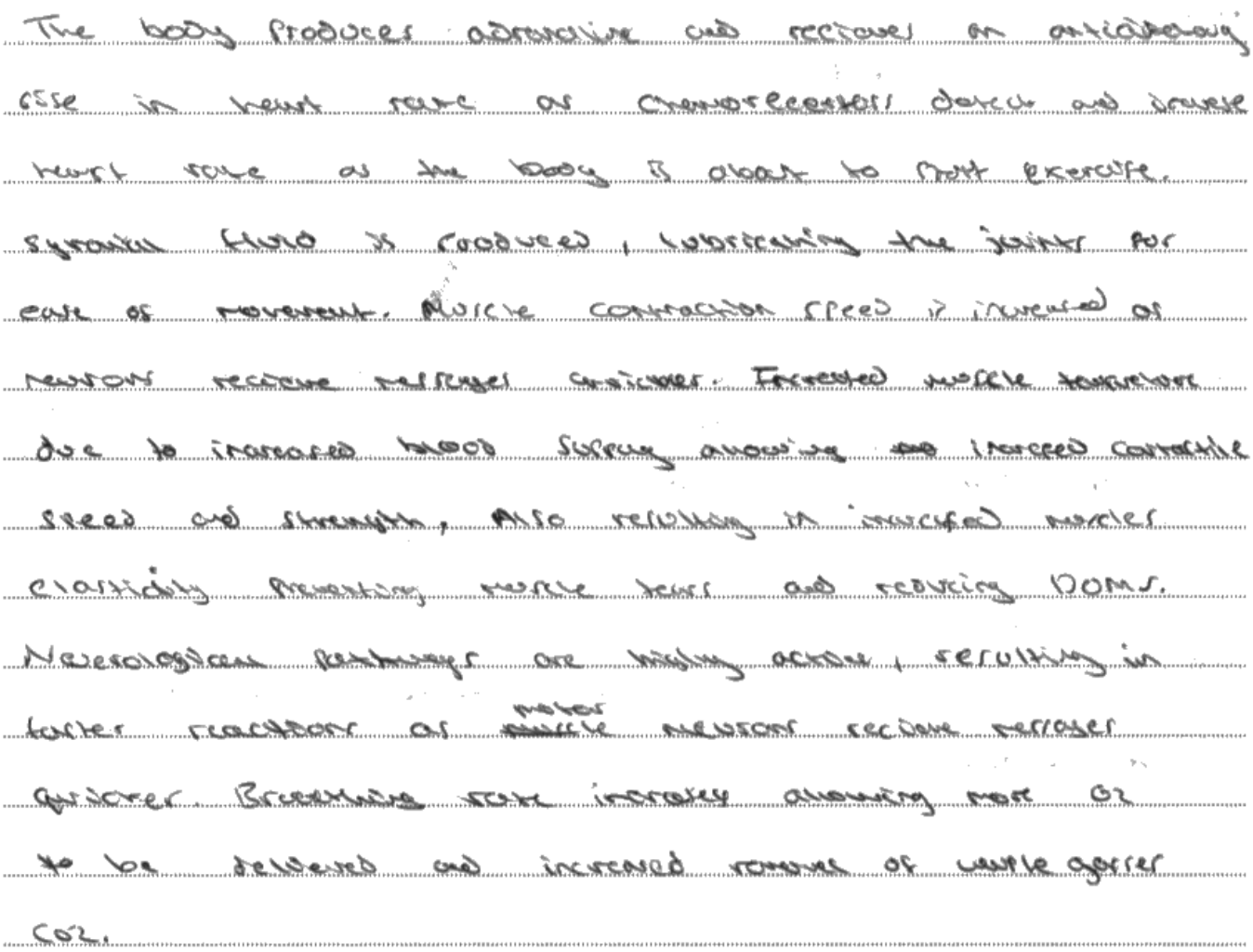
Generally, this was not a well-answered question. As a new area of the specification, it needs understanding more thoroughly.

Many candidates did not know what 'priming exercise' was. There is a useful article on this in the *Inside Track* magazine. Those candidates who did understand priming more commonly explained what it *was*, rather than applying their knowledge to this question, which refers to how it *benefits* a performer.

Most candidates could identify a link between heart rate and oxygen supply but very few other points in the mark scheme were addressed. It seemed as though last year's question on priming exercise was candidates' only reference point and that information was regurgitated, rather than knowledge applied to this specific question.

