



The EverLearner

National Mock Exams 2024

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Model Answers

CTEC L3 Sport and Physical Activity

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

Summer 2024

This document contains:

- Model answers for the National Mock Exam questions
- Model examples of extended writing

How should schools use these papers?

These model answers are written to support PE teachers and students review the National Mock Exam 2024 and to prepare for the live revision session delivered by James in May 2024. We strongly recommend that students learn these model answers in preparation for the summer exams 2024. The questions posed and the answers provided are based on significant analysis and model BOTH content and skills.

Please, use these model answers in combination with the National Mock Exam paper, mark scheme and the revision session (Wednesday, 1st of May 2024, 16:30-18:00), available via the CTEC L3 Sport and Physical Activity Revision page:

<https://pages.theeverlearner.com/2024-ctec-sport-and-physical-activity-revision>

All questions are taken from ExamSimulator. 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

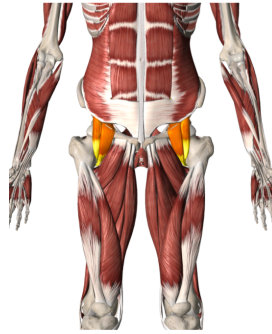
First name	
Last name	
Class	
Teacher	

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?

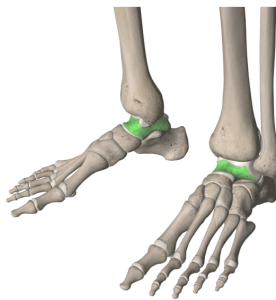


- A Gluteus medius
- B Iliopsoas
- C Erector spinae
- D Adductor magnus

My answer is: [Option B - Iliopsoas](#)

Marks: **[1]**

2. Which one of the following bones is highlighted?



- A Tarsals
- B Patella
- C Metatarsals
- D Talus

My answer is: [Option D - Talus](#)

Marks: **[1]**

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



- A Isometric contraction
- B Isotonic contraction
- C Eccentric contraction
- D Concentric contraction

My answer is: [Option A - 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?

- A Latissimus dorsi
- B Soleus
- C Gastrocnemius
- D Tibialis anterior

My answer is: [Option D - Tibialis anterior](#)

Marks: **[1]**

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

- A Heart rate
- B Inspiratory reserve volume
- C Stroke volume
- D Cardiac output

My answer is: [Option B - Inspiratory reserve volume](#)

Marks: **[1]**

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

- A** Minute ventilation increases.
- B** Tidal volume decreases.
- C** Residual volume decreases.
- D** Resting heart rate increases.

My answer is: Option A - Minute ventilation increases

Marks: **[1]**

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

- A** Muscular hypertrophy
- B** Muscular atrophy
- C** Muscle fatigue
- D** Increase in muscle fibres

My answer is: Option C - Muscle fatigue

Marks: **[1]**

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

Value: 24

Unit: l/min

Marks: **[1]**

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

When blood is redirected to areas of most need in the body such as the skeletal muscles during maximal exercise.

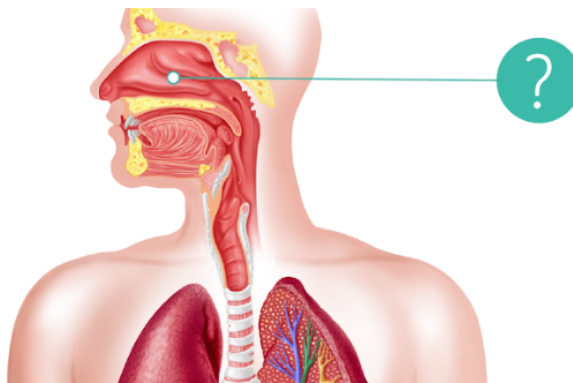
Marks: [1]

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

During exercise, tidal volume: Increases

Marks: [1]

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

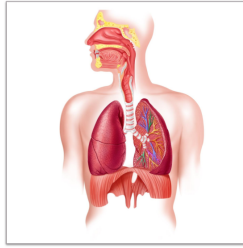


The structure is: Nasal cavity

Its role is: It uses hairs to filter out any pollutants as well as to warm the air

Marks: [3]

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



A is the process of moving air into the lungs. The **B** needs to be **C** in the lungs than in the atmosphere. The diaphragm moves upwards and outwards, **D** .. the volume of the thoracic cavity.

A: Inspiration

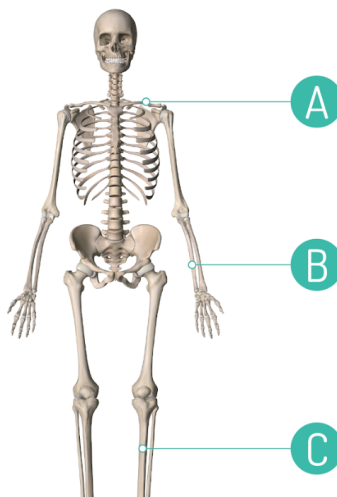
B: Pressure

C: Lower

D: Increasing

Marks: **[4]**

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



A: Clavicle

B: Ulna

C: Tibia

Marks: **[3]**

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

1: Shape

2: Support

3: Blood-cell production

Marks: [3]

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

Description	Type of bone
These bones provide protection and allow for movement.	A
These bones are found in tendons and reduce friction across a joint.	B
These bones allow fine or small movements and can provide stability.	C

A is: Irregular

B is: Sesamoid

C is: Short

Marks: [3]

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

Gaseous exchange

Marks: [1]

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

Alveoli are one-cell thick, which leads to a short diffusion pathway as well as having a very large surface area due to their globular shape. Finally, they have a partially permeable membrane which allows gas particles (O₂ and CO₂) to diffuse in both directions.

