BTEC

L3 Lead Examiner Report 1901

January 2019

L3 Qualification in Sport

Unit 1: Anatomy and Physiology (31524H)

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31524H – Unit 1: Anatomy and Physiology

Grade	Unclassified	Level 3			
		N	P	M	D
Boundary Mark	**0**	**12**	**24**	**38**	**53**

Introduction

This was the third series of the new specification, and the second time that this unit has been assessed under the new rubrics. Centres and candidates should be congratulated on their preparation for this change to the assessment format. Overall, candidates performed better than the January series and it was obvious that they prepared for many of the specification topics covered in this assessment, to which they need congratulating for.

The question paper followed the format identified in the sample assessment materials. The paper was split into six sections. Each section was based on a sport or exercise scenario and required candidates to demonstrate knowledge and understanding of a range of specification topics and apply this knowledge to the specific question scenario. Each section is weighted in accordance to the specification design.

As in January the extended response questions were marked using a 'levels based' approach to assessment where the overall quality of the response was considered rather than the specific number of facts stated from the indicative content, although this obviously had a bearing on the quality of the response. The remainder of the questions on the paper were assessed using a traditional points-based approach, where a mark was given for each appropriate point. More detail can be found below in the individual question section of the report.

Introduction to the Overall Performance of the Unit

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

Candidate performance varied throughout the paper. Whilst the extended response questions still provided the greatest challenge, most candidates gained some marks for these questions. The style of the assessment is challenging due to the depth and breadth of knowledge required to fully address the demands of the paper. The extended writing questions account for just over 30% of the paper,

each question demanding depth of knowledge, but across the paper this also requires breadth as each of these questions examines different areas of the specification.

The assessment is also challenging due to the need to apply knowledge not only in the extended answer questions but also the 'points-based' questions.

It was clear that some candidates did not make full use of the stimulus material provided in the question, but this continues to get better series by series. To reiterate with explain command verb questions there is an expectation that knowledge and understanding tested is applied to the situation in context and expansion marks are awarded accordingly.

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

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

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

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

Individual Questions

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

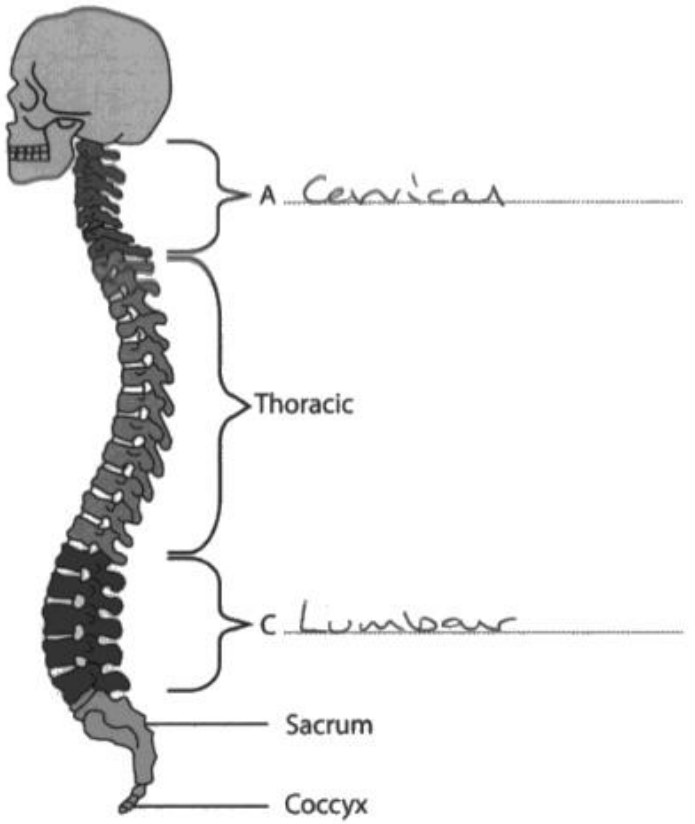
Q1(a)

The majority of candidates performed as anticipated on this question, with many identifying the cervical and lumbar as correct answers. It is important that technical terminology is used and phonetic spelling was credited. Common errors were cartilage being labelled as other regions of the vertebral column.