8 Explain how the body responds to priming exercise used as part of a warm-up.

(6)



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Examiner Comments

This response is not worthy of any marks. The candidate does not cover the content in the mark scheme or link points, which are needed for 'explain' questions.

0 marks

Question 9

Most candidates had knowledge of how the nerve impulse travels along the motor neurone, and sliding filament theory.

Candidates were able to provide a middle band answer describing how these processes happened but were unable to integrate their knowledge of the two systems. Very few candidates made the link between the nervous and muscular elements and how the nervous system can control the force of contraction.

rate of firing rate of fibre recruitment

9 Examine the function of the neuromuscular system in a muscle contraction.

(8)

A muscle contraction begins as ~~the~~ an electrical impulse travels down the axon. The axon is covered in a ~~myelin~~ myelin sheath, with nodes of ranvier. The electrical impulse will jump ~~over~~ the nodes of ranvier ~~to~~ to increase the rate at which the impulse passes along the axon, ~~t~~This is an advantage of having the nodes of ranvier. When the electrical impulse reaches the ~~neuromuscular~~ neuromuscular junction, ~~acetyl~~ acetylcholine is released across the synaptic cleft as a neurotransmitter. It binds to the receptor protein on the post-synaptic membrane, depolarising the sarcolemma and generating an action potential. This causes calcium ions (Ca^{+}) to be released into the

muscle fibres. Ca+ travels to the myofibrils, where it binds to the troponin on the actin, causing the tropomyosin to move, exposing the binding site. Now, the myosin heads can bind to the actin, forming an actin-myosin cross-bridge. The myosin then pulls the actin along its length to generate a muscle contraction. ATP is used as the energy for this, so the ~~same~~ lactate respiration can happen to provide ATP, the faster the ~~reaction~~ contraction is initiated. Also, the increased rate of firing ~~it~~ to the more muscle fibres will ~~cause~~ the contraction speed. The all or none law suggests that all the recruited fibres will contract at the same time, as the ~~nerve~~ neuromuscular system can increase the amount of muscle fibres recruited to produce a bigger contraction.

(Total for Question 9 = 8 marks)

ResultsPlus
Examiner Comments

This response achieves marks in the top band because it begins to look at the integration of the two elements.

7 marks

Question 10

In this question, there was a focus from candidates on recovery techniques and explaining what Exercise-Induced Muscle Damage (EIMD) and Delayed-Onset Muscle Soreness (DOMS) were or how they might be prevented. This was not the focus of the question. The answer should have focussed on **subsequent** training.

Some candidates thought that DOMS was caused by lactate, which is not correct. There were, however, candidates who achieved high marks by focussing their answer tightly around training and citing a range of ways to adapt their training.

An 8-mark question is not an essay – it is a tightly-focussed answer on a particular topic.

This candidate has read the question and focussed their answer fully on the question asked.

10 Examine how athletes might adapt their subsequent training in order to cope with the effects of exercise induced muscle damage (EIMD) and delayed onset of muscle soreness (DOMS).

(8)

The athlete should ~~~~ first make a judgement of when they can next train and at what intensity based on the level of pain, shyness, soreness they are feeling. They may delay a training session or reduce the planned intensity in order to reduce the risk of injury from overtraining. To reduce the intensity, they may reduce the ~~~~ duration or training zone to not cause any further fatigue and damage. They could vary their training method (cross train) to work different muscles. For example a marathon runner may have EIMD and DOMS in his quadriceps and hamstrings from continuous training, so the next day or two, he could swim which has low impact on the muscles but it still benefits his

submaximal aerobic fitness. Using a runner as an example again, they could use assisted training methods to reduce the stress on muscles and joints, for example using a bungee. The athlete may change their technique ~~and~~ if it is causing them damage and fatigue. A method of training like weights has many different variations of exercises the athlete can adapt to if they are not comfortable with a certain technique.

ResultsPlus
Examiner Comments

This response achieves top band marks.

It examines a range of ways that training can be adapted, such as changing intensity of training and changing training methods.

