

**CAMBRIDGE TECHNICALS LEVEL 3 (2016)**

**Examiners' report**

# **SPORT AND PHYSICAL ACTIVITY**

**05826–05829, 05872**

**Unit 1 January 2025 series**

# Contents

Introduction .....	3
Unit 1 series overview .....	4
Section A overview .....	5
Question 1 .....	5
Question 2 .....	5
Question 3 .....	6
Question 4 .....	6
Question 5 .....	6
Question 6 .....	7
Question 7 .....	7
Question 8 .....	8
Question 9 .....	8
Question 10 .....	8
Section B overview .....	9
Question 11 (a) .....	9
Question 11 (b) .....	10
Question 11 (c) .....	10
Question 12 .....	11
Question 13 .....	11
Question 14 (a) .....	12
Question 14 (b) .....	14
Question 15 .....	15
Question 16 (a) .....	16
Question 16 (b) .....	17
Question 17 (a) .....	18
Question 17 (b) .....	19
Question 18 .....	19
Question 19 .....	20
Question 20 .....	20
Section C overview .....	21
Question 21* .....	21

## 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 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 19, the question asks for the effects of a cool down on the respiratory system. Some candidates linked their responses to different physiological systems, the most common being the cardiovascular system. 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 inaccurately responded to Question 18 on resting values linked to the efficiency of the respiratory system. It is important that candidates are taught and revise thoroughly all sections of the specification.

In Question 21, an extended response question, candidates did well for this examination series, with many hitting the required points in the mark scheme and carefully following the guidance identified in the question as well as linking their responses to the correct physiological system, the muscular system. Those that performed less well for this question did not use the guidance to lead them through the requirements of the question or the responses provided were basic with limited reference to points required in the mark scheme.

Many candidates showed that they had been taught the specification effectively and had many opportunities to relate theory to practical examples. The more successful 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:
<ul style="list-style-type: none"> <li>• accurately identified the requirements of each question and which part of human physiology each question referred to</li> <li>• carefully considered each response when answering multi-choice questions</li> <li>• responded with the depth required</li> <li>• used appropriate technical vocabulary throughout for Level 3 qualification</li> <li>• answered the extended question (Question 21) fully with clear paragraphs covering all the elements required from the question.</li> </ul>	<ul style="list-style-type: none"> <li>• did not address the requirements of the question, giving irrelevant material in their responses</li> <li>• left whole questions unanswered</li> <li>• identified and described rather than explained when a full explanation was required</li> <li>• did not cover all the elements required in the extended question (Question 21).</li> </ul>

## 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 got the correct response. 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 of the questions 1 to 8.

1 Which one of the following muscles contracts to cause movement at the shoulder?

(a) Iliopsoas

(b) Latissimus dorsi

(c) Soleus

(d) Vastus lateralis

[1]

Most candidates got a mark for this question identifying (b) as the correct answer, although some identified (a) incorrectly.

### Question 2

2 Which one of the following sections of the vertebral column is **above** the thoracic vertebrae when an individual is standing up?

(a) Cervical vertebrae

(b) Coccyx

(c) Lumbar vertebrae

(d) Sacrum

[1]

Most candidates identified (a) as the correct response, although those that got the question incorrect generally identified (c) incorrectly.

### Question 3

3 Which one of the following shows the correct order in which air travels into the lungs during inspiration?

- (a) Bronchus → bronchiole → trachea
- (b) Bronchiole → trachea → bronchus
- (c) Trachea → bronchus → bronchiole
- (d) Trachea → bronchiole → bronchus

[1]

Most candidates correctly answered (c) for this question, but some answered (d) incorrectly.

### Question 4

4 Which one of the following is the timescale for full recovery of the **ATP-PC/lactic** energy system?

- (a) 10 seconds
- (b) 30 seconds
- (c) 3 minutes
- (d) 30 minutes

[1]

Many candidates chose (c), which was the correct response. This showed a good understanding of the ATP-PC/lactic energy system. Those that were unsuccessful mostly chose (b).