This response gained 2 marks

Figure 1 shows the regions of the vertebral column.

1 Identify the regions labelled **A and C.**



(1)

(1)

Figure 1

(Total for Question 1 = 2 marks)

Q2 (a) and (b)

Candidates were required to identify two other types of bone and function of the type. Many identified to long and short bone as the bone types, with the vast majority getting the function of the long bone correct. Fewer candidates correctly identified the function of the short bone. Common errors made were helps small movements, absorbs shock, to be awarded this point it needs to indicate it is used for weight bearing.

This response gained 4 marks

A flat bone is one type of bone. One function of a flat bone is to protect vital organs of the body.

2 Complete **Table 1** by:

(a) giving **two** other types of bone in Column A

(b) giving **one** function of each type of bone in Column B.

An example has been provided.

	Column A	Column B
	(a) Type of bone	(b) Function of the bone given in Column A
Example	Flat bone	Protect vital organs
1	Long bone (1)	Produce red/~~and the~~ white blood cells (1)
2	Short bone (1)	Weight bearing (1)

Table 1

(Total for Question 2 = 4 marks)

This response gained 3 marks

A flat bone is one type of bone. One function of a flat bone is to protect vital organs of the body.

2 Complete **Table 1** by:

(a) giving **two** other types of bone in Column A

(b) giving **one** function of each type of bone in Column B.

An example has been provided.

	Column A	Column B
	(a) Type of bone	(b) Function of the bone given in Column A
Example	Flat bone	Protect vital organs
1	long bone ~~Femum~~ (1)	~~protects brain~~ ~~where Red blood~~ ~~ce~~ helps large movement (1)
2	~~Sternum~~ Short (1)	~~protects heart~~ help with smaller movements (1)

Table 1

(Total for Question 2 = 4 marks)

Q3

Candidates were required to identify one short term response of the skeletal system to exercise. Many identified to increased mineral uptake, amongst other correct answers.

This response gained 1 mark.

3 Give **one** response of the skeletal system when participating in a single session of weight-bearing exercise.

increased stimulated up take of minarals

(Total for Question 3 = 1 mark)

Q4

The majority of candidates gained both available marks for this question by correctly identifying a flexion and extension as the movements possible at the knee. It is important that technical terminology is used and common errors where some candidates dropped marks were for bending and straightening.

This response gained 2 marks.

The knee is a hinge joint.

4 Describe the range of movement at the knee.

The range of movement at the knee joint would be flexion and extension

(Total for Question 4 = 2 marks)

Q5

The majority of candidates gained the at least one of the three marks available for this question, with many achieving the mark for identification of 'bones rubbing together'. Common errors made were that the bones wear away as opposed to the cartilage and because of no synovial fluid or the synovial fluid is not there.

This response gained 3 marks

Carys is a mountain walker. She is experiencing pain in her knees. Her doctor has diagnosed her condition as arthritis.

5 Explain why arthritis causes pain.

Arthritis is the inflammation of a joint. She will experience pain as bones will grind together creating friction as ~~synovial fluid~~ the articular cartilage has been worn a way which normally would ~~a~~ create a smooth surface

(Total for Question 5 = 3 marks)

This response gained 1 mark

Carys is a mountain walker. She is experiencing pain in her knees. Her doctor has diagnosed her condition as arthritis.

5 Explain why arthritis causes pain.

Arthricis causes Pain because the Synovial fluid which is in the Joints to Stop bones rubbing together are not there of not enough, So this means the bones are rubbing together which is causing Pain, ~~ie~~ NA.