8 marks

ResultsPlus
Examiner Tip

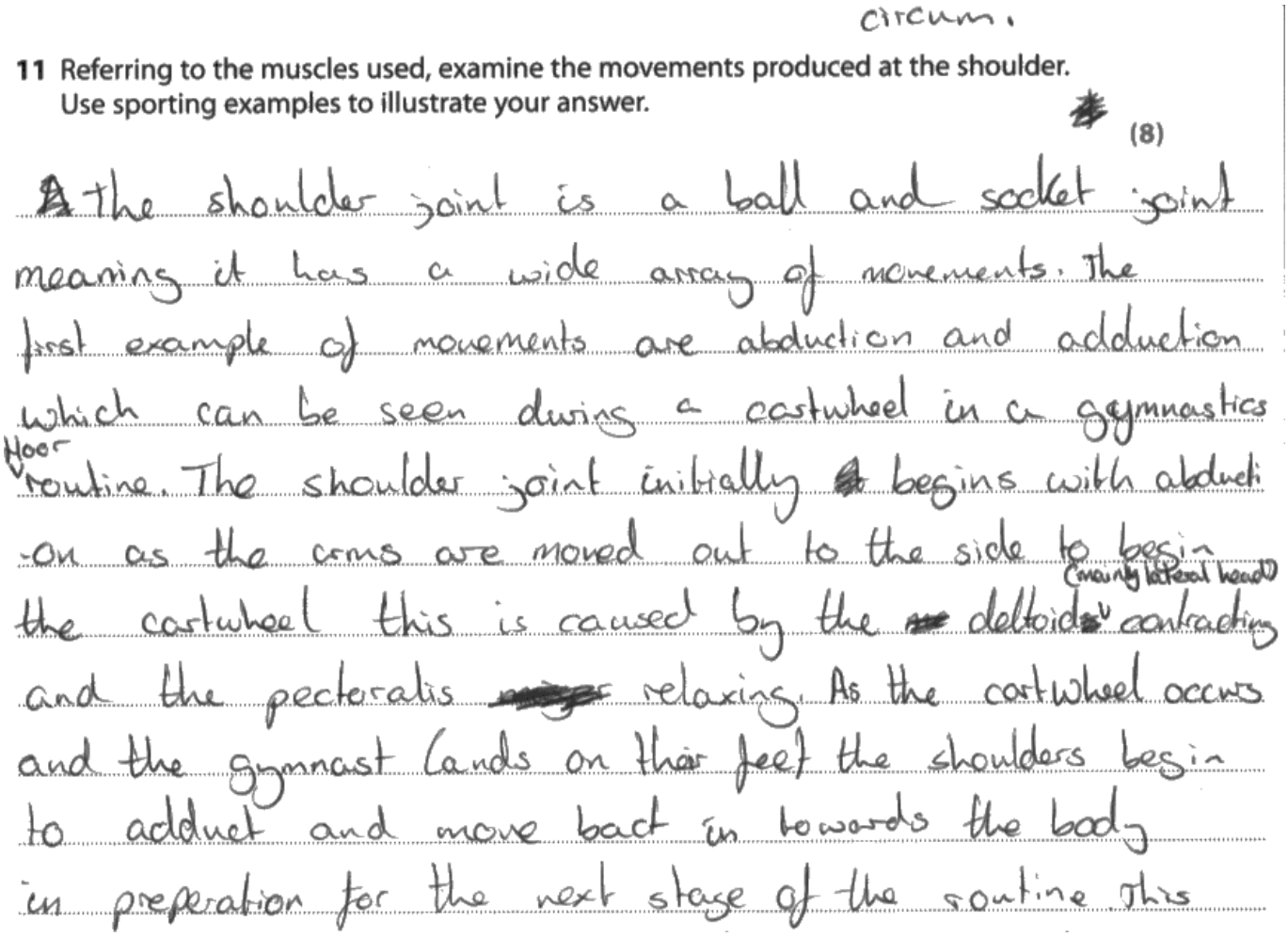
Look for the key focus of the question and underline key points

Question 11

Where this question was answered well, candidates were able to name the movement, name the muscle involved and give a correct sporting example.

Too many candidates omitted one element of the question. Most referenced circumduction in their answer. A number of candidates gave very generic examples such as throwing a ball, hitting a shot in tennis, but did not identify which part of the action was the specific movement to which they referred.

In weaker answers, candidates simply listed all the movements and muscles they knew, without a correct identification of which muscles created which movements. Understanding of the role of the Biceps Brachii and Triceps Brachii was not good.



circum.

11 Referring to the muscles used, examine the movements produced at the shoulder. Use sporting examples to illustrate your answer.

