The EverLearner

National Mock Exams 2024

POWERED BY ExamSimulator

Model Answers

BTEC Level 3 Sport Unit 1

(Anatomy and Physiology)

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 (Thursday, 2nd of May 2024, 15:00-16:30), available via the BTEC L3 Sport Revision page:

https://pages.theeverlearner.com/2024-btec-sport-L3-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

The EverLearner

Subject	Physical Education
Course	BTEC Level 3 Sport: Unit 1 Anatomy and Physiology
Time allowed	1 hour 30 minutes

First name	
Last name	
Class	
Teacher	

Title	BTEC Level 3 Sport Unit 1 Anatomy and Physiology National Mock Exam Summer 2024

Guidance	• This paper is marked out of 80 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 8-mark question. • Good luck.

Total marks	80

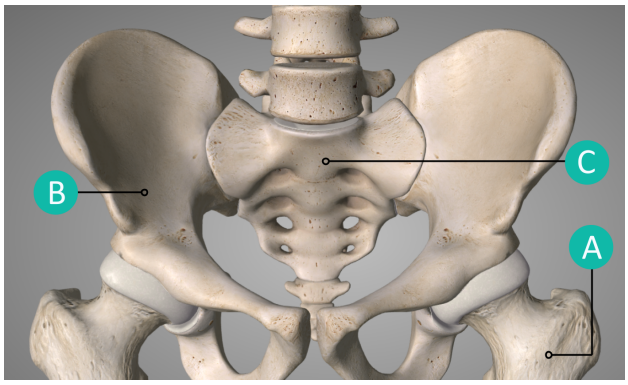
1. Describe **two** functions of long bones.

Function 1: Long bones are used to provide leverage

Function 2: Long bones produce red blood cells

Marks: [2]

2. Identify the three bones labelled on this image.



A: Femur
B: Pelvis
C: Sacrum

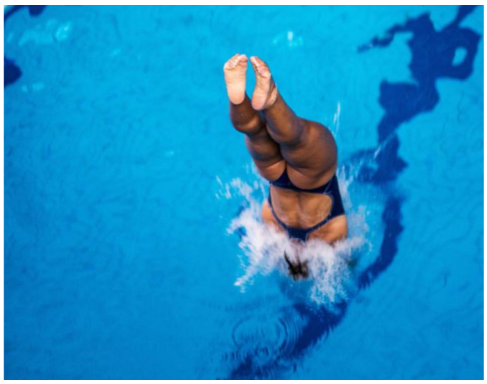
Marks: [3]

3. Protection, support and store of minerals are all functions of the skeleton. Identify **one** other function of the skeleton.

Muscle attachment

Marks: [1]

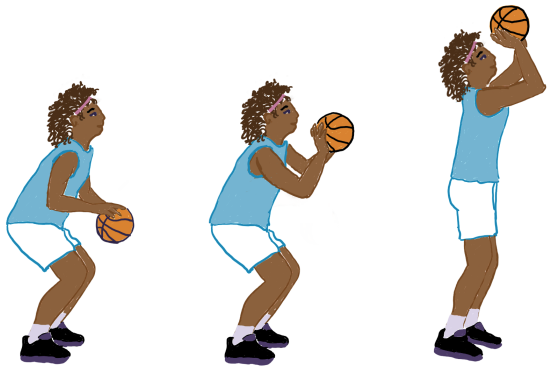
4. Look closely at this image. Explain how the skeleton protects the performer during entry to the water in a high dive.



Upon entry, the cranium protects the brain as their head hits the water. The ribs protect the heart and lungs upon impact and the pelvis protects the reproductive organs of the diver as they hit the water.

Marks: [3]

5. Look closely at this image. Explain how movements at the knee **and** ankle allow the player to take a successful free throw.



During the preparation phase of the free throw, dorsiflexion occurs at the ankle joint due to the tibialis anterior contracting to keep the player in a stable position. As the player executes the shot, plantar flexion occurs at the ankle joint, with the gastrocnemius contracting as the player comes up on their toes to gain maximum height. Also during the execution phase, there is extension at the knee joint from the quadriceps contracting, which allows the player to straighten their legs as they take the shot, creating power in the legs.

Marks: **[3]**

6. Describe adaptations to the muscular system as a result of regular circuit training.

Regular circuit training will result in muscular hypertrophy, which is an increase in muscle size. There will also be a strengthening of the tendons, which attach muscle to bone. This helps to stabilise joints. Regular circuit training will also result in an increase in mitochondria, which benefits energy production.

Marks: **[3]**

7. Identify the muscle group highlighted in this image.

Gluteals

Marks: [1]

8. Explain the role of this muscle group during a kick in taekwondo.

The gluteals act as the agonist during hip extension to pull the leg back during a kick.
They are the antagonist during hip flexion, when the leg kicks forwards during a kick.

Marks: [2]

9. Describe **two** responses of the muscular system to a single exercise session.

Response 1: During a single exercise session, the muscles will receive an increased blood supply in order to get sufficient oxygen to keep exercising.

Response 2 A single exercise session also leads to an increase in muscle pliability.

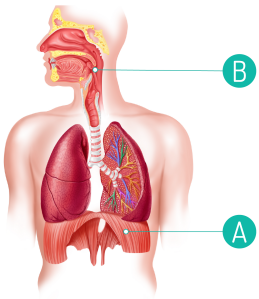
Marks: [2]

10. Name the muscle fibre type that would be **most** beneficial to a marathon runner.
Justify your choice.

Muscle fibre type: Type 1 muscle fibre (slow oxidative)
Justification: This muscle fibre type has a high resistance to fatigue, so will help the marathon runner to keep repeating the action of running without tiring. The muscle fibre type also has a high aerobic capacity, which is most beneficial as marathon running is mainly an aerobic event.