(Total for Question 5 = 3 marks)

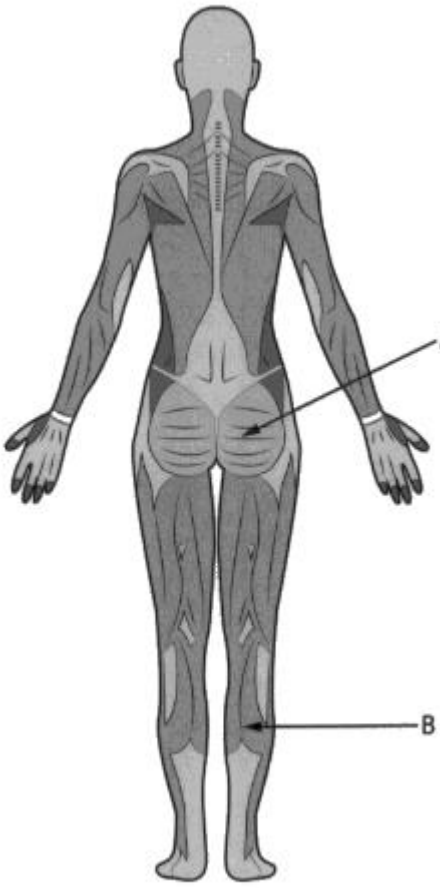
Q6

The majority of candidates performed as anticipated on this question, with many identifying the gluteal/s and gastrocnemius as correct answers. It is important that technical terminology is used and phonetic spelling was credited. Common errors were gluteal being labelled as 'gluts' and 'calfs'. It is important for centres to only teach the muscles on the specification and use the names provides rather than shortened versions.

This response gained 2 marks

Figure 2 shows the posterior view of the skeletal muscles of the body.

6 Identify the muscles labelled **A and B**.



A gluteals (1)

B gastrocnemius (1)

Figure 2

(Total for Question 6 = 2 marks)

Q7(a) and (b)

The majority of candidates gained the mark for stating that the cardiac muscle is involuntary on question 7(a).

Common errors were repeating the stem of the question, says it is non-fatiguing.

This response gained 1 mark

One characteristic of cardiac muscle is that it is non-fatiguing.

7 (a) State **one other** characteristic of cardiac muscle.

(1)

Involuntary

Question 7 (b) was an extension to the previous question, why it is important that the cardiac muscle is non-fatiguing. Key terminology to access the mark within this is 'constant'. Common errors, were 'so that it can pump blood around the body', without any indication of constant work.

This response gained 1 mark

(b) State **one** reason why it is important that cardiac muscle is non-fatiguing.

(1)

It needs to contract the heart constantly so it can pump the blood ~~are~~ to every part of our body

(Total for Question 7 = 2 marks)

Q8(a)

Candidates were required to explain why type I muscle fibres are used in long-distance swimming races. The majority of candidates correctly identified that one of the characteristics is that they were fatigue resistant, with less identifying that they had a slow speed of contraction/small contraction force. Very few stated the implications on performance and swimming particularly. Common errors encompassed a lack of application to the question and answers provided were very general, such as work at a low intensity or swim for longer.

This response gained 2 marks.

Zoe competes in long-distance swimming races.

8 (a) Explain why type I muscle fibres are used in long-distance swimming races.

(3)

Type 1 muscle fibres are slow twitch meaning they fatigue alot slow than Type 2x and a. It also means they give a smaller amount of power over a longer time period which is just what a long distance swimmer needs.

Q8(b)

Candidates found this question difficult to access all available marks; many achieved two marks for correct identification of the bicep and tricep as the agonist and antagonist respectively. The candidates could articulate what it does but lacked detail and clarity desired by the mark scheme, in terms of accessing the two linked expansion marks.

This response gained 3 marks

One of Zoe's training exercises is a bicep curl.

Figure 3 shows the starting and finishing position of the upward phase of a bicep curl.

Source: © Nicholas Piccillo/Shutterstock

Starting position **Finishing position**

Figure 3

(b) Describe the action of the antagonistic muscle pair at the elbow allowing Zoe to complete the upward phase of the bicep curl in **Figure 3.**

(4)

The agonist is the bicep and tricep is the antagonist. Her bicep tenses to pull the weight up whilst the tricep relaxes

Q7

The majority of candidates gained at least 2 marks for this question, with many options in terms of how it could be answered. The rubrics of these type of questions require candidates to not mix their answer across the mark scheme. It is important for centres to inform candidates that expansion marks are not awarded in these type of questions unless they have the correct response.