(8)

The shoulder joint is a ball and socket joint meaning it has a wide array of movements. The first example of movements are abduction and adduction which can be seen during a cartwheel in a gymnastics floor routine. The shoulder joint initially begins with abduction as the arms are moved out to the side to begin the cartwheel this is caused by the deltoids (mainly lateral head) contracting and the pectoralis relaxing. As the cartwheel occurs and the gymnast lands on their feet the shoulders begin to adduct and move back in towards the body in preperation for the next stage of the routine This

is caused by the pectoralis contracting and the deltoid relaxing. Horizontal ~~flexion~~ extension can be seen at the shoulder in the preparation phase of a forehand in tennis and horizontal flexion occurs during the execution phase of the forehand in tennis and similarly to abduction and adduction the muscles used here are the deltoids (the posterior head) ~~and~~ and the pectoralis. ~~Ex~~ Extension and flexion also occur at this joint demonstrated during back stroke as the joint extends during the above water phase of the arms stroke through the deltoid (clavicular head) contracting and then flexion occurs in the underwater phase as the angle at the shoulder is reduced. Circumduction which can be seen during a ~~b~~ spin bowler in the execution phase is a combination of all of the movements and uses the deltoids and pectoralis.

(Total for Question 11 = 8 marks)

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Examiner Comments

This response gains maximum marks, covering all elements of the question with accuracy.

8 marks

Question 12

Too many candidates focussed their answer on *recovery* from fatigue rather than *managing* fatigue. There was emphasis placed on recovery strategies but this was not the focus of the question.

Few strategies to manage fatigue were known but better answers did have knowledge of hydration strategies, energy drinks and gels, and pacing strategies. The best answers were able to discuss these and incorporate some analysis.

***12** Discuss how an athlete might seek to manage fatigue when performing at varying intensities.

Use your knowledge and understanding from across the course of study to answer this question.

(15)

At higher intensities fatigue will occur more quickly, this is due to more energy being used meaning the lactic acid system will be used more quicky and lactic acid will start to build up eventually leading to DOMS. To manage fatigue the athlete will need periods of lower intensity where oxygen can remove some of lactic acid. to slow down fatigue. Factors affecting fatigue are depletion of energy stores, metabaic accumulation and dehydration and loss of body fluid. The athlete must be taking on water or sports drinks regularly to manage fatigue, Fatigue will occur slower if the performer stays dehydrated and with sports drinks they also provide a slight energy boost also delaying fatigue.

Performer could also take on sports gels during exercise to increase energy levels to delay fatigue. Aswell as that, the athlete could use hypobaric chambers before the event as the low concentration of oxygen will cause the lactic acid system to be used which will help the body get use to having lactic acid in it's system and can buffer it slightly. Athlete could take bicarbonate to delay the lactic threshold as the bicarbonate acts as a buffer to lactic acid which will again delay fatigue so that it can be managed and the athlete can continue to perform. If the performer has high self confidence and self efficacy then that could motivate the performer to push through the hard stages and again manage the fatigue as the belief in their own ability will help them through.

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Examiner Comments

This answer attempts some understanding of how an athlete might seek to manage fatigue.

More issues would need to be explored to move higher up the mark bands.

Level 2

5 marks

Question 13

Candidates need to learn definitions of the key terms, using the topic guides. A definition could be on any key term in the specification.

Inaccuracies on this question were use of the words **maximum** amount of oxygen and the **time-frame**. Where the terms 'volume' or 'amount' were used, a time-frame was needed. Omitting the word 'maximum' caused some candidates to lose marks.

All the key terms need to be learnt.

13 Define the term $\dot{V}O_2$ Max.

(1)

The maximum volume of oxygen that can be utilise in one minute, per kg of body weight

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Examiner Comments

This response receives the mark available for a correct definition.

1 mark

ResultsPlus
Examiner Tip

Learn all the definitions in the topic guides

Question 14

Candidates were most commonly able to identify that the intensity of exercise was different between sub-maximal and maximal exercise.

Answers generally showed a lack of understanding of maximal aerobic fitness. Answers were often vague.

There was little knowledge of linking this to energy systems, fuels used, and sometimes intensity was not clearly understood. Learning these two basic definitions first is essential, so that this knowledge can then be applied to other questions.

14 Outline the differences between sub-maximal aerobic exercise and maximal aerobic exercise.

(4)

Maximal aerobic exercise is working in the top 80% of your target heart rate while still taking in oxygen and removing. Sub max is working in the 60 - 80% target heart rate zone, more manageable. Maximum is working aerobically at level of possible. You will fatigue much quicker at maximum than sub maximal.

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Examiner Comments

This answer is too vague to be worthy of any credit.

0 marks

Question 15

Weaker answers focussed on how parachutes may benefit a performer in terms of improved fitness and not around the advantages and disadvantages of using them.

Cost was a common answer. However, this often only gained one mark. Candidates clearly knew what parachutes were but did not focus their answer on the question asked.