Marks: **[3]**

11. Identify the **two** parts of the respiratory system labelled in this image.



A: Diaphragm
B: Pharynx

Marks: **[2]**

12. Describe residual volume.

The amount of air left in the lungs after fully exhaling

Marks: **[1]**

13. Explain the mechanics of breathing during **inspiration** whilst exercising.

During inspiration whilst exercising, the diaphragm contracts and flattens and the intercostal muscles also contract. This lifts the rib cage up and outwards to increase the volume of the thoracic cavity.
When exercising, the sternocleidomastoid and the pectorals are also recruited to help increase the volume of the thoracic cavity further.

Marks: **[3]**

14. Explain how breathing rate is controlled during exercise.

During exercise, breathing rate is controlled through neural and chemical control.
Chemoreceptors detect a change in partial pressure of gases and send a signal to the medulla oblongata.
Messages are then relayed to the respiratory muscles and the diaphragm and intercostal muscles contract with more force, allowing more oxygen to enter the lungs and more carbon dioxide to be removed.

Marks: **[4]**

15. Explain why a coach would encourage an endurance athlete to attend a high-altitude training camp.

By attending a high-altitude training camp, the endurance athlete will be given time to acclimatise to the conditions which will help them prepare for competition. This acclimatisation process will minimise the impact of decreased partial pressure of oxygen at high altitude.
High-altitude training will increase the production of red blood cells, which will assist the athlete in delivering oxygen to the working muscles. Altitude training also helps to stabilise breathing rate and ventilation for the athlete. By acclimatising through the training camp, the athlete will reduce the chances of altitude sickness occurring, which could disrupt training and competition. Improved sleep patterns as a result of the camp is also of benefit to the athlete.

Marks: **[6]**

16. Describe **three** features of veins.

Feature 1: Veins have thin walls due to carrying blood at low pressure
Feature 2: They have valves to prevent the backflow of blood
Feature 3: They have a large lumen

Marks: **[3]**

17. Cardiac hypertrophy and a decrease in resting heart rate are two cardiovascular adaptations to exercise.
Identify **three** other adaptations.

Increase in stroke volume. Decrease in heart-rate recovery time and reduction in resting blood pressure.

Marks: **[3]**

18. Explain how blood flow is redirected in response to exercise.

Blood flow is redirected during exercise via the vascular shunt mechanism. Blood is shunted towards skeletal muscle and away from other organs in the body. This process occurs through the vasodilation of arterioles towards the working muscles, which increases blood flow. The arterioles towards other organs in the body vasoconstrict, restricting blood flow to these areas.

Marks: **[4]**

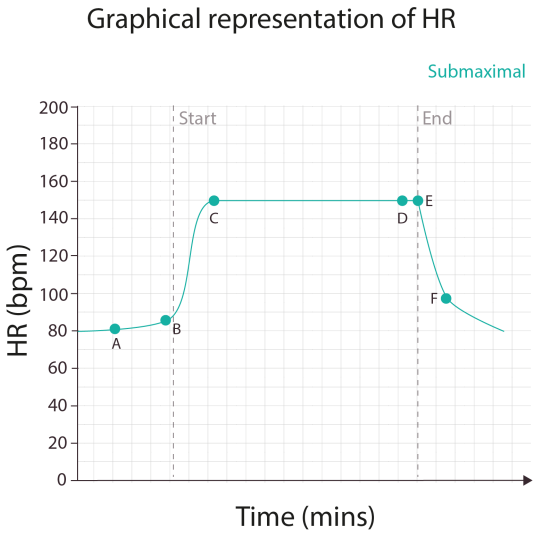
19. Describe the role of Purkinje fibres **and** the sinoatrial node as part of the conduction system.

Purkinje fibre: Purkinje fibres distribute an electrical impulse through the ventricle walls and this causes the ventricle walls to contract

Sinoatrial node: The sinoatrial node generates an electrical impulse and fires the impulse through atria walls. The firing rate of the sinoatrial node will determine heart rate.

Marks: **[4]**

20. Look closely at this line graph, which shows the heart rate of a performer before, during and after a continuous training session.
Analyse the performer's heart rate at points A-B ,C-D and E-F.



A-B: A-B is an anticipatory rise in heart rate due to the release of adrenaline in anticipation of starting the activity

C-D: C-D: the heart rate is at a steady state, as there is sufficient oxygen supply to the working muscle, so the heart rate "plateaus".

E-F: E- F: there is a rapid decrease in heart rate as exercise has ceased and the performer is entering recovery.

Marks: **[6]**

21. Describe the ATP-PC energy system.

The ATP-PC system is used during high-intensity activity. Creatine kinase is released and this triggers the breakdown of phosphocreatine (PC), which releases energy. The energy release resynthesises ATP and this happens through a coupled reaction.

Marks: **[4]**

22. Identify the three stages of the **aerobic system**.

Stage 1: Aerobic glycosis
Stage 2: Kreb's cycle
Stage 3: Electron transport chain

Marks: **[3]**

23. Evaluate the use of the aerobic energy system for the long jump.

The aerobic system is used for low-intensity work, usually between three minutes and two hours in duration. However, the long-jump is an event that is short in duration and involves high-intensity, explosive movements. As a result, the aerobic system cannot power the intense movements involved in long jump and would be used mainly by endurance athletes. Although the aerobic system is not useful for executing a jump, it could be argued that the aerobic system is used during recovery between jumps and through