This response gained 3 marks for increased blood supply, linked to fatigue (Point 2)

During Zoe's weight training session her muscles become more pliable and increase in temperature.

(c) Explain **one other** response of her muscles to a single weight training session.

(3)

~~Her muscles~~ A build up of lactate forms from the training session which is formed by an increase in carbon dioxide in the blood/muscles. This means there is an increase blood flow of oxygenated blood to the muscles to try and remove the carbon dioxide from the body. The lactate means your muscles are fatigued. Lactate is a byproduct of Carbon dioxide and is removed by oxygen.

(Total for Question 8 = 10 marks)

This response gained 3 marks for microtears, (Point 4)

During Zoe's weight training session her muscles become more pliable and increase in temperature.

(c) Explain **one other** response of her muscles to a single weight training session.

(3)

One other response would be microtears. This is when the muscles develop small microscopic tears under strenuous pressure of the working muscles which eventually leads to a delayed onset of muscle soreness.

(Total for Question 8 = 10 marks)

Q9

The majority of candidates performed as anticipated on this question, with many identifying the nasal cavity and diaphragm as correct answers. It is important that technical terminology is used and phonetic spelling was credited.

This response gained 2 marks

9 Identify the structures labelled **A and B.**

A Nasal cavity (1)

B Diaphragm (1)

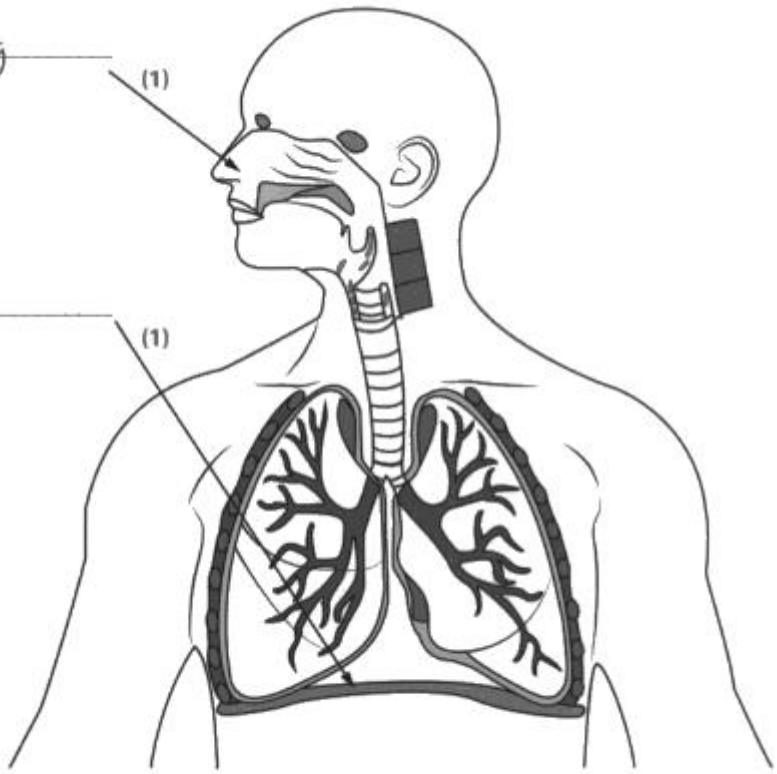


Figure 4

(Total for Question 9 = 2 marks)

Q10 and Q11

The following were recall questions looking at the responses of the respiratory system to exercise, the first question required candidates to state the meaning of the term increased breathing rate. Common errors were no reference to **one minute**.

This response gained 1 mark

10 State what is meant by an increase in breathing rate.

to y our lungs

The more breath's you take in in a minute

(Total for Question 10 = 1 mark)

This question took the concept of increased breathing rate and asked for the other response (increased tidal volume) of the respiratory system to exercise on the specification. Common errors were bringing in cardiovascular responses, such as increased cardiac output. Some candidates repeated the question and put in increased breathing rate.

This response was awarded 1 mark.

Increased breathing rate is one response of the respiratory system when starting exercise.

