CAMBRIDGE TECHNICALS

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CAMBRIDGE TECHNICALS LEVEL 3 (2016)

Examiners' report

SPORT AND PHYSICAL ACTIVITY

05826–05829, 05872

Unit 1 January 2024 series

Version 1

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Contents

Introduction

Our examiners' reports are produced to offer constructive feedback on candidates' performance in the examinations. They provide useful guidance for future candidates.

The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions and highlight good performance and where performance could be improved. The reports will also explain aspects which caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique, or any other identifiable and explainable reason.

Where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.

A full copy of the question paper and the mark scheme can be downloaded from Teach Cambridge.

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Unit 1 series overview

Candidates generally found this paper accessible and performed well this series.

Although many candidates wrote well, wrote fully and responded to each question set, many others showed confusion or misunderstanding of the requirements of each question. This revealed, for some, a

lack of examination preparation.

Candidates should read each question carefully to ascertain what the examiner is referring to. For

example in Question 15, the question asks for short-term effects of exercise on the muscular system, some candidates referred to long-term effects as opposed to short-term; and some candidates linked their answers to different physiological systems. Candidates should check carefully which part of human physiology the question refers to.

There were areas of the syllabus for which candidates were clearly unprepared. For example, many

candidates either left blank or inaccurately responded to Question 14 (b) on the muscles that contract to rotate the radio-ulnar joint. It is important that candidates are taught and revise thoroughly all sections of the specification.

In extended response Question 21, candidates performed well for this examination series with many hitting the required points in the mark scheme and followed carefully the bullet points identified in the question.

Those that performed less well for this question did not use the bullet point guidance to lead them through the requirements of the question.

Many candidates showed that they had been taught the specification effectively and had many

opportunities to relate theory to practical examples. The better candidates read each question carefully and often made a few notes before responding – especially for the extended question (Question 21).

Once again, most candidates finished the paper set in the time allocated with many requiring extra sheets of exam paper. Those that did use extra sheets often used these to expand on points they had made in response to Question 21.

Candidates who did well on this paper generally:	Candidates who did less well on this paper generally:
• identified accurately the requirements of each question and to which part of human physiology each question referred to • carefully considered each response when answering multiple choice questions • responded with the depth required for this • Level 3 qualification used appropriate technical vocabulary throughout • answered the extended question (Question • 21) fully with clear paragraphs covering all the elements required from the question.	• did not address the requirements of the • question, giving irrelevant material in their • responses • left whole questions unanswered • identified and described rather than explained when a full explanation was required • did not cover all the elements required in the extended question (Question 21).

Section A overview

The candidates who did well in this section, which included multi-choice questions, carefully considered each of the responses given and through a process of elimination came up with the correct answer. Those that did less well appeared to have rushed through this section and did not carefully read the requirements of the question. Overall in this series, this section was answered well.

Question 1

Put a tick (✓) in the box next to the **one** correct answer for each question.

1 Which one of the following bones is **not** part of the appendicular skeleton?

(a) Clavicle ☐

(b) Cranium ☐

(c) Fibula ☐

(d) Metatarsal ☐

[1]

Most candidates were given a mark for this straightforward question identifying (b) as the correct response although some identified (a) incorrectly.

Question 2

2 Which one of the following muscles is a fixator during the bicep curl exercise?

(a) Biceps brachii ☐

(b) Biceps femoris ☐

(c) Deltoid ☐

(d) Triceps brachii ☐

[1]

Most candidates identified (c) as the correct response although some identified (d) incorrectly.

Question 3

3 Which one of the following actions causes air to be expired?

(a) Decrease in pressure in the thoracic cavity ☐

(b) Decrease in volume of the thoracic cavity ☐

(c) Movement of the ribs up and out ☐

(d) Raising the arms above the head ☐

[1]

Many candidates chose (b) which was the correct response although some identified (a) incorrectly.

Question 4

4 Which one of the following blood vessels contains valves to prevent the backflow of blood?

(a) Arteries ☐

(b) Arterioles ☐

(c) Veins ☐

(d) Venules ☐

[1]

Most candidates chose (c) as the correct response although some identified (d) incorrectly.