### Question 5

5 Which one of the following muscles contracts to cause **expiration** during exercise?

- (a) Internal intercostal
- (b) Pectoralis minor
- (c) Scalene
- (d) Sternocleidomastoid

[1]

Most candidates correctly answered (a) for this question, but some answered (b) incorrectly.

## Question 6

6 Which one of the following statements describes an **isometric** muscle contraction?

(a) Muscle contracts at a constant speed

(b) Muscle length does not change as it contracts

(c) Muscle lengthens under tension

(d) Muscle shortens as it contracts

[1]

Most candidates identified (b) as the correct response, although those that got the question incorrect generally chose (a).

## Question 7

7 Which one of the following forms of exercise mainly uses the **ATP-PC/lactic** energy system?

(a) High intensity and long duration

(b) High intensity and short duration

(c) Low intensity and long duration

(d) Low intensity and short duration

[1]

Many candidates chose (b), which was the correct answer. Those that were unsuccessful mostly chose (a) or (c).

### Question 8

8 Consider the following statements about the cardiovascular system:

- A – Cardiac output increases during exercise.
- B – Heart rate decreases during exercise.
- C – Stroke volume is highest at rest.

Which statements are **incorrect**?

- (a) A only
- (b) A and B
- (c) B and C
- (d) C only

[1]

Most candidates chose (c) as the correct response, although some answered (a) incorrectly.

### Question 9

9 Complete the following sentence using the correct word from the word box.

isotonic      partial      synovial      systolic

Gaseous exchange at the lungs is caused by differences in the ..... pressures of gases.

[1]

Many candidates gave the correct answer, which was partial. Those that did not get the mark tended to choose either isotonic or systolic, which were incorrect.

### Question 10

10 Calculate the stroke volume of an individual during exercise with a heart rate of 110 beats per minute and a cardiac output of 13 200 millilitres per minute. Give your answer in the correct units.

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

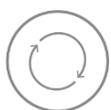
The more successful candidates did well on this question by being able to identify the correct response including units, 120ml/120 millilitres/0.12 litres. Common incorrect responses had the correct calculation but were missing the units which was asked for in the question. Less successful responses also tended to multiply the two figures instead of dividing them.

## 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 candidates demonstrated that they had read each question with care to identify which physiological system was being referred to. Less successful responses did not have specific enough information for marks to be given.

### Assessment for learning



Candidates need to be aware of the meanings of the key command verbs as some candidates showed a misunderstanding of what was required by each question especially for 'describe' and 'explain' questions and answers.

### Question 11 (a)

11

(a) The vertebral column is part of the axial skeleton.

Other than the bones of the vertebral column, name **two** different bones of the **axial** skeleton.

1 .....

2 .....

[2]

Many candidates provided two correct responses, with the most common being cranium and sternum. The main reason candidates did not get marks was for including vertebral column bones in their answer which was incorrect as stated in the question. Some candidates also provided bones of the appendicular skeleton, e.g. femur as their answer which again is incorrect as the question asked for bones of the axial skeleton.

### Question 11 (b)

(b) Name **three** bones in the foot.

- 1 .....
- 2 .....
- 3 .....

[3]

Candidates generally did well on this question, with most candidates scoring at least 2 marks. Common errors were candidates identifying carpals and metacarpals which were incorrect.

### Question 11 (c)

(c) Explain **three** functions of flat bones.

- 1 .....
- 2 .....
- 3 .....

[3]

Most candidates showed a good understanding of the functions of flat bones with more successful candidates getting 2 marks or more. Less successful candidates tended to write one-word responses, stating the functions of the skeleton, e.g. shape/support/protection, but did not explain the functions of flat bones as was asked for in the question therefore were not credited.

### Question 12

12 Draw a line to link each structure of a synovial joint to its function.

Structure	Function
Ligament	Reduces friction between bones and connective tissue.
Synovial fluid	Encloses the joint and forms the outer lining of the joint.
Bursa	Lubricates the joint and helps to absorb shock.
Joint capsule	Connects bone to bone and stabilises the joint.

[4]

Most candidates got 2 marks for this question, but those that got less generally confused the definitions of the functions of bursa and synovial fluid.

### Question 13

13 Describe **two** positive long-term effects of exercise on the **skeletal** system.

- 1 .....
- .....
- 2 .....
- .....

