



Mark Scheme

CTEC L3 Sport and Physical Activity

Unit 1 (Body systems and the effects of physical activity)

Please read before distributing to students.

Purpose of this document

This document and the associated question paper are based on the data analysis performed by The EverLearner Ltd and published within the 2024 infographics. Please, note the following:

- We believe this mark scheme has a very strong association with previous CTEC L3 Sport and Physical Activity Unit 1 exams in relation to command terms, skills, AO distribution, extended writing requirements and topics.
- However, this is categorically NOT a mark scheme for a predicted paper. No one can accurately predict an exam paper and we make no claim to this end.
- It is vital that you only use this document internally in your school/college. Publishing the document online or sharing it in any other way is strictly prohibited as this will undermine the potentially educational experiences of students in other schools/colleges.
- Finally, please check the publication dates of the model answers for this paper as well as the associated revision sessions in May.

This mark scheme contains:

- Copy of each question for reference
- Marking guidance where appropriate
- Marking points containing alternative acceptable responses plus relevant assessment objective

How should schools use this mark scheme?

The mark scheme has been constructed specifically for the exam paper used in The EverLearner's National Mock Exams from 2024. The model answers will be available in early April and many of these questions will be discussed in the live revision show provided by James Simms (Wednesday, 1st of May, 16:30-18:00 on [youtube.com/TheEverLearner](https://www.youtube.com/TheEverLearner)).

All questions/mark schemes are available on ExamSimulator. Please note, there are hundreds of additional questions and mark schemes on ExamSimulator covering the IGCSE PE topics and skills. Within the platform, the teacher is assisted with the marking and full diagnostic feedback is also provided. ExamSimulator is a premium resource available via TheEverLearner.com.

I hope this helps both students and teachers in their exam preparations.

James Simms



Subject	Physical Education
Course	Cambridge Technical (CTEC) - Sport Level 3 - Unit 1 - Body systems and the effects of physical activity
Time allowed	1 hour 30 minutes

Title	Cambridge Technical (CTEC) - Sport Level 3 - Unit 1 - Body systems and the effects of physical activity - National Mock Exam Summer 2024
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Guidance	<ul style="list-style-type: none">• This paper is marked out of 70 marks.• You have 90 minutes (plus additional time for those who have Exam Access Arrangements).• Answer all questions.• A calculator is permitted for this exam.• This paper contains one 10-mark question.• Good luck.
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Total marks	70
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1. Which one of the following muscles is highlighted?

Marking guidance

Eagle-eyed teachers and students will notice that there are two muscles highlighted. These are the iliacus and the psoas which, collectively, carry the muscle group name iliopsoas.

Marking points **(maximum 1)**

(1) [AO 2] B/Iliopsoas

2. Which one of the following bones is highlighted?

Marking points **(maximum 1)**

(1) [AO 1] D/Talus

3. The picture shows a gymnast holding the crucifix position on the rings. Which one of the following types of contraction is being used?

Marking points **(maximum 1)**

(1) [AO 2] A/Isometric/Isometric contraction

4. Which one of the following is the antagonist at the ankle when a gymnast points their toes **during the take-off** for their somersault?

Marking points **(maximum 1)**

(1) [AO 2] D/Tibialis anterior

5. Which of the following short-term cardiovascular responses to exercise does **not** increase during exercise?

Marking points **(maximum 1)**

(1) [AO 4] B/Inspiratory reserve volume

6. Which one of the following is a short-term respiratory response to exercise?

Marking points (maximum 1)

(1) [AO 4] A/Minute ventilation/Minute ventilation increases

7. Which one of the following is a short-term muscular response to exercise?

Marking points (maximum 1)

(1) [AO 2] C/Muscle fatigue

8. State the typical value and unit of the cardiac output of an untrained individual during exercise.

Marking guidance

A mark can be awarded for any number in the range. Marks can only be awarded if the correct unit (l/min) is used.