11 State **one other** response of the respiratory system when starting exercise.

An increas in Tidal volume.

(Total for Question 11 = 1 mark)

Q12

This question proved to be a good differentiator, evident through the spread of marks. It was clear that those candidates who understood the process scored highly with succient answers. Credit was also awarded to the role of chemoreceptors informing the medulla of chemical changes. Common errors were that, some candidates did not, make the link to how the medulla oblongata increases breathing rate and just wrote that it sends messages and causes faster breathing, which is a repeat of the question.

This response was awarded 2 marks.

The medulla oblongata plays an important role in the neural control of breathing during exercise.

12 Describe how the medulla oblongata increases breathing rate.

Medulla oblongata is situated at the top of the spinal cord. The chemo receptors will detect the CO_2 levels and acidity levels in the blood. Impulses will then be sent to the respiratory muscles giving them information to speed up.

(Total for Question 12 = 2 marks)

Q13

This question again acted as a good differentiator, the vast majority of candidates achieved one mark for the concept of struggling to breathe, which is the last point on the mark scheme. Generally candidates did not access the first point on the mark scheme that it increases breathing rate or decreases tidal volume.

This response was awarded 3 marks.

Asthma is a condition that affects the respiratory system.

13 Explain **one** way in which asthma affects breathing.

Astma is an infla matlon of the air ways, letting them contract and because of that ~~th~~ it makes it harder to breath. One reaction to this is that you start taking irregular, quick and short breaths.

(Total for Question 13 = 3 marks)

This response was awarded 2 marks, because of no reference to breathing rate or tidal volume.

Asthma is a condition that affects the respiratory system.

13 Explain **one** way in which asthma affects breathing.

Asthma affects breathing because the airways become smaller therefore it is harder to get enough oxygen to your lungs.

(Total for Question 13 = 3 marks)

Q14

This was the first extended response question of the paper and focused on the effects of an increased oxygen and carbon dioxide diffusion rate on basketball performance of an individual'. Responses for the question required focus on the effects in terms of oxygen delivery and carbon dioxide removal, linked to the impact on basketball performance and the indicative content was written accordingly to encompass this knowledge and application.

Like all of the extended response questions, the quality of candidates' responses varied. Some candidates were clearly very knowledgeable about increased oxygen and carbon dioxide diffusion rate and the effects on performance. Other candidates were unable to address the question fully due to confusion between the cardiovascular system and respiratory system.

Level 1 responses tended to focus on one area or provided a list with no development of the points within the indicative content. At level 3 candidates' responses provided accurate knowledge of increased oxygen and carbon dioxide diffusion rate, used technical terminology with clear development of the point and referenced to basketball.

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

A number discussed the impacts on the cardiovascular system, when it was in the respiratory section.

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

Alex is a basketball player.

He has undertaken a continuous training programme where he has completed a 45-minute run five times a week.

His training has led to an increase in his oxygen and carbon dioxide diffusion rate.

14 Assess the effect of an increase in oxygen and carbon dioxide diffusion rate on Alex's basketball performance.

An increase in Oxygen and Carbon dioxide diffusion rate is very useful for Alex as a basketball player. This means that more oxygen can be diffused from the alveoli into the capillaries where the O_2 can be transported the the working muscles. Therefore if Alex is getting more O_2 to his muscles, he can do more respiration and create more energy to last the whole match at a higher intensity than his opposition, gaining a competitive advantage. Also more CO_2 can diffuse from the capillaries into the alveoli to be exhaled. This means that Alex can get rid of this waste product (CO_2) ~~more~~ at a faster rate which will delay fatigue as there won't be as much CO_2 in his blood to produce alot of lactate. This means that if the match goes on longer than expected he will still be able to perform at a high intensity

(Total for Question 14 = 6 marks)

This response was placed at Level 2 and given 4 marks. The answer assesses lots points from the indicative content, however there was no application to basketball and therefore that was the highest grade available due to this. It is important for centres to ensure that their candidates are aware that marks are given in levels based questions for application to the sport/activity within the question.

Alex is a basketball player.

He has undertaken a continuous training programme where he has completed a 45-minute run five times a week.