Question 5

5 Which one of the following is represented on the energy continuum?

(a) How much energy is produced during exercise ☐

(b) The by-products of energy production ☐

(c) The main energy system used in an activity ☐

(d) Which food fuels are being used during exercise ☐

[1]

Many candidates chose (c) which was the correct response. The most common incorrect response was (a).

Question 6

6 Which one of the following is a structural characteristic of slow oxidative muscle fibres?

(a) Limited amount of myoglobin ☐

(b) Limited number of capillaries ☐

(c) Many fibres per motor neurone ☐

(d) Many mitochondria ☐

[1]

Many candidates chose (d), which was the correct response, showing a good understanding of slow oxidative muscle fibre characteristics. The most common incorrect response was (a).

Key point – Myoglobin and Mitochondria

These are often confused by candidates.

Myoglobin – a protein found in the muscle cells. It functions as an oxygen-storage unit; therefore it provides oxygen to the working muscles.

Mitochondria – The powerhouse of the cell that allows for aerobic respiration to occur which is a key characteristic of slow oxidative muscle fibres.

Question 7

7 Which one of the following relies most on the aerobic energy system?

(a) Cross-country running ☐

(b) Pole vault ☐

(c) Squash rally ☐

(d) 500-metre rowing race ☐

[1]

Most candidates chose (a) which was the correct response. The most common incorrect response was (d).

Question 8

8 Consider the following statements:

A – Arterioles to the skin vasodilate during exercise.

B – During a warm-up, arterioles to working muscles vasoconstrict.

C – Pre-capillary sphincters to the stomach open during exercise.

Which of the following is true?

(a) **A** alone is correct ☐

(b) **A** and **B** are both correct ☐

(c) **B** and **C** are both correct ☐

(d) **A**, **B** and **C** are all correct ☐

[1]

Many candidates chose (a) which was the correct response. Unsuccessful responses were a mix of the remaining three answers.

Question 9

9 Name **one** muscle that contracts to flex the knee joint.

..... **[1]**

Many candidates were given a mark, with the most common response being Biceps Femoris. Incorrect responses included 'hamstrings' which is not the correct terminology or 'quadriceps' which was incorrect. It is important at this level for candidates to be accurate when using technical terms/vocabulary.

Key point – Muscles that flex the knee joint

Candidates are reminded that individual muscles which are identified in the unit specification must be learned.

Knee Flexors – Biceps Femoris, Semitendinosus and Semimembranosus.

Question 10

10 Which blood vessel connects an arteriole to a venule?

..... **[1]**

Common incorrect responses stated pre-capillary sphincters.

