CAMBRIDGE TECHNICALS

OCR
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CAMBRIDGE TECHNICALS LEVEL 3 (2016)

Examiners' report

SPORT AND PHYSICAL ACTIVITY

05826–05829, 05872

Unit 1 Summer 2024 series

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. A selection of candidate answers is also provided. 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 OCR.

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 16(b), the question asks for the effects of a warm-up on the cardiovascular system; some candidates linked their responses to different physiological systems, the most common being the muscular system. Candidates should check carefully which part of human physiology the question refers to.

There were areas of the specification for which candidates seemed unprepared. For example, many candidates inaccurately responded to Question 18 on the muscles that contract during inspiration and expiration. It is important that candidates are taught and revise thoroughly all sections of the specification.

In the extended response question, Question 21, candidates scored well for this examination series, with many hitting the required points in the mark scheme and following carefully the structures identified in the image. Those that gained fewer marks for this question did not use the 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 multi-choice questions. • responded with the depth required for this Level 3 qualification and 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 scored 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

1 Which one of the following helps blood to clot?

(a) Plasma ☐

(b) Platelets ☐

(c) Red blood cells ☐

(d) White blood cells ☐

[1]

Most candidates scored a mark for this straightforward question, identifying (b) as the correct answer – although some chose (a).

Question 2

2 Which one of the following is a typical resting value for tidal volume for a trained individual?

(a) 0.1 litres ☐

(b) 0.5 litres ☐

(c) 1.0 litres ☐

(d) 1.5 litres ☐

[1]

Most candidates identified (b) as the correct answer. Those that got the question incorrect generally identified (c).

Question 3

3 Which one of the following athletic events would **not** benefit from a high percentage of fast glycolytic muscle fibres?

(a) Marathon ☐

(b) Pole vault ☐

(c) Shot put ☐

(d) Triple jump ☐

[1]

The question was generally answered correctly by most candidates, choosing (a), but some identified (b) incorrectly.

Question 4

4 Consider the following statements:

A – Improved posture is a long-term effect of exercise on the skeletal system.
B – Increased bone density is a long-term effect of exercise on the skeletal system.
C – Increased risk of osteoporosis is a long-term effect of exercise on the skeletal system.

Which of the above statements are correct?

(a) A and B ☐

(b) A and C ☐

(c) A, B and C ☐

(d) B and C ☐

[1]

Many chose (a), which was the correct response, showing a good understanding of the long-term effects of exercise on the skeletal system. Those that scored zero mostly chose (c).

Question 5

5 Which one of the following is the equation for calculating minute ventilation?

(a) Stroke volume x breathing frequency ☐

(b) Stroke volume x tidal volume ☐

(c) Tidal volume x breathing frequency ☐

(d) Tidal volume x heart rate ☐

[1]

Many candidates chose (c) the correct answer. Those that scored zero mostly chose (a) or (d).

Question 6

6 Which one of the following pairs of joint movements only occur at the ankle?

(a) Dorsiflexion and plantar flexion ☐

(b) Flexion and extension ☐

(c) Pronation and supination ☐

(d) Rotation and circumduction ☐

[1]

Most candidates chose (a) as the correct answer although some identified (b) incorrectly.

Question 7

7 Which one of the following is **not** an effect of a cool down on the muscular system?

(a) Increases supply of oxygen ☐

(b) Maintains blood flow to muscles ☐

(c) Prevents blood pooling ☐

(d) Reduces the risk of arthritis ☐

[1]

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

Question 8

8 What type of synovial joint is found at the shoulder?

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

Many candidates provided the correct answer – ball and socket joint. Those that did score zero mainly identified a hinge joint.

Question 9

9 What term is used for the volume of blood ejected by the heart per minute?

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

The more able candidates did well on this question and were able to identify cardiac output as the correct answer, although others found it more challenging. A common incorrect answer was stroke volume.

Misconception – Cardiac output and stroke volume

These are often confused by candidates.

Cardiac output – the volume of blood ejected by the heart per minute.

Stroke volume – the volume of blood ejected by the heart per beat.

Question 10

10 State **one** process that takes place during recovery for the ATP-PC / alactic energy system.

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

The more able candidates did well on this question although others found it more challenging. Common incorrect answers stated the Krebs cycle or glycolysis.

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. Responses which scored highly were by candidates who 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; some candidates showed a misunderstanding of what was required by each question, for example not giving more in-depth responses for explanations.