His training has led to an increase in his oxygen and carbon dioxide diffusion rate.

14 Assess the effect of an increase in oxygen and carbon dioxide diffusion rate on Alex's basketball performance.

Oxygen and carbon dioxide diffusion are found in gaseous exchange, this means that more O_2 is diffused into the blood stream from the alveoli and CO_2 to be diffused into the alveoli from the blood stream.

If there is an increase of diffusion of oxygen into the blood stream this means that more oxygen can be transported to the muscles for energy.

On the other hand ~~the~~ if there is an increase in carbon dioxide being diffused out of the blood stream this reduces blood acidity therefore no harm or fatigue can be caused to the body

This allows Alex to work for longer periods of time as there is less chance of fatigue and more energy to the muscles. **(Total for Question 14 = 6 marks)**

Q15

This was a recall question for describing the flow of blood through the right side of the heart. Generally candidates scored well on this question with the vast majority accessing at least one mark for right ventricle. Common errors were bicuspid valve

instead of the tricuspid valve. Significantly fewer candidates correctly identified the semi-lunar/pulmonary valve and missed this out, stating blood moves from the right ventricle to the pulmonary artery and thus scoring two marks.

This response gained 3 marks.

15 Describe the flow of blood from the right atrium through the heart to the pulmonary artery.

The ~~blood~~ de-oxygenated blood enters the right atrium from the superior and inferior vena cava. Next, the blood is passed down into the right ventricle through the tricuspid valve. After that the de-oxygenated blood is pumped away ~~the~~ from the heart through the pulmonary valve and into the pulmonary artery.

(Total for Question 15 = 3 marks)

Q16

The majority of candidates gained at least 1 mark for this question, with many putting increased stroke volume or cardiac output, these were only credited once because increased cardiac output occurs due to increased stroke volume when exercising. Answers that were seen less frequently were increased blood pressure and redirection of blood flow.

This response gained 1 mark because both marks, were on the same mark point

Heart rate increases in response to a single exercise session.

16 Give **two other** responses of the cardiovascular system to a single exercise session.

(1)

1 increased Stroke volume

(1)

2 increased cardiac output

(Total for Question 16 = 2 marks)

Q17(a)

This was a new style of question that required candidates to fill in the missing part of the sequence of the cardiac cycle, many accessed both marks available for this question.

This response gained 2 marks.

Figure 5 is an incomplete flow diagram of the structures within the heart that control the cardiac cycle.

17 (a) Identify the **two** structures needed to complete the flow diagram shown in **Figure 5**.

Sinoatrial node (SAN)

↓

1 Atrioventricular node (AVN)

(1)

↓

Bundle of His

↓

2 purkinji fibres

(1)

Figure 5

Q17(b)

Candidates were required to describe the role of the sino-atrial node (SAN). Many identified it acts as the pacemaker or initiates the signal, significantly fewer stated that it causes the atria to contract.

This response gained 2 marks.

(b) Describe the role of the sinoatrial node (SAN).

(2)

Acts as a pacemaker and sends electrical impluses which allows the atria to contract.

(Total for Question 17 = 4 marks)

Q18 (a) and (b)

Candidates were required to identify two other components of blood and function/s of it. Many identified to red and white blood cells and the associated functions and accessed maximum marks.

This response gained 4 marks

One component of blood is platelets. The function of platelets is to clot the blood to prevent bleeding.

18 Complete **Table 2** by:

(a) giving **two other** components of blood in Column A

(b) giving **one** function of each component of blood in Column B.

An example has been provided.

	Column A	Column B
	(a) Component of blood	(b) Function of the component given in Column A
Example	Platelets	Clot the blood to prevent bleeding
1	Plasma (1)	Transports nutrients (1) around the body
2	White Bloods (1)	Fights infections (1) and diseases.

Table 2

(Total for Question 18 = 4 marks)

Q19

This was the second extended response question of the paper and focused on the effects of increased blood volume on performance in the long distance cycling and indicative content was written according to encompass this knowledge and application.