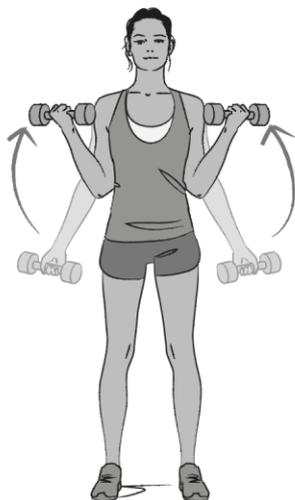
[2]

Most candidates showed a good understanding of the positive long-term effects of exercise on the skeletal system with many candidates getting 2 marks. Those who did not tended to repeat answers for both mark points, e.g. increased bone density and stronger bones.

### Question 14 (a)

14

(a) The image below shows the upward phase of a biceps curl.



The table identifies **three** muscles involved in a biceps curl and states the function of each.

Complete the table to describe each type of muscle function during the upward phase of the biceps curl.

Muscle	Function	Description of muscle function during the upward phase of a biceps curl
Biceps brachii	Agonist	..... ..... .....
Triceps brachii	Antagonist	..... ..... .....
Deltoid	Fixator	..... ..... .....

[3]

Most candidates were able to describe the function of the agonist but struggled with the antagonist and fixator, with either incomplete functions or incorrect responses provided.

**Key point – Agonist, Antagonist and Fixator**

Candidates often confused these terms.

Agonist – the muscle that contracts and shortens.

Antagonist – the muscle that relaxes and lengthens.

Fixator – the muscle that stabilises a body part while another part moves.

**Exemplar 1**

Muscle	Function	Description of muscle function during the upward phase of a biceps curl
Biceps brachii	Agonist	Contracts concentrically during the upwards phase to cause elbow flexion.
Triceps brachii	Antagonist	Contracts eccentrically (relaxes) during the upwards phase to cause flexion at the elbow joint.
Deltoid	Fixator	Contracts isometrically to keep the shoulder joint stable during the upwards phase of a bicep curl.

[3]

This exemplar got the maximum 3 marks. The candidate was able to identify the functions of the agonist, antagonist and fixator muscles during the upward phase of a bicep curl.

### Question 14 (b)

(b) Complete the paragraph that describes the structure and function of **slow oxidative muscle fibres** using words from the word box.

few	high	low	many	small	strong
-----	------	-----	------	-------	--------

Slow oxidative muscle fibres are used in ..... intensity sporting activities.

These muscle fibres have ..... capillaries.

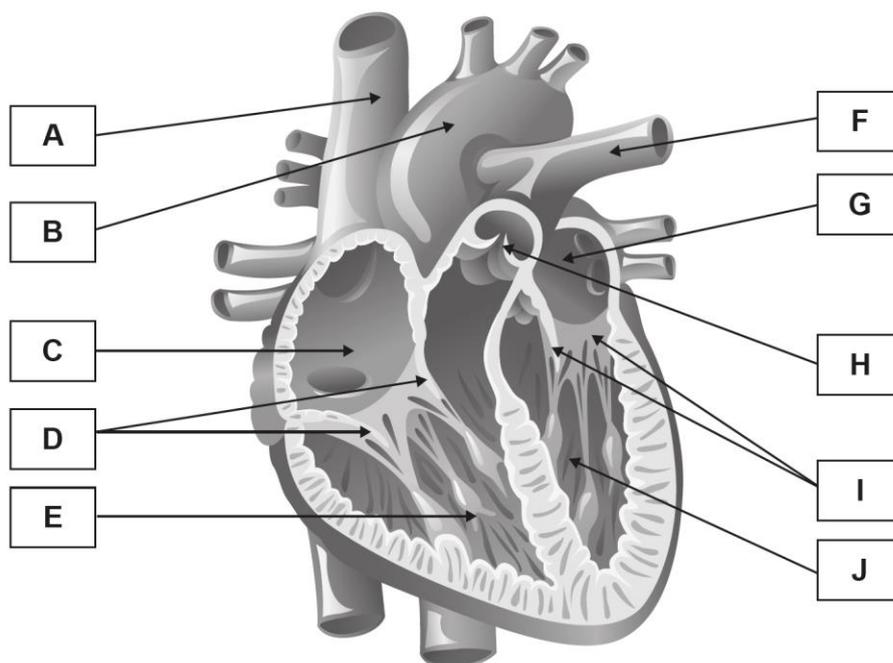
Their resistance to fatigue is .....