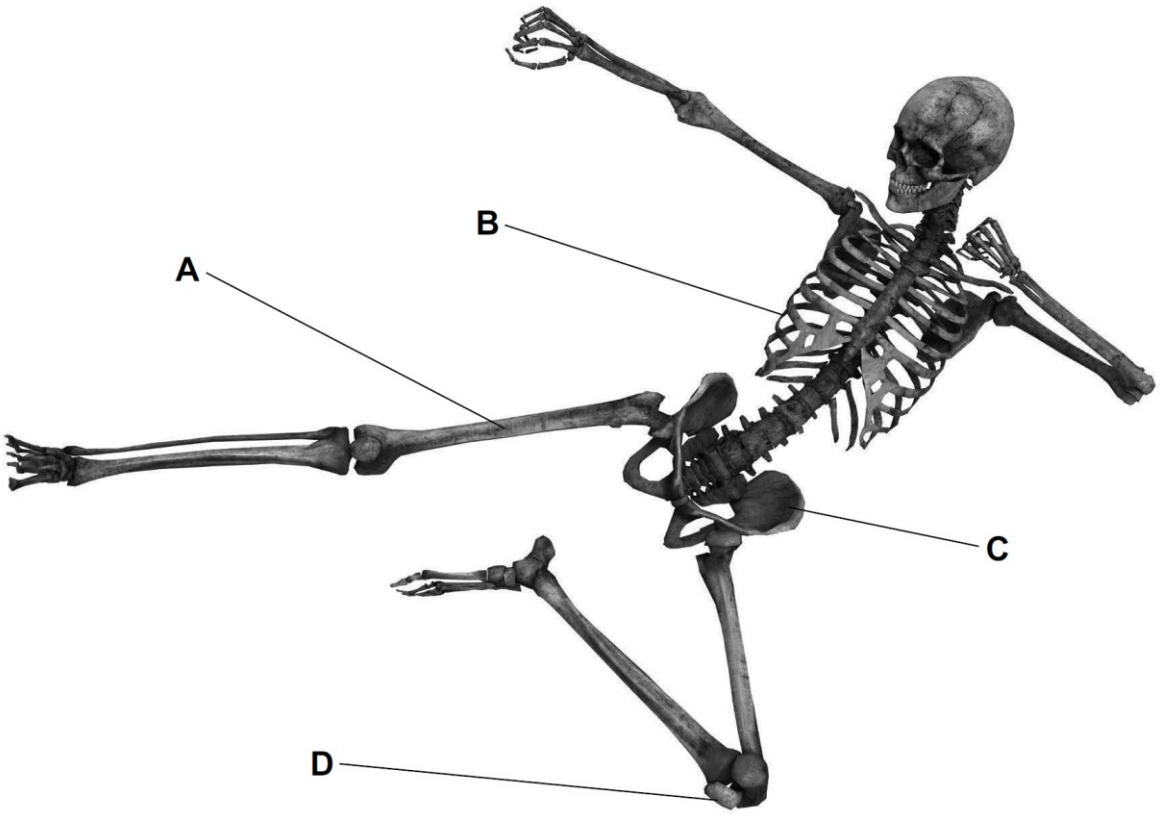
Section B overview

This section includes questions covering the whole range of the syllabus and requires a variety of different responses, including identify questions, descriptions and explanations. The questions in this section often required short but accurate responses with the most successful candidates looking at the marks allocated and judging the length of their responses accordingly.

Generally, if 4 marks are available then four separate points should be made. More successful responses demonstrated that they had read each question with care to identify which physiological system was being referred to. Less successful responses did not give specific enough information for marks to be given. Candidates need to be aware of the meanings of the 'command words' because some candidates showed a misunderstanding of what was required by each question, for example, not giving more in-depth responses for explanations.

Question 11 (a)

11 The diagram shows an image of a skeleton.



(a) Identify the bones labelled **A**, **B**, **C** and **D**.

A .....

B .....

C .....

D .....

[4]

This was answered well by most candidates. Most candidates were given a minimum of 3 marks with common errors referring to 'hip' for the third response.

Assessment for learning

Most candidates are reminded that the correct names of the bones are listed in the syllabus. It is important at this level for candidates to use accurate technical terms/vocabulary.

Question 11 (b)

(b) One function of the skeleton is protection. State **four** other functions of the skeleton.

1 .....

2 .....

3 .....