Question 11

11 One section of the vertebral column consists of the lumbar vertebrae.

Name **four** other groups of vertebrae found in the vertebral column.

1 .....

2 .....

3 .....

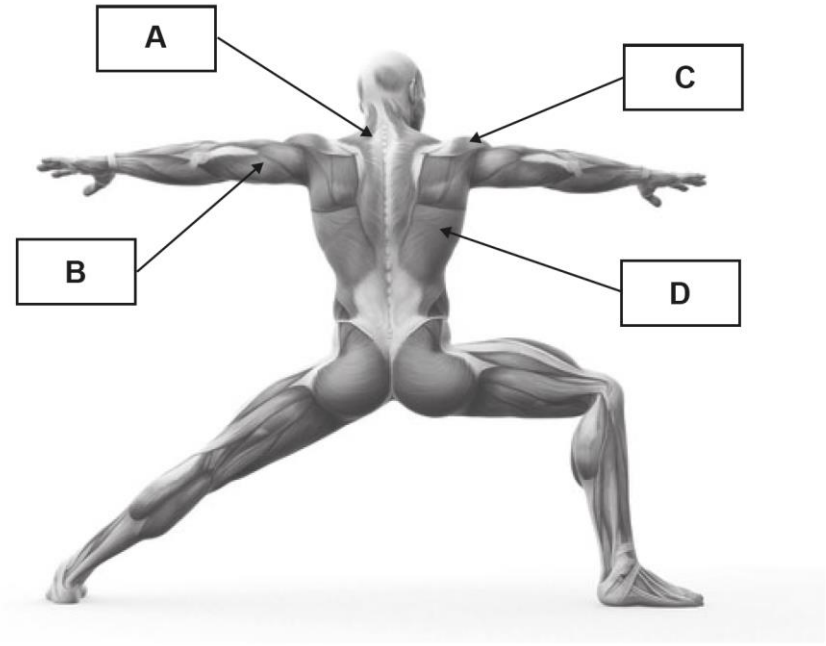
4 .....

[4]

This was answered well by the majority of candidates with most gaining at least 3 marks. A common error seen was 'lumbar' as the fourth answer – this was stated in the question.

Question 12

12 The image below shows some of the major muscles of the human body.



Identify the muscles labelled **A**, **B**, **C** and **D**.

A .....

B .....

C .....

D .....

[4]

Candidates generally scored well on this question with the majority of candidates scoring a minimum of 3 marks. Common errors included some candidates identifying sternocleidomastoid for answer A instead of trapezius, and obliques for answer D instead of latissimus dorsi.

Assessment for learning

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

Question 13 (a)

13 The image below shows a volleyball player straightening their arms as they prepare to receive the ball.

(a) Explain how the muscles acting at the elbow work together to cause the elbow to extend to receive the ball.

.....

.....

.....

.....

.....

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

Higher performing candidates scored well on this question, mostly scoring 4 marks. Those that did score 2 marks or fewer often mixed up the roles of the agonist and antagonist linked to the question.

Misconception – Agonist and antagonist

These are often confused by candidates.

Agonist – the muscle that contracts and shortens.

Antagonist – the muscle that relaxes and lengthens.

Exemplar 1

Muscles work in pairs antagonistically. To straighten the arm the arm, the triceps brachii contracts pulling on the tendon which then straightens the limb; this muscle is the agonist as it is working. The antagonist is the biceps brachii as it is resting and not currently contracted as it would only contract to bend the arm.

Exemplar 1 gained all 4 marks. The candidate was able to identify that the muscles were working as antagonistic pairs and the correct muscles acting as the agonist and antagonist along with their role in the sporting action.

Question 13 (b)

(b) Describe the following types of muscle contraction:

Isometric contraction

.....

.....

Concentric contraction

.....

.....

[2]

Most candidates gained 2 marks for this question. Those that lost marks generally confused the type of contraction for an isometric with an eccentric contraction.

Question 14

14 Outline **four** long-term effects of exercise on the muscular system.

1 .....

.....

2 .....

.....

3 .....

.....

4 .....