15 Outline **two** advantages and **two** disadvantages of using parachutes when resistance training.

(4)

Advantages:

- Easy to use
- Don't need assistance

Disadvantages:

- Not accessible to all people, need specialist equipment.
- Expensive

ResultsPlus
Examiner Comments

This answer is set out well but does not address relevant points in the mark scheme.

0 marks

Question 16

This question was answered well. Responses were sometimes long, with some irrelevant content, rather than answered tightly in distinct sentences per point made.

Frequent reference was made to reviewing or quantifying training, often linked to comparing members of a team.

Sometimes, answers referred to types of technology, rather than how they can be used, and some simply repeated the question by saying it can be used to monitor work rate.

16 Describe the benefits of using technology to monitor work rate for games players.

(4)

There are GPS tracking vests available such as 'PLAYR' which many professional football clubs use while training and even sometins during games. This helps the player find out what their work rate is and then they could increase or ~~decrease~~ decrease the intensity of their workout accordingly. It also ~~help~~ helps coaches track every player to see which players are working hard and which players ~~are~~ are being lazy, so then the coach can take those player off / improving the team. Technology like this is also accurate and can calculate the players total distance covered as well as ~~the~~ the top speed of the player during the game. These stats can then be analysed by analysists and could

help with specificity in terms of what the athlete needs to work on. The use of technology like ~~this~~ this would also motivate players to work harder ~~as~~ than their ~~teammates in~~ team mates in order to become part of the starting line up for example as a reward to the outstanding workrate. **(Total for Question 16 = 4 marks)**

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Examiner Comments

This response gains maximum marks, with four benefits described.

4 marks

Question 17

Many candidates knew the BORG scale of perceived exertion and Karvonen theory, and these were the most frequent responses. Other answers were less well-known and very few candidates mentioned blood lactate measurement.

17 Outline **five** different ways athletes can measure the intensity of their training.

(5)

They could use the rate of percieved exertion which is a subjective scale based on the borg scale of how hard the athlete thinks theyre working based on physical sinsations. They could also use percentage of functional intensity which refers to the highest physicall intensity you can sustain for an hour, it can be measured using a power meter. They could also use karvonens theory which uses target heart rate calculated by finding the heart rate reserve. Using work to rest ratios can also be used, for aerobic is would generally be 1:1 while anarrobic would be 1:3. Lastly they could use 1RM which refers to the greatest weight you can lift in a single contraction/rep, can be used to calculate training intensities.

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Examiner Comments

This response gains maximum marks for outlining the:

- rate of perceived exertion
- percentage of functional intensity
- power meters
- target heart rate
- 1RM

5 marks

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Examiner Tip

Outline the five ways as five distinct points

Question 18

The majority of candidates did not know what the Wingate test was. Those who did, gained high marks.

Not enough detail was known about the test. Each of the tests in the specification needs to be known in enough detail to answer a question on it. This question was left blank by many candidates. Those who attempted it often wrote *warm up* and *pedal as hard as possible for 30 seconds.* Few candidates knew more details.

18 Outline the protocol for the Wingate test.

Tests power
maximal test.

(5)

- The participant will take their weight before taking the test.
- The bike will be set up to fit the participant.
- The participant will under take a 30 second warm up on the lowest level to increase the blood flow to the muscles and also to get into a rhythm.
- After the 30 seconds the load is applied / level increases and the participant has to cycle as fast as they can for 1minute.
- Another member will use a stop watch to time both the 30 seconds and 1minute.

- When the time is over they must stop and take their reading and record it. The results will also take into account your weigh.

(Total for Question 18 = 5 marks)

- The results will then be compared to normative data / the adverage.
- This test, tests your power
- It is a maximal test.

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This candidate achieved maximum marks and was able to outline the test protocol clearly.

5 marks

Question 19

Very few candidates answered this question well. There were many blank responses.

A number of candidates discussed components of fitness or used outdated terminology like cardiovascular endurance, which is not in the specification. There was a significant lack of knowledge on this new topic.

19 Explain **three** physiological determinants of running performance using sporting examples.

(6)

Anaerobic power: This is the first system to provide short term energy from anaerobic sources. Sports require anaerobic power in order to propel them forward with every stride that they take. The more powerful contraction produces more force

Exercise economy: The ~~velocity~~ energy required to maintain a constant velocity at movement. This is also Pythagoras and a marathon. The performers can have some level of aerobic fitness, but one may have better technique than the other which less energy and his more economical

Sub-maximal aerobic fitness: the ability to maintain a high percentage of VO_2 max for a prolonged period of time. ~~Importance~~ This is because an individuals runners as this will be able to work at higher ~~that~~ the higher once of their lactate threshold, thereby preparing them to run faster at higher intensities

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Examiner Comments

This candidate lays out the answer clearly and explains each determinant with a sporting example.