[3]

Most candidates did well on this question. Common errors were incorrect responses for MP2, or mixing up MP1, low, and MP3, high.
--

### Question 15

15 The image below shows a labelled diagram of the heart.



Identify the following structures of the heart by matching the letter to the structure:

- Left atrium .....
- Aorta .....
- Vena cava .....
- Tricuspid valve .....
- Pulmonary valve .....

[5]

More successful candidates did well on this question, getting 4 marks or more. Less successful candidates tended to confuse the left and right sides on the diagram therefore getting 0 marks for this question.

### Question 16 (a)

**16**

**(a)** Complete the table to compare the structure and function of arteries and veins.

The first answer has been completed for you.

Feature	Comparison
Lumen size	The size of the lumen in arteries is smaller than in veins.
Direction of blood flow	..... .....
Speed of blood flow	..... .....
Muscle wall diameter	..... .....
Blood pressure	..... .....

**[4]**

Many candidates did well on this question as they used the example as guidance to complete the other responses. More successful candidates generally scored 3 marks or more, while others either described the blood vessels or provided responses that were too vague for credit.

### Question 16 (b)

(b) Complete the following sentences to describe the vascular shunt mechanism.

The vascular shunt mechanism describes the redistribution of .....  
around the body during exercise.

The vasomotor control centre within the brain sends signals causing blood vessels called ..... to change diameter.

Narrowing of these blood vessels is called .....

Widening of these blood vessels is called .....

The diameter changes so that the ..... get more  
.....

[6]

Most candidates were able to identify the correct answer for MP1, although many were unsuccessful with MP2, with common incorrect responses linking to either pre-capillary sphincter or capillaries. More successful candidates tended to answer MP3 and MP4 correctly, but other candidates sometimes mixed up these responses. Likewise, some candidates got MP5 and MP6 correctly, but there were many instances where candidates provided responses that were too vague for credit, e.g. MP5 'muscles' or 'body' was deemed to be too vague as the correct response would be 'working muscles'.

### Exemplar 2

(b) Complete the following sentences to describe the vascular shunt mechanism.

The vascular shunt mechanism describes the redistribution of Oxygen .....  
around the body during exercise.

The vasomotor control centre within the brain sends signals causing blood vessels called Venules ..... to change diameter.

Narrowing of these blood vessels is called Vasodilation Vasohilite .....

Widening of these blood vessels is called Vasoconstrict .....

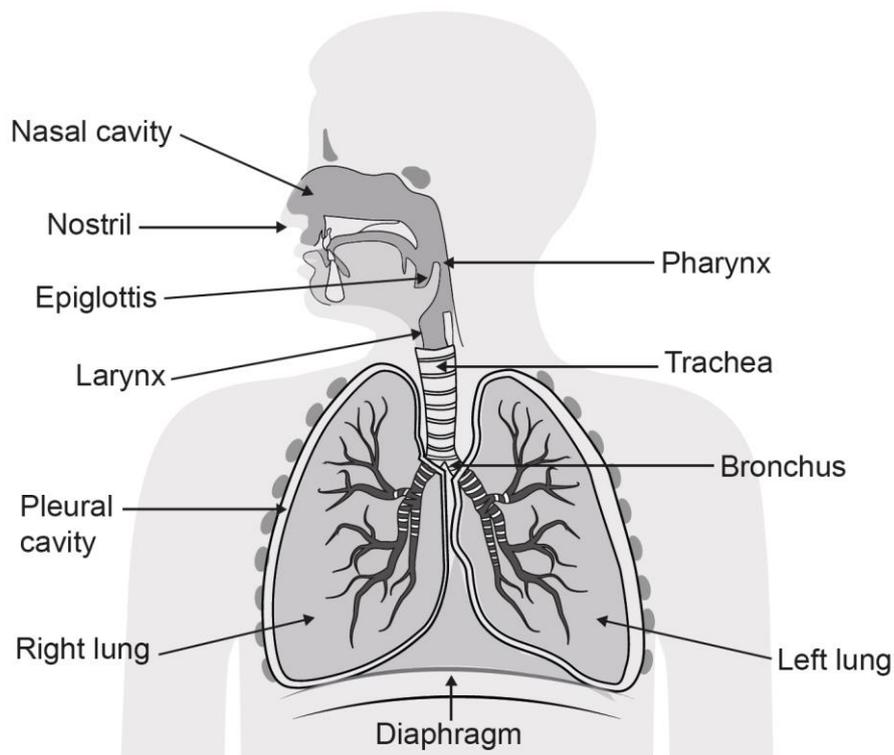
The diameter changes so that the body ..... get more  
Oxygen .....