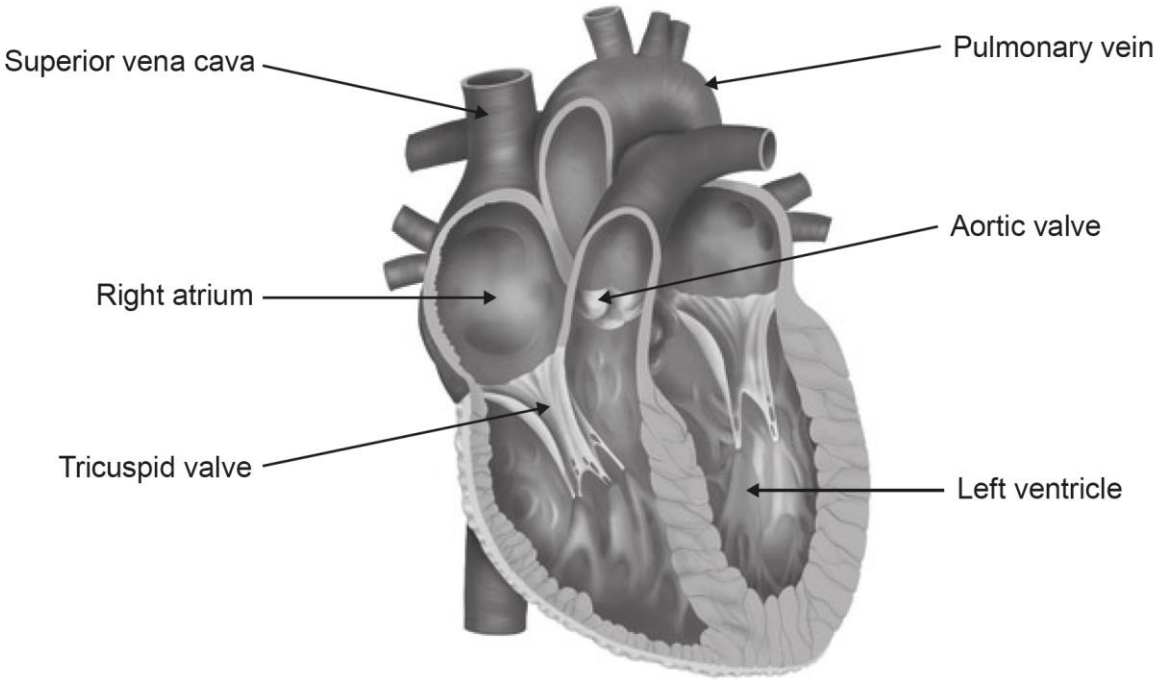
.....

[4]

Most candidates showed a good understanding of the long-term effects of exercise on the muscular system, with more successful responses scoring 3 marks or more. Less successful responses often identified a mixture of long-term and short-term effects, or long-term effects on the cardiovascular system.

Question 15 (a)

15 The image below shows the structures of the heart. **Two** structures are labelled incorrectly.



(a) Identify which **two** structures are labelled incorrectly and state the correct name for these structures.

Incorrect label ..... Correct name .....

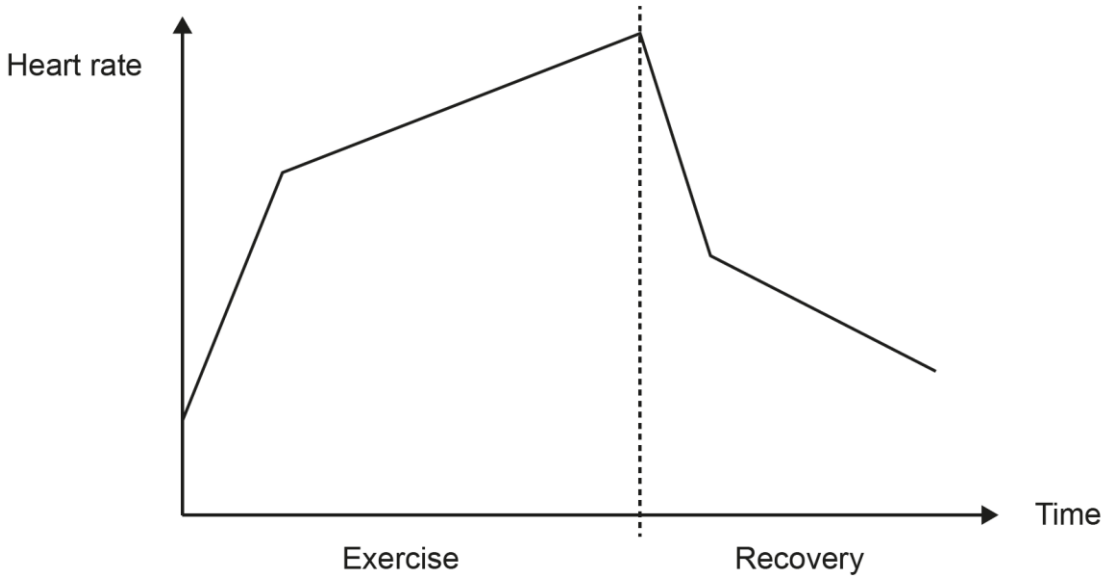
Incorrect label ..... Correct name .....