This response achieves maximum marks.

6 marks

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Examiner Tip

Lay out the answer in the three distinct sections to show the examiner how your answer is structured.

Question 20 (a)

The concept of split times confused some candidates, who gave total time. Most read the graph accurately.

Some candidates calculated speed in m/s rather than providing a split time. Interpreting data is a key requirement of the specification and data questions have to make up a proportion of every examination.

104 - 76

(a) Calculate the split time for each 50 metres.

(4)

Distance (m)	Split times (s)
0–50	22
50–100	28
100–150	26
150–200	28

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Examiner Comments

Accurate split times calculated, achieving maximum marks.

4 marks

ResultsPlus
Examiner Tip

Know how to read and interpret data

Question 20 (b)

Most candidates were able to answer this question. Showing working out is good practice and the most common error was in rounding the answer incorrectly.

(b) Calculate the average speed of the swimmer over 200 m.

(1)

200 / 104 = 1.92

1.92 m/s

ResultsPlus
Examiner Comments

This response gains the mark available for a correct calculation.

1 mark

ResultsPlus
Examiner Tip

Show working out and round up/down carefully

Question 21

Candidates were clearly confident with what SAQ is and thus attempted the question well. Many wrote about speed, agility and quickness but sometimes forgot to identify that these elements would be improved.

Some candidates lost marks by identifying the benefit but not explaining it – the linked points were for applying the knowledge to a games player.

21 Explain the benefits of speed agility quickness (SAQ) training to games players.

(5)

Speed agility quickness training allows and includes all 3 components of fitness in one training method, this makes this method very precise as training all three components will save time when training. This will allow for many athletes to complete the training in a short time and will be effective making it a useful method of training for games players such as football.

ResultsPlus
Examiner Comments

This response is too vague to be worthy of any credit.

0 marks

Question 22

Most candidates could identify air resistance and gravity as forces acting on projectiles.

Lift was less well-known. Gravity was sometimes described as the 'weight force'. Answers need to be more precise.

Some candidates discussed the Magnus effect and spin, which was not part of this answer. The most frequent error was to focus on angle height and speed of release, rather than the forces in flight.

Gravity, Air resistance, Lift forces

22 Using sporting examples, assess the forces that affect the projectile motion of an object in flight.

(8)

When a discuss is thrown, there are 3 forces acting upon it. Gravity is constantly pulling down on the object but it will only begin to pull it down when the lift forces are weaker, than the gravitational pull. Lift forces cause the object to rise while it is in flight. As a discus is thrown, the air flowing over the top of it has further to travel so it travels quicker compared to the air travelling beneath, which causes an area of low pressure to be on the top. As the slower air travels underneath, an area of high pressure is made and due to this, the high pressure pushes up on the discus

causeing the discus to rise and this principle is called the magnus force/effects. Once the discuss is throun, air resistance occurs and what this does is slow down the velocity of the discus until the force at which the discus has been thrown and acceleration of the discuss is matched and then less than air resistance which is where lift forces become weaker than gravity and the discus falls until it reaches the ground again.

ResultsPlus
Examiner Comments

This response gains maximum marks.

The answer is tightly-focussed on the question.

The three forces are covered and supported with explanations and examples.

8 marks

Question 23

Those candidates achieving high marks were able to identify two or three appropriate tests and then go on to address the advantages and disadvantages of them.

Inaccuracies occurred when candidates did not know suitable tests and used examples such as 30m sprint or Illinois agility run. Some candidates focussed on the protocols, rather than focussing their answer on the question.

-Wingate

23 Examine the most suitable fitness tests to determine an athlete's anaerobic capacity.

(8)

Cullingham and faulkner test may be seen as the most appropriate in testing aerobic capacity as it is highly accurate. It includes running on a treadmill at 11·3 incline at 8mph at max effort for ~~a long period of time~~ as long as they can. However, this is specific to running is expensive ~~test~~ relies on motivation and only one person can do it at a time. The repeated anaerobic sprint test may be seen as more appropriate as its not as expensive ~~MCAT~~ to conduct. ~~It~~ It includes 6 x 35metres sprints with ten seconds rest at maximum effort. However, again the the result relly on motivation and results may not be as accurate. ~~The Wingate test could be seen as~~ Though the MAOD test may be seen as more accurate as it uses a gas analyser to measure oxygen uptake though again only one person can can take the test at once. The overall the MAOD test may be the most ~~that~~ suitable as your running for and extended period of time till exhaustion and uses accurate gas analysis.