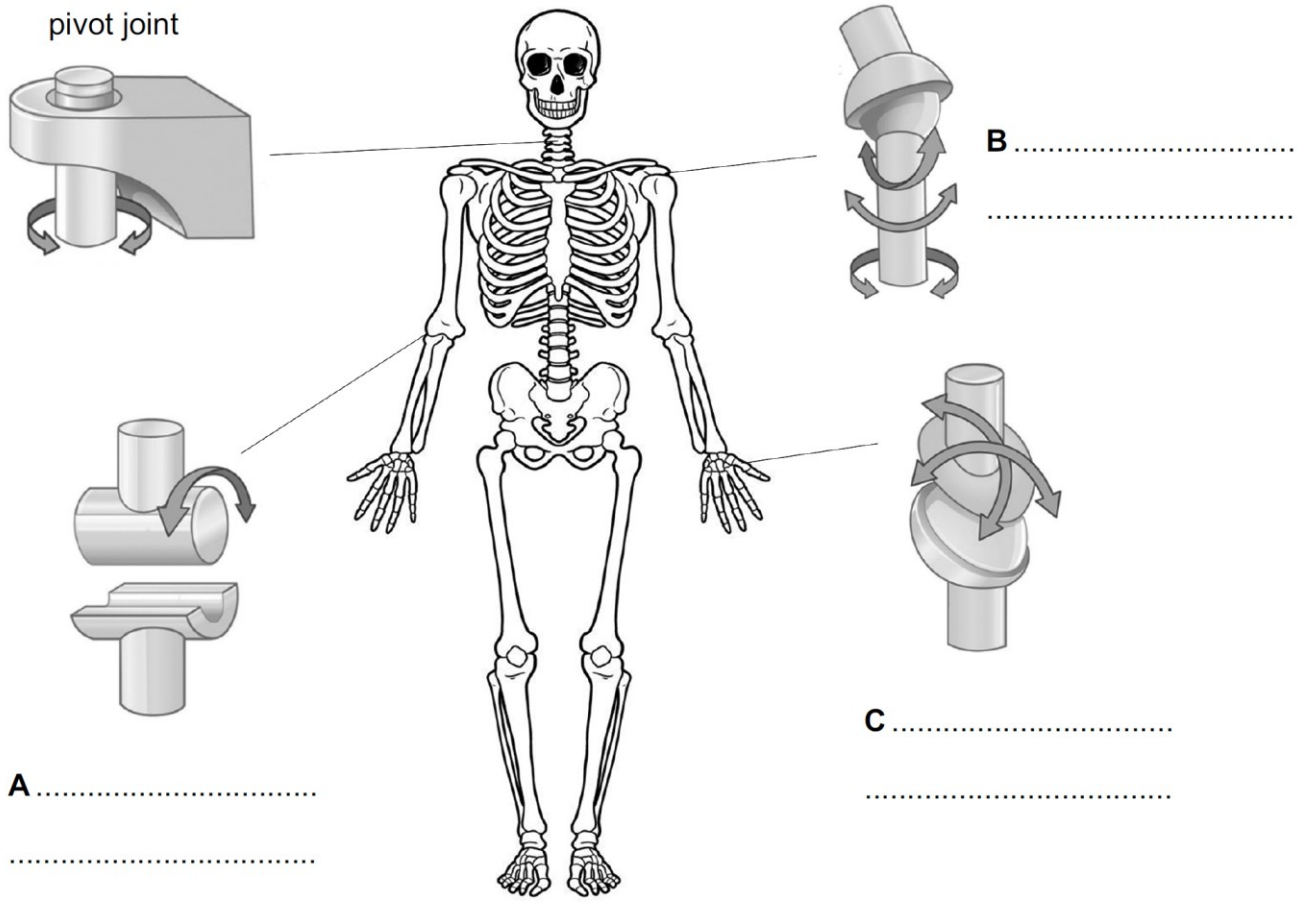
4 .....

[4]

Candidates generally responded well to this question with most candidates being given a minimum of 3 marks. Common errors were candidates identifying two linked functions as separate functions, e.g. shape and structure as two answers.

Question 12 (a)

12 The diagram highlights four types of synovial joint in the human body. The pivot joint at the neck has been identified.



(a) Fill in the blank spaces for **A**, **B** and **C** to identify the **three** other types of synovial joint.

[3]

Most candidates were given a minimum of 2 marks for this question. Common errors were mostly seen relating to answer C, with a variety of incorrect answers provided.

Question 12 (b)

(b) Describe **four** long-term benefits of regular physical activity for the skeletal system.

1 .....

.....

2 .....

.....

3 .....

.....

4 .....

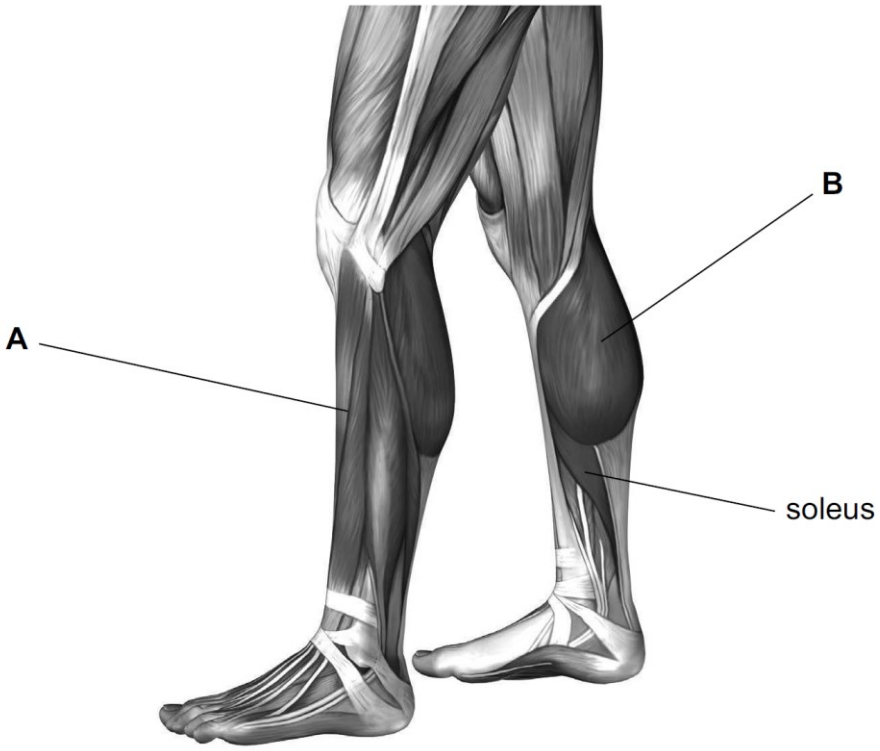
.....