[4]

Higher performing candidates scored well on this question, scoring 3 marks or more. The most common inaccuracy was the identification of the semi-lunar valve instead of pulmonary valve; 'semi-lunar valve' on its own was too vague to score a mark.

Question 15 (b) (i)

(b) The graph below shows changes in heart rate during maximal exercise and during recovery.



(i) Explain why heart rate increases rapidly at first and continues to rise during maximal exercise.

.....

.....

.....

.....

.....

..... **[2]**

Most candidates scored 1 mark. Common errors included candidates explaining anticipatory rise linked to adrenaline increase, which was not shown on the graph, or the inability to link to high intensity exercise or removal of CO_2.

Exemplar 2

Heart rate increases rapidly at first due to an increase in adrenaline throughout the body. It then continues to rise because there is also an increase in demand for oxygen. Therefore the quicker the heart rate is, the more oxygenated blood can be pumped around the body.

Exemplar 2 gained 1 mark. The candidate discusses the need for increase oxygen (gaining 1 mark) but the link to adrenaline and the remaining response was not creditworthy.

Question 15 (b) (ii)

(ii) Suggest **one** reason why the heart rate does not return immediately to resting heart rate during the recovery stage.

.....

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

Most candidates scored well on this question although candidates that scored zero lacked specific detail in their response.

Question 16 (a)

16

(a) Blood travels through different blood vessels as it flows around the body.

Fill in the missing words to show the correct order of blood vessels after blood leaves the heart.

Arteries → ..... → Capillaries → ..... → Veins

[2]

Most candidates scored well on this question, although the most common mistake identified pre-capillary sphincters for either answer which was incorrect.

Question 16 (b)

(b) One effect of a warm up is to increase blood flow to the working muscles.

Describe **three** other effects of a warm up on the cardiovascular system.

1 .....

.....

2 .....

.....

3 .....

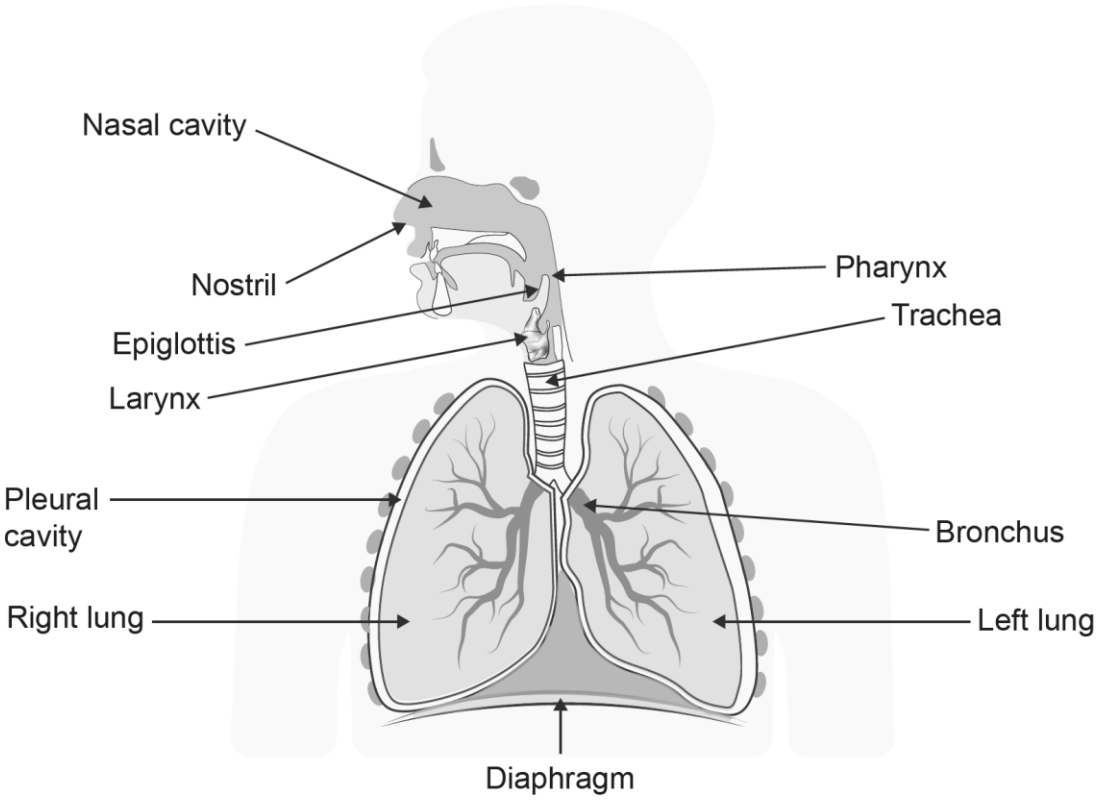
.....