ResultsPlus
Examiner Comments

This response covers multiple tests that are suitable tests of anaerobic capacity and goes into advantages and disadvantages of each.

This answer is tightly-focussed on the question and gains maximum marks.

8 marks

23 Examine the most suitable fitness tests to determine an athlete's anaerobic capacity.

(8)

The wingate anaerobic cycle test will test an athletes performance anaerobically by pushing for 30 seconds maximally. However this test only measures lower body power whilst anaerobically powered. This method would be unsuitable for performers which this is not sport specific to. For example a swimmer. The RAST test also tests anaerobic capacity. Repeated sprint times are used to work out the capacity. However, this test is also unsuitable to certain sports people such as a cyclist. The most suitable best overall would be the anaerobic wingate test as it wouldn't be impacted by a factor such as speed for example.

ResultsPlus
Examiner Comments

This response gains marks in the top band because it covers multiple tests and begins to look at their suitability for different athletes to determine anaerobic capacity.

7 marks

Question 24

Most candidates could identify multiple factors preventing injury.

The two examples shown both received marks in the top band. They demonstrated excellent knowledge and understanding, which was focussed tightly on the question asked of them.

Frequently, candidates were able to reference conditioning, muscle balance, technique, protective equipment, playing within the rules and managing risks. Candidates sometimes misinterpreted the question and strayed into curing injuries and recovery strategies, rather than staying on prevention of injuries.

There was a heavy emphasis on warming up in answers, which did not have enough evidence to support it.

Most candidates attempted this question and could identify a range of ways to prevent injury.

MR managing risk T echnique
PE protective equipment muscBalance
Conditioning (training

24 Discuss how an athlete might seek to prevent injuries.

(15)

The prevention of injuries can occur due to the management of risks, protective equipment, correct technique, muscular balance and conditioning of an athlete.

The management of risks involves various things such as adhering to the rules and can be implemented through sanctions/bans if displayed behaviour is wrong ~~Gets~~ as well as correct officiating. An athlete may endanger themself/others if they don't follow the rules of a sport, for example in ~~hockey~~ football is a foul occurs due to a dangerous tackle both the offending athlete and opposition could be at greater risk of an injury such ligament damage to the ACL or PCL, rules following the rules and performing safe tackles would reduce this risk. However if some players aren't adhering to rules and the referee isn't punishing them, then this injury risk is still present to isn't always reliable.

(P) The wearing of protective equipment or inclusion on pitches ~~prote~~ prevent the likelihood of injury. For example in rugby and american football the pads include padding so that if a player collides with the structure, the impact is absorbed. For rugby and cricket the wearing of helmets prevent (injuries) of concussion caused my impact to the head ~~to~~ from a ball. Recently head ~~gear~~ guards/helmets have become compulsory

in cricket due to the death of a batsman player, ~~th~~ a who died due to serve concussions. Other forms of this injury prevention include mouth ~~guard~~ guards again to reinforce structure of the bones and absorb impact of tackles and balls in games such as hockey, preventing dislocated jaws. But sometimes such equipment like gum shields can fail and, meaning the risk is still present.

(P) Correct technique will also reduce chances of sustaining an injury. For example incorrect technique in golf will lead to golfers elbow on the inside of the elbow causing strain of muscles. In tennis, using an incorrect grip by stiffening the wrist ~~will~~ could cause tennis elbow causing strain on the outside of the elbow, such injuries are generally chronic and could prevent an athlete from performance in the future, ~~This~~ due to the pain. Thus it is important coaches correct athletes techniques early on to prevent bad habits that could lead to over use injuries, such as golfers and tennis elbow. However if the athlete isn't taught the correct technique injury risk is high.

Muscle ~~im~~ imbalance is another form of injury management. An athlete should perform weight lifting to balance the strength of each muscle. As over use of one side of the body could cause toppling or an injury such as ~~stres~~ ~~spra~~ a strain as too

much pressure is placed on the muscles. Therefore equalling the strain across the body and ~~finally conditioning~~ training the muscles to cope with the demands of the exercise will reduce injury. For darts players with muscular imbalance is unpreventable, these risks of injuries such as arthritis are high due to the common hand wrist exercise.