Like all of the extended response questions, the quality of candidate responses varied. Some candidates were clearly very knowledgeable about the increased blood volume and the effects, but some candidates struggled to express this in the context of the cardiovascular system.

Level 1 responses highlighted that increased blood volume means that more oxygen will go to the muscles, without much expansion towards the impact of this especially

on performance and technical terminology was used sporadically. At level 3 candidates charted the effect of increased blood volume and the impact on performance, used technical terminology and discussed the impact of the on this on the long distance cycling.

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

The answer clearly assesses a number of points from the indicative content, focusing on the effects of an increased blood volume, with effective use of technical terminology, appropriate development in reference to the question was evident, but there was no application to performance, harder for longer is too vague in the context of the question.

Christine is an endurance cyclist. As part of her training for a 140-mile race Christine undertakes a 100-mile bike ride once a week. As a result of this training, one of the adaptations to Christine's cardiovascular system is an increase in her blood volume.

K - W P P.

19 Analyse the effects that an increase in blood volume could have on Christine's cycling performance.

An increase in blood volume will mean that blood will ~~become~~ have less viscosity which means that the flow of blood will increase. Christine will also have more haemaglobin contained with in her blood. This means that the body will be able transport more blood to her muscles through oxhamaglobin and that the diffusion rate of O_2 and CO_2 in the blood will increase. ~~The~~ blood volume becomeng ~~more~~ higher will also mean that her heart won't have to work as ~~heart~~ hard at rest causing a lower resting heart rate. This will also mean that her stroke volume will increase and her cardiac output during exercise will increase. Overall this will mean that she is able to perform harder for longer.

(Total for Question 19 = 6 marks)

The next section of the paper looked at the energy systems, as anticipated candidates found this section more difficult than other sections and this was reflected within their responses, although this was somewhat improved from the summer.

Q20(a) and (b)

Another pair of recall questions where the candidates were required to identify the fuel used by the ATP-PC system. Many identified creatine/phosphate/phosphocreatine and therefore accessed the mark.

This response gained 1 mark

Figure 6 shows Dave performing in a shot put event.

Source: © Jamie Roach/Shutterstock

Figure 6

Dave uses the ATP-PC energy system when putting the shot.

20 (a) State **one** chemical source used in the ATP-PC system.

(1)

Phosphocreatine

The next question looked at why the ATP-PC system is used when performing the shot put. Common errors were discussing time and giving values, rather than saying 'used for quick/explosive activities'. Few achieved the maximum marks due to no application to the shot put, which is required by all explain questions

This response gained 2 marks

(b) Explain **one** reason why the ATP-PC energy system is used when putting the shot.

(3)

ATP-PC last for 10seconds which means that it is best used in generatic quick power and energy to perform the action.

(Total for Question 20 = 4 marks)

Q21

This question proved to be a good differentiator, this was evident through the spread of marks. It was clear that those candidates who understood hypoglycemia scored the maximum available marks with succient answers.

Common errors were identifying 'sugar is low in the body', which is not specific enough for 'blood sugar being too low' which would access the mark.

This response gained 2 marks

Sports performers can experience hypoglycaemic attacks.

21 Explain **one** possible cause of a sports performer experiencing a hypoglycaemic attack.

The performer might not have eaten causing their blood sugar levels to drop which might cause a hypoglycaemic attack.

(Total for Question 21 = 2 marks)

Q22

The final question of this section required the candidates to assess the adaptations of the aerobic energy systems for a badminton performer.

Like all of the extended response questions, the quality of candidate responses varied. Some candidates were clearly very knowledgeable about the adaptations and related this to performance in badminton. Other candidates were unable to address the question fully and as with the entire section candidates were writing everything they knew about the energy system/s in general rather than answering the specific question.

Level 1 responses came from those candidates who identified would have more energy to play. Common mistakes were explaining aerobic glycolysis, Krebs cycle and electron transport chain, with is irrelevant in the context of the question. Level 3 responses those who assessed the adaptations and articulated them using technical terminology (increased storage of glycogen/increased use of fats/increased size and number of mitochondria) how these adaptations impact on performance in badminton.

This response was placed at Level 3 and given 6 marks. The answer clearly assesses the three adaptations and links this to the impact on badminton performance.