[6]

This response got 1 mark. The candidate was able to identify oxygen for MP6 but the other answers were incorrect.

### Question 17 (a)

17 The image below shows the structures of the respiratory system.



(a) Describe the roles of the following:

Epiglottis .....

.....  
.....

Trachea .....

.....  
.....

[2]

Most candidates performed well on this question on the respiratory system. A common error was mixing up the role of the Epiglottis with the Trachea.

### Question 17 (b)

(b) Describe the role of the **diaphragm** in the mechanics of breathing during **inspiration**.

.....

.....

.....

..... [2]

The more successful candidates did well on this question whereas others found it more challenging. Common errors included contradictory responses, e.g. the diaphragm contracts and moves up.

### Question 18

18 State typical resting values, including units, for an untrained individual for:

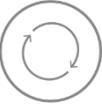
Tidal volume .....

Breathing frequency .....

Minute ventilation ..... [3]

More successful candidates did well on this question, being able to identify the correct resting values for tidal volume, breathing frequency and minute ventilation. Common incorrect answers were ranges outside the upper and/or lower limits that were accepted. Many candidates also used incorrect units.

### Assessment for learning

 Candidates must be taught respiratory system resting values for trained and untrained individuals and changes during exercise for tidal volume, breathing frequency and minute ventilation (as well as for the cardiovascular system values of SV, HR and Q)

### Exemplar 3

Tidal volume ..... 500 ml .....

Breathing frequency ..... 12 - 15 breaths per minute .....

Minute ventilation ..... 7.5 L/min .....

[3]

This exemplar got the maximum 3 marks. The candidate was able to answer the correct resting values for tidal volume, breathing frequency and minute ventilation along with the correct units for each.



## 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 which shows 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 getting Level 1 (1-4 marks) or Level 2 (5-7 marks).

### Question 21\*

**21\*** Explain the positive and negative effects of physical activity and sport on the muscular system.

Your answer should include:

- short-term effects during exercise
- long-term effects due to training.

[10]

This question asked candidates to explain the positive and negative effects of physical activity and sport on the muscular system. They were also directed to include the short-term effects during training and the long-term effects due to training on the muscular system.

Many candidates were able to achieve Level 1 marks as they explained limited positive and possibly one of the negative effects linked to either the short-term or long-term effects. Candidates who got lower marks also tended to discuss other body systems (CV, respiratory and skeletal) which were not applicable, therefore these responses were not creditworthy.

Responses that allowed candidates to be given Level 2 marks often detailed some of the positive and negative effects linked to either the short-term or long-term effects. The most common effects covered by candidates relating to short-term effects included increased temperature, increased flexibility, DOMs and fatigue, with long-term effects being hypertrophy, increased strength and reduced chance on injury.

The responses that allowed candidates to gain Level 3 marks also included explanations of an extensive range of both positive and negative short-term and long-term effects. The more successful candidates were able to offer a wide range of short-term and long-term positives, including increased energy production (ATP/PC/glycogen breakdown), increased enzyme activity, increased efficiency of muscle function (increased mitochondria and myoglobin), as well as increased availability of food fuels. They also covered many of the available negatives, including depletion of PC, glycogen as well myoglobin stores and chronic injuries.

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