[3]

Higher performing candidates scored well on this question. Lower performing candidates tended to provide the effects of a warm-up on the muscular system which were not creditworthy.

Question 17 (a)

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



(a) Describe a different role each of the following structures plays in the respiratory system:

Nasal cavity .....

.....

Epiglottis .....

.....

Larynx .....

.....

[3]

Most candidates scored well on this question on the respiratory system. Common errors included candidates mixing up the role of the epiglottis with the larynx.

Question 17 (b)

(b) Describe how the structure of the alveoli allows gaseous exchange to take place efficiently.

.....

.....

.....

.....

.....

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

This was answered well by most candidates, showing a good understanding of the structure of the alveoli. Common errors involved candidates describing the process of diffusion which did link to the structure asked for in the question.

Question 18

18 Respiratory muscles work together during ventilation. Some contract to cause inspiration, others contract to cause expiration.

Complete the table to describe the role of the respiratory muscles. The role of the diaphragm has been done for you.

Respiratory muscle	**Does the contraction cause inspiration or expiration?**
Diaphragm	Inspiration
Internal intercostals	.....
Pectoralis minor	.....
Rectus abdominis	.....
Sternocleidomastoid	.....

[4]

The more able candidates did well on this question whereas others found it more challenging. Common errors included candidates identifying the incorrect role of the respiratory muscles.

Misconception – Respiratory muscles contractions

These are often confused by candidates.

Muscles that contract during inspiration:

- diaphragm
- pectoralis minor
- sternocleidomastoid
- scalenes (not included in this question but could be asked in future series).

Muscles that contract during expiration:

- internal intercostals
- rectus abdominus.

Question 19

19 Consider the definitions of various lung volumes given below.

A – The number of breaths taken in one minute.
B – The total volume of the lungs after maximal inspiration.
C – The volume of air inspired or expired per breath.
D – The volume of air left in the lungs after maximal expiration.
E – The volume of air inspired or expired per minute.

Match the correct definition to each of the following lung volumes:

Breathing frequency = ...

Minute ventilation = ...

Tidal volume = ...

[3]

Most candidates did well on this question. Common errors showed candidates identifying the incorrect definitions for either minute ventilation or tidal volume, and in some cases mixing the two up.

Question 20 (a)

20

(a) Complete the paragraph using words from the word box to explain the lactic acid system.

aerobic	anaerobic	enzyme	glycogen	lipids
one	protein	pyruvic acid	thirty-eight	two

The type of reaction in the lactic acid system is ……..…….....……..…..... .

The fuel used for this system is ……..…….....……..…..... .

One molecule of this fuel produces ……..…….....……..…..... ATP in this system.

The by-product of the reaction is lactic acid, which inhibits ……..…….....……..……

activity.

[4]

Higher performing candidates generally scored well on this question. Lower performing candidates commonly mixed up anaerobic with aerobic for the first mark point, and incorrectly identified thirty-eight instead of two ATP for the third mark point.

Question 20 (b)

(b) The image below shows an example of an energy continuum.

Show your knowledge of energy systems by placing the following sporting activities on the energy continuum.

A – A triathlon
B – A badminton smash
C – A basketball match.

[3]

This was generally well answered by most candidates, showing good knowledge of the energy systems and energy continuum.

Section C overview

This section includes one extended question worth 10 marks.