[4]

This question had mixed responses with successful responses being given a minimum of 3 marks. Less successful responses struggled to identify long-term benefits and instead listed the functions of the skeleton.

Question 13 (a)

13 The diagram shows an image of the lower legs.



(a) Identify the muscles labelled **A** and **B**.

A .....

B .....

[2]

This was completed well by most candidates. Again, using the correct terminology is key to success as candidates that were given zero marks either identified 'calf' or 'shin' which is not the correct terminology. It is important at this level for candidates to be accurate when using technical terms/vocabulary.

Question 13 (b)

(b) State the joint movements at the ankle caused by contracting muscle **A** and muscle **B** concentrically.

Joint movement caused by muscle **A** .....

Joint movement caused by muscle **B** .....

[2]

Most candidates were given 2 marks for this question but those that were given zero marks generally identified the responses in the wrong order.

Question 13 (c)

(c) Complete the following sentences to describe different types of muscle contraction.

..... muscle contractions occur when a muscle contracts and lengthens to control movement and resist gravity.

..... muscle contractions occur when a muscle contracts but there is no movement.

..... muscle contractions occur when a muscle shortens under tension.

[3]

Successful responses were generally given 3 marks. Common errors were shown with candidates getting concentric and eccentric mixed up.

Question 14 (a)

14

(a) What is meant by the following terms?

Agonist muscle .....

.....

.....

Antagonist muscle .....

.....

.....

[2]

Most candidates performed well on this question although incorrect responses generally confused the agonist with the antagonist meaning.

Question 14 (b)

(b) Name **two** muscles that contract to rotate the radio-ulnar joint.

1 .....

2 .....

[2]

This proved to be difficult for many candidates. Less successful responses tended to identify wrist extensors/flexors or biceps and triceps, which are incorrect. More successful responses were given at least 1 mark for this question.

Assessment for learning

Candidates are reminded that the correct names of synovial joints along with the main muscles at them are listed in the syllabus. It is important at this level for candidates to use accurate technical terms/vocabulary.

Question 15

15 One short-term effect of exercise on the muscular system is an increase in muscle temperature.

Outline **three** other short-term effects of exercise on the muscular system.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

Most candidates showed a good understanding of the short-term effects of exercise on the muscular system with more successful responses being given 3 marks. Less successful responses tended to identify a mixture of long-term and short-term effects.

Question 16

16 Complete the sentences to compare circulatory values for untrained individuals with trained athletes.

Assume that the untrained individual and the trained athlete are the same size and weight.

The first comparison has been done for you.

The maximal stroke volume of an untrained individual is **lower** than the resting stroke volume of a trained athlete.

The resting heart rate of an untrained individual is ..... than the resting heart rate of a trained athlete.

The resting stroke volume of an untrained individual is ..... than the resting stroke volume of a trained athlete.

The maximal cardiac output of an untrained individual is ..... than the maximal cardiac output of a trained athlete.

[3]

This was generally well answered by most candidates showing good knowledge of circulatory values.

Question 17 (a)

17

(a) Complete the table to identify and describe the roles of various structures of the lungs.

Structure	Role
.....	Hollow tubes ringed with cartilage. They branch off to the left and right lungs.
Alveoli	....
.....	Air enters here and passes over the vocal cords before moving into the trachea.
Bronchioles	....
.....	This warms, moistens and filters inspired air.

[5]

Most candidates were given at least 3 marks for this question on the respiratory system. Common errors included candidates confusing the bronchi with the trachea and the larynx with the pharynx.