Freddie is a badminton player, he has been training for five years. Over this time his aerobic energy system has adapted.

22 Assess the impact of adaptations to the aerobic energy system on Freddie's badminton performance.

Over this 5 year period freddies aerobic System will have adapted in a few ways. one of them adaptations being an increase in the number and size of mitochondria. Mitochondria is the sight of respiration, therefore if freddie can do more aerobic respiration, creating more energy for his badminton match and possibly tire out his opponent. Another adaptation of Freddies aerobic System, is an increase in fat stores as a fuel source. Because of this Freddie can use more fats to convert into glucose and glycogen in order to gain more energy, therefore if freddie is playing in a tight match freddie will have that extra bit of energy to keep pushing his opponent and hopefully gain the winning point. Yet another adaptation of freddies aerobic System is an increase in glycogen stores. Due to this freddie can store more glycogen in his muscle cells and liver in order to create more energy and play the full badminton match whilst maintaining a high intensity.

(Total for Question 22 = 6 marks)

Q23

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

Like all of the extended response questions, the quality of candidate responses varied. Some candidates were clearly very knowledgeable about how the respiratory and muscular systems work together to be able to generate the increased pace within the question. Some candidates were unable to address the question fully.

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

High level responses displayed synoptic coverage from both areas as well as making link to how these systems work collectively. High-level responses displayed coverage from both areas as well as making link to how these systems work collectively.

Level 1 responses tended to focus on isolated elements that make general assertions and did not reference the movement. Level 4 responses provided accurate knowledge of both the respiratory and muscular systems enabling the movement (increased pace) to take place. Like any levels of response based question, it is not 1 point equals 1 mark, the indicative content is extensive for candidates to demonstrate a breadth of knowledge and generate credit.

This response below was placed at Level 4 and given 8 marks. The answer clearly analyses how the systems work together to enable the movement to be carried out. Each system is visited and application to performance and interrelationships are developed throughout.

Khalid is a 1500m runner who is in the middle of a race. He decides that he wants to increase his pace and therefore needs a good supply of oxygen to his working muscles.

23 Analyse how the responses of Khalid's respiratory and muscular systems allow him to increase and maintain his pace.

(8)

The responses to the muscular system are an increase in muscle temperature and this means the baroreceptors try to thermoregulate the heat. An increase in flexibility of ligaments means Khalid can take longer strides and not feel a strain because the ligaments are more pliable. This means an increase in pace may be possible as the longer strides will cover more distance.

An increase in Khalids breathing rate means more oxygen can get to the muscles to remove the carbon dioxide before the by product of lactate is produced. This means Khalids legs will feel fresher for longer so he can increase his pace. An increased tidal volume also means more oxygen can be present for his muscles and aerobic energy stores to maintain his speed. A decrease in inspiratory and expiratory reserve volumes means that the oxygen can be used to help catch your breathe so have more oxygen present for the muscles.

A greater demand of blood to the muscles means and increase breathing rate so more oxygen is present. Another response is a change in PH of the blood because more carbon dioxide is present which means the medulla oblongata makes the breathing rate increase.

Summary

Based on their performance on this paper, candidates should:

- Use appropriate technical language throughout their responses,
- Tailor their response based on the command word in the question, e.g. for an explain question there will always be marks available for expansion points and relevance to the scenario.
- Be clear about terminology used in the specification as these words will be repeated in the exam paper, e.g. short-term responses (immediate, due to the exercise/sport), adaptations (long term). The same can be said for questions such as Q22 – aerobic system adaptation responses. This is taken directly from the specification E.5 and therefore they were the only three answers available for credit.
- Only address the correct body system within this section, e.g.in Section B 'The Muscular System' credit will only be awarded for responses from the specification of the muscular system. No marks will be available for reference to any other body system.
- I urge Centre's to read the guidance under AO5 (page 20) of the specification to see the combinations between body systems.
- Use the question scenario to demonstrate their ability to apply their knowledge.
- Check their paper carefully for any missed questions and attempt everything.
- Please click here for the specification and SAMS.

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