Marking points (maximum 1)

(1) [AO 3] 24 l per minute/20-25 l per minute

9. Define the term **vascular shunting**.

Marking points (maximum 1)

(1) [AO 3] Blood diverted to active areas and diverted away from inactive areas/Is the process of blood movement through vasoconstriction and vasodilation

10. State the long-term effect of regular exercise on tidal volume.

Marking points (maximum 1)

(1) [AO 4] Increases/Gets higher/Gets bigger

11. Look at the image, identify this structure in the respiratory system and describe its role.

Marking points **(maximum 3)**

- (1) [AO 4] Nasal cavity
- (2) [AO 4] Hairs filter out dust, pollen and other particles
- (3) [AO 4] Warms and moistens the air

12. Complete the paragraph below, which describes the mechanics of breathing.

Marking points **(maximum 4)**

- (1) [AO 4] A is inspiration
- (2) [AO 4] B is pressure
- (3) [AO 4] C is lower
- (4) [AO 4] D is increasing

13. The image below shows a skeleton. Identify the bones labelled **A**, **B** and **C**.

Marking points **(maximum 3)**

- (1) [AO 1] A is the clavicle
- (2) [AO 1] B is the ulna
- (3) [AO 1] C is the tibia

14. Identify **three** functions of the skeleton **other than** protection and movement.

Marking guidance

Do not accept protection or movement, as per the question.

Marking points **(maximum 3)**

- (1) [AO 1] A is irregular
- (2) [AO 1] B is sesamoid
- (3) [AO 1] C is short

15. Using the descriptions, identify the **types of bones** in the table.

Marking points (**maximum 3**)

(1) [AO 1] Shape

(2) [AO 1] Support

(3) [AO 1] Blood-cell production

(4) [AO 1] Mineral storage

16. Identify the process of movement of oxygen from the air into the blood, and of carbon dioxide from the blood into the air.

Marking points (**maximum 1**)

(1) [AO 4] Gaseous exchange

17. Describe how the structure of alveoli aids the movement of oxygen into the blood and carbon dioxide into the air.

Marking points (**maximum 3**)

(1) [AO 4] Thin walls/One-cell-thick walls

(2) [AO 4] Short diffusion pathway

(3) [AO 4] Large surface area/Millions of alveoli allows greater uptake of oxygen

(4) [AO 4] Surrounded by capillary network/Excellent blood supply

18. Describe the difference in minute ventilation between someone completing a 40-minute yoga session and someone competing in a basketball match.

Marking points (**maximum 3**)

(1) [AO 4] Yoga is lower intensity and the basketball match is higher intensity/Yoga is in the anaerobic training zone, whereas a basketball match will have parts of the game in both anaerobic and aerobic training zones

(2) [AO 4] The basketballer will have higher minute ventilation

(3) [AO 4] The yogi will have lower minute ventilation

(4) [AO 4] Yoga has lower demand for oxygen than basketball

(5) [AO 4] So less air required to enter the lungs in yoga compared to basketball

19. Explain how the mix of muscle fibre types will affect a netball player.

Marking points (**maximum 6**)

(1) [AO 2] Mix of all three muscle fibre types/Different percentage of each

(2) [AO 2] Higher percentage of Type I will be stronger at endurance activities/More Type I will aid aerobic endurance/Type 1 will allow them to last the full match

(3) [AO 2] Higher percentage of Type IIa will improve high-intensity activities/Type IIa will allow a player to keep up marking another player on the attack

(4) [AO 2] Higher percentage of Type IIb will succeed at explosive activities/Type IIb will allow them to sprint to chase a lost ball or player but will need a rest afterwards

(5) [AO 2] Different positions in netball will require a different mix of fibre types

(6) [AO 2] Centre will require higher Type IIa to continually mark and create space/GK or GS will require higher Type IIb to make explosive movements into space

(7) [AO 2] Tactics during an event may depend on mix of fibres/Teams who play fast netball will require more Type IIa and Type IIb/Teams who want to slow the play down will require a greater percentage of Type 1

20. The image shows three components of blood.

Select **two** components from the image and complete the information below.

Marking guidance

Only accept answers related to the correct image.

Marking points (maximum 4)

- (1) [AO 3] Platelets
- (2) [AO 3] Aid clotting
- (3) [AO 3] Red blood cells
- (4) [AO 3] Transport oxygen/Transport carbon dioxide
- (5) [AO 3] White blood cells
- (6) [AO 3] Help to fight bacteria and viruses

21. Explain the specific roles of the vena cava and the aorta in the transport of blood.

Marking points (maximum 4)

- (1) [AO 3] Vena cava carries deoxygenated blood
- (2) [AO 3] From the body back to the heart
- (3) [AO 3] Aorta carries oxygenated blood
- (4) [AO 3] From the left ventricle to the body

22. Describe **two** effects of a warm-up on the cardiovascular system.

Marking guidance

Marks should only be awarded for answers related to the cardiovascular system.

Marking points (maximum 2)

- (1) [AO 3] Increase in heart rate
- (2) [AO 3] Increase in stroke volume
- (3) [AO 3] Increased cardiac output
- (4) [AO 3] Vasodilation/Increased blood flow

23. Describe **two** effects of a cool-down on the respiratory system.

Marking guidance

Marks should only be awarded for answers related to the respiratory system.