② Finally conditioning an athlete through proper training will prevent the likelihood of injury. For a cognitive learner this is important before trying a new sport, for example ~~for~~ an athlete learning to surf should practice the stance on shore & not in the water to understand the kinaesthetic feel for the sport. Also athletes ~~may~~ should use correct types of training, an athlete attempting a marathon should use proper preperation such as CHO meals and adequate rest and sleep, as well as running near enough the full amount. 26.5 miles before attempting the real thing. Otherwise the event could cause injuries such as a periostitus - inflammation of the muscles as an athlete didn't condition themselves properly in training. If an athlete doesn't know when rest is needed they may overwork the muscles causing shinsplints.

③ Overall an athlete can undertake many techniques to reduce the likelihood of an injury. But without all of them working in harmony the ultimate risk of injury likelihood is still present.

(Total for Question 24 = 15 marks)

athletes have the highest chance of injury prevention with all.

Athletes must combine managing risks, protective equipment, correct technique, muscular balance and conditioning through preperation to prevent their chances of injury; not one is more important than the other. &c

TOTAL FOR SECTION B = 70 MARKS

TOTAL FOR PAPER = 140 MARKS

ResultsPlus
Examiner Comments

This response achieves marks in the top band.

It demonstrates excellent knowledge and understanding of how an athlete might prevent injuries.

13 marks

24 Discuss how an athlete might seek to prevent injuries.

(15)

plan:

• Managing risks • conditioning ✓ • Muscle balance ✓ • clothing & equipment ✓ • environment, surface ect. ✓ • technique

There are a number of way in which both the athletes and coaches can help to prevent injuries. These include conditioning, muscle balance, clothing and equipment, Environment, technique and managing risks.

conditioning is an important way to prevent injuries. conditioning helps to work and promotes muscular hypertrophy the muscles not only help the athlete to perform but also helps to stabalise the bones and joints during activity. this reducing the chance of injury to the bones / joints. It is important for the athlete to do an equal amount of conditioning on each muscles as if an athlete trains their abdominus Rectus / core and not their back latissimus dorsi it may cause the muscles to become imbalance meaning they may also pull on the bones causing them to break or get damaged. Muscle balance is important to avoid any strain on the

bones. However, conditioning will help to keep a muscle balance reducing the risk of injury.

Athletes may take into concideration clothing they wear when training. If they have had a previous injury they should apply a support or strap to reduce the chance of further injury. They may also wear compression clothing to reduce Doms and any damage the the muscles, or tissue. Runners will take into consideration types of shoes. They could get them specially fitted to them depending on the shape of their feet and the way they run. This will reduce injury to the foot and prevent injuries such as Achilles tendon damage. It is important for both the coach and the athlete to check the equipment before use. For example in gymnastics the bars should be checke to make sure the lever and the screw are tightened as it could come undone and cause a person to fall of and seriously hurt themselves. It is also important to put mats around the equipment as it provides a saye landing and more support when lanaing reducing the pressure.

The coach and athlete should also check the environment for example in football they should take into consideration the weather as it it is really slippy due to the rain the ↙

athletes could be at a higher risk of injuring themselves. They should also check the playing surface as if the pitch has holes in it could cause someone to sprain, strain or potentially fracture their foot / ankle. They or should fill in the as holes or change the pitch they are playing on to reduce the risk of injury. The pitch should be checked for anything such as sharp objects to prevent any chance of harm or injury.

Technique is another important factor which should be taken into consideration to prevent injury. The coach should not allow an athlete to perform a skill on their own if they are not confident they can do it and they have the right technique. For example when performing a round off back flip back tuck in gymnastics they should be in a tigh tucked position to allow a fast full rotation if they do not do so they could land wrong and cause serious injury. Technique allows athletes to perform moves safely and properly.

managing risks is the final and most important factor to take into consideration as managing risks takes into account all the factors above.

(Total for Question 24 = 15 marks)

ResultsPlus
Examiner Comments

A top band answer that focusses well on the question and covers key content in detail.

13 marks

Paper Summary

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

- Structure answers appropriately for the question. eg If you are asked for three things then have three logical parts to your answer
- Focus your answer tightly to the question asked
- Use the Pearson resources such as topic guides and *Inside Track,* to help you
- Learn every key word as a definition but also practise applying this knowledge to longer questions
- Know the command words and what they require of you. For example, 'explain' needs linked points
- Use technical terminology in your answers
- Underline key words in the question and check how many marks will be available

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

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

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