Question 17 (b) (i)

(b) The box below lists some of the respiratory muscles used to increase ventilation during exercise. Use them to answer **(i)** and **(ii)**.

diaphragm	internal intercostals	pectoralis minor
rectus abdominus	sternocleidomastoid	scalene

(i) Identify **two** respiratory muscles that contract to inhale air during exercise.

1 .....

2 .....

[2]

Most candidates were given 1 mark for this question. Common errors included listing internal intercostals as a response.

Question 17 (b) (ii)

(ii) Which **two** respiratory muscles contract to exhale air during exercise?

1 .....

2 .....

[2]

Most candidates were given 1 mark for this question. Common errors included listing pectoralis minor or the scalenes as a response.

Key point – Respiratory Muscles contracting during exercise

These are often confused by candidates.

Muscles that contract to inhale during exercise:

- Diaphragm
- Pectoralis minor
- Sternocleidomastoid
- Scalene

Muscles that contract to exhale during exercise:

- Internal Intercostals
- Rectus Abdominus

Question 18

18 The table below shows typical respiratory values at rest and during exercise.

Complete the table by calculating the missing values.

	Breathing frequency (breaths/minute)	Tidal volume (litres)	Minute ventilation (litres/minute)
At rest	12	0.5	.....
During exercise	30	.....	90

[2]

Most candidates were given either 1 or 2 marks for this question. Common errors were made by not realising that basic multiplication or division calculations were necessary to calculate the correct answer. Candidates should be reminded to read the instructions for each question fully before answering.

Question 19

19 Gaseous exchange at the alveoli depends on differences in partial pressures of gases.

Explain how differences in partial pressures of oxygen (O_2) and carbon dioxide (CO_2) cause gaseous exchange at the alveoli.

.....

.....

.....

.....

.....

..... **[4]**

This was answered well by most candidates, showing a good understanding of gaseous exchange at the alveoli. Candidates that were given at least 1 mark recognised the movement of gases between an area of high pressure to an area of low pressure but were unable to explain the differences in partial pressure of oxygen and carbon dioxide and how this causes gaseous exchange to happen at the alveoli.

Question 20

20 Describe the energy system that is predominantly used during the performance of a long jump in athletics.

.....

.....

.....

.....

.....

..... **[3]**

Common errors included ATP (only) or an incorrect energy system. It is important at this level for candidates to be accurate when using technical terms/vocabulary.

Section C overview

This section includes one extended question worth 10 marks.

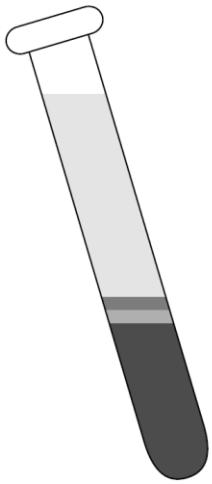
This is marked using a levels mark scheme that includes credit for the quality of written communication. There are three levels: Level 1 showing a limited response, Level 2 which shows a competent response and Level 3 which shows a comprehensive response.

Few candidates were in the top level (8-10 marks), with most in Level 1 marks (1-4 marks) or Level 2 (5-7 marks).

This is an area of the specification where many candidates seemed to find it difficult to explain the factors that limited how effective each component of blood could be during physical activity in the detail required for this Level 3 qualification. Those who did well included all the components of blood linked to physical activity and answered with fluency and accuracy, often developing each explanation well.

Question 21*

21* The image shows a test tube containing blood, separated into its four components.



Describe the functions of the **four** components of blood. Explain how each component affects performance in physical activity.

Your answer should include:

- how each component might help during physical activity
- factors that limit how effective each component can be during physical activity.

[10]

This question asked for candidates to explain the four different components of blood and the factors that limited how effective each component could be during physical activity.

Many candidates were able to access Level 1 marks, as they identified some or all of the components of blood and described the single main functions of each.

Responses that allowed candidates to access Level 2 marks often detailed that some of the components had more than one function as well as applying their knowledge and understanding of how those components of blood helped during physical activity.

The responses that allowed candidates to access Level 3 marks also included explanations of how certain factors could limit the effectiveness of the components blood during physical activity with relevant sporting examples provided.

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Question 12: Synovial joints of body, Free to use Creative Commons Attribution 3.0 Unported (CC BY 3.0)

Question 13: Muscles of lower leg, Modified shutterstock 674183425

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