Marking points (maximum 2)

- (1) [AO 4] Gradually decrease breathing rate
- (2) [AO 4] Decrease in tidal volume
- (3) [AO 4] Decrease in minute ventilation
- (4) [AO 4] Decrease in inspiratory reserve volume/Decrease in expiratory reserve volume
- (5) [AO 4] Residual volume stays the same

24. Complete the information in the table below about different types of contraction.

Marking points (maximum 4)

- (1) [AO 2] Concentric is when a muscle shortens
- (2) [AO 2] Upwards phase of a sit-up
- (3) [AO 2] Eccentric is when a muscle lengthens
- (4) [AO 2] Downwards phase of a sit-up

25. The image shows an energy continuum.

Using your knowledge of energy systems, place the named activities in the appropriate place on the continuum.

Marking points (maximum 3)

- (1) [AO 5] A is triathlon
- (2) [AO 5] B is 400m hurdles
- (3) [AO 5] C is badminton smash

26. For **two** of the named activities, justify your answer in relation to the energy continuum.

Marking points (**maximum 2**)

(1) [AO 5] Triathlon is low intensity/Long duration event/Endurance-based activity

(2) [AO 5] 400m hurdles is a higher intensity event/Lasts longer than 10 seconds so less anaerobic than badminton smash/Predominantly uses lactic acid system

(3) [AO 5] Badminton smash is a very high intensity movement/Explosive movement/Power-based activity

27. Explain the long-term adaptations to the cardiovascular and muscular systems as a result of physical activity.

Marking guidance

[10 Mark Level Descriptors](#)



Marking points (**maximum 10**)

- (1) [AO 2] Increased strength of muscles
- (2) [AO 2] Due to muscular hypertrophy
- (3) [AO 2] Stronger ligaments/Stronger tendons
- (4) [AO 2] Recruitment of muscle fibres
- (5) [AO 2] Able to recruit more type 2 muscle fibres as a result of strength training/Recruit more type 2 muscle fibres through training
- (6) [AO 2] Increased intensity of exercise due to increased muscular strength
- (7) [AO 2] Improved flexibility
- (8) [AO 2] Due to muscles becoming more elastic
- (9) [AO 2] Better flexibility due to increased range of movement at a joint
- (10) [AO 2] Less likely to suffer from injuries as a result of increased flexibility
- (11) [AO 3] Heart muscles become stronger as a result of regular exercise
- (12) [AO 3] Leading to myocardial hypertrophy/Thicker ventricular walls
- (13) [AO 3] Leading to an increase in stroke volume
- (14) [AO 3] Therefore, more blood can be pumped to working muscles during exercise
- (15) [AO 3] Increased maximal cardiac output during high intensity work
- (16) [AO 3] Lower resting heart rate/Bradycardia/Resting heart rate below 60bpm
- (17) [AO 3] Leading to a lower working heart rate when exercising/Heart becomes more efficient during exercise
- (18) [AO 3] Heart rate returns to resting rate more quickly following exercise
- (19) [AO 3] Increased capillarisation/More active capillaries
- (20) [AO 3] So more oxygen can be delivered to muscles/More oxygen can be delivered to tissues
- (21) [AO 3] Allows for increased gaseous exchange/Allows for increased diffusion

- (22) [AO 3] Vascular shunt mechanism becomes more efficient
- (23) [AO 3] Improved vasodilation and vasoconstriction
- (24) [AO 3] Increased number of red blood cells
- (25) [AO 3] Increase in haemoglobin
- (26) [AO 3] Increased haematocrit levels
- (27) [AO 3] Therefore, more oxygen can be carried to the working muscles/Therefore, the athlete will have a greater oxygen-carrying capacity
- (28) [AO 3] Reduced blood viscosity
- (29) [AO 3] More white blood cells produced/Fight infections and illnesses more effectively
- (30) [AO 3] Lower blood pressure
- (31) [AO 3] Leading to less risk of high blood pressure/Lower risk of hypertension
- (32) [AO 3] Lower systolic pressure/Lower diastolic pressure
- (33) [AO 3] Lower cholesterol, helping to prevent arteriosclerosis/Lower cholesterol means less chance of atherosclerosis
- (34) [AO 3] Reduced risk of cardiovascular disease
- (35) [AO 3] Lower chance of angina/Reduced chance of suffering a stroke/Lower chance of coronary heart disease or heart attack