Marks: **[3]**

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

Yoga is performed at a lower intensity than basketball. The basketball player will have a higher minute ventilation during performance compared to the yogi. Basketball has a higher demand for oxygen in total and, therefore, there is a greater demand for air to be breathed in and out at the lung during performance.

Marks: **[3]**

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

A netballer needs a blend of all three types. The type I fibres with their high fatigue resistance and high aerobic capacity allow the netballer to perform across a full 60-minute game but, crucially, also to recover rapidly between anaerobic bouts. The type IIa fibres enable the netballer to attack and defend in successive moves without tiring, as they have a high anaerobic capacity. The type IIb fibres are essential for the explosive movements in netball such as jumping as high as possible to catch a looping pass into the D or sprinting to prevent the ball going out of play. Type IIb fibres are capable of very high-intensity bursts of energy which power explosive netball movements. Within netball, a centre player would benefit from a high proportion of type IIa, whereas a GK or GS may need more IIb. Finally, the tactics a team plays may influence the need for different fibre types. For example, a very explosive counter-attacking team would need players with more type IIb, whereas a team that slows the play down and keeps possession may benefit more from type IIa and even type I fibres.

Marks: [6]

20. The image shows three components of blood.

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



Component 1: Platelets

Function: clot the blood when the skin is broken

Component 2: White blood cells

Function: Part of the specific immune system and help fight infection

Marks: [4]

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

The vena cava transports deoxygenated blood from the body back to the right atrium. The aorta transports oxygenated blood from the left ventricle to the rest of the body.

Marks: [4]

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

Effect 1: Heart rate increases, which increases as a result of a greater venous return.

Effect 2: Stroke volume increases, which increases as a result of a greater venous return.

Marks: [2]

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

Effect 1: A cool-down allows for a high breathing rate to be decreased gradually rather than suddenly.

Effect 2: Gradually decreasing the depth of breathing (otherwise calculated as tidal volume).

Marks: [2]

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

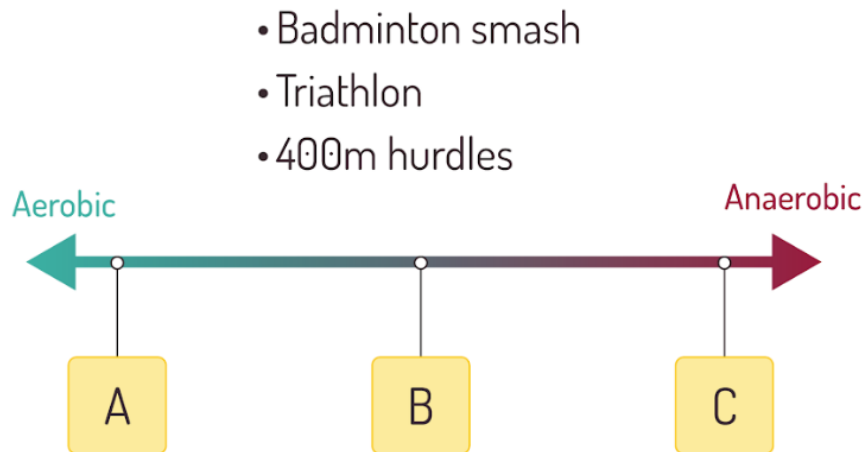
Type of contraction	Description	Example
Isometric	Muscle contracts but stays the same length, so no movement takes place.	Holding a plank
Concentric	A	B
Eccentric	C	D

- A: A concentric contraction is when a muscle shortens under tension.
- B: An example of this is what happens to the abdominal muscles in the upwards phase of a sit-up.
- C: An eccentric contraction is when a muscle lengthens under tension.
- D: An example of this is what happens to the abdominal muscles during the downward phase of a sit-up.

Marks: **[4]**

25. The image shows an energy continuum.

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



- A: Triathlon
- B: 400m hurdles
- C: Badminton smash

Marks: [3]

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

Triathlon is a low-intensity and long-duration event, so it can be considered more aerobic.
400m hurdles is much higher intensity and shorter duration (about a minute). However,
this is greater than 10 seconds so is not as high intensity as the badminton smash.

Marks: [2]

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

Training strengthens the skeletal muscles which hypertrophy as a result of the storage of more anaerobic reactants such as glucose. Furthermore, the tendons which transmit force from the muscles to the skeleton also thicken and strengthen and are able to transmit greater amounts of force more efficiently. Moreover, the recruitment of type IIb fibres improves and this allows a performer to achieve greater force of muscular contractions during training and, therefore, adapt more. But the muscular system does not only become stronger. It also becomes more pliable, allowing a performer to move through a greater range of motion and this, in turn, helps to prevent soft-tissue and joint injuries, especially within dynamic performances. The cardiovascular system improves in many ways including the hypertrophy of the heart, which grows in order to generate more force. This causes an increase in both resting and maximal stroke volume, which means that resting heart rate (RHR) can fall in order to maintain cardiac output. If RHR falls below 60bpm, this is considered bradycardia and is indicative of a well-trained individual. A lower RHR is important, as it means the performer has a greater exercising heart rate range. Furthermore, the individual's heart rate recovery becomes faster and steeper, which means that they can perform more reps in training per unit of time, for example. Capillary beds grow thicker around tissues such as the alveoli and also the muscle tissue which causes a greater rate of diffusion and, therefore, more aerobic respiration being possible at higher intensities of exercise. Finally, the blood itself changes a little. There is a growth in red blood cells and this allows for greater oxygen transportation. All of this combined leads to a more efficient muscular and cardiovascular system and allows an athlete to perform better, train harder and recover faster during performance and training bouts.

Marks: **[10]**