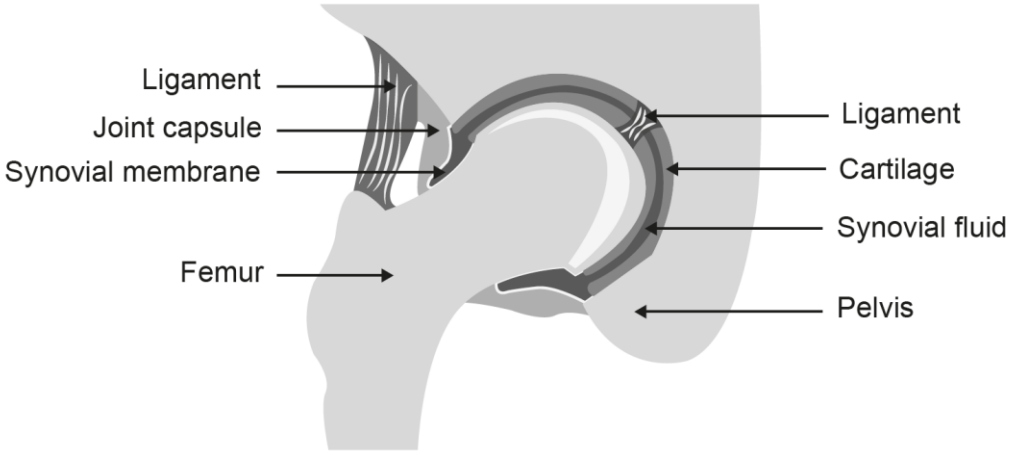
This is marked using a levels mark scheme that includes credit for the quality of written communication. There are three levels: Level 1 which shows a limited response, Level 2 which shows a competent response and Level 3 which shows a comprehensive response.

Fewer candidates overall scored in the top level (8–10 marks), with most scoring Level 1 marks (1–4 marks) or Level 2 (5–7 marks).

Many candidates seemed to find it difficult to describe the structures of synovial joints but could in many cases link to their functions, which saw many candidates scoring in the Level 1 response bracket. Those scoring well included a description of some or most of the structures identified on the image of a synovial joint, and included others which were not identified on the picture, along with specific linkage to their functions. These candidates also answered with fluency and accuracy, often developing each explanation well.

Question 21*

21* The image below shows a diagram of the synovial joint at the hip with some structures labelled.



Describe the structures of synovial joints, including other structures that have not been identified in the image.

Explain how these structures allow synovial joints to function.

[10]

This question asked for candidates to describe the structures identified in the picture of the synovial joint along with explaining each of their functions.

Many candidates were able to access Level 1 marks as they explained some or all basic functions of the identified structures of synovial joints that are shown in the picture.

Candidates who scored low marks also tended to discuss the other different types of synovial joints, for example, 'hinge' which was not required from the question. They also discussed tendons and relating structures which again were not applicable, therefore these responses were not creditworthy.

Responses that allowed candidates to access Level 2 marks often detailed that some of the identified structures had more than one function. They also applied their knowledge and understanding of synovial joints to describe structural components of these or identify structures that were not shown on the picture along with in some cases their functions.

The responses that allowed candidates to access Level 3 marks also included explanations of the functions of most, if not all, of the structures.

Exemplar 3

The ligaments attach muscle to bone this allows the movement within the joint as it allows muscles to contract. Cartilage ~~is a~~ absorbs shock and stops bones rubbing against each other this allows it to function as the bones are ~~wearing~~ wearing down by rubbing against each other. The synovial joint is ball and socket this helps with the function as the femur is round allowing the cartilage, synovial fluid and synovial membrane to attach onto it. Synovial membrane produces synovial fluid this helps with the function as the synovial fluid wouldn't be here without it. The synovial fluid acts as a lubrication between the bones to allow them to glid against each other smoothly. Joint capsule holds the synovial fluid in this helps with the function as the synovial fluid would escape and not be effective in the joint.

Exemplar 3 shows a typical Level 1 response. The response achieved 3 marks as the candidate has given two development points for cartilage along with one each for the synovial membrane and synovial fluid. The information provided for the joint capsule was judged to be too vague for extra credit and there are no descriptions provided relating to the structure of cartilage, synovial membrane or synovial fluid.

Copyright information

Question 12: Image human muscle anatomy, © (Modified) Shutterstock 116241661 by Ramona Kaulitzki

Question 13: Young woman playing volleyball, © Shutterstock 653825131 by Boris Ryaposov

Question 15 (a): Heart anatomy cross section part, © (Modified) Shutterstock 1720336468 by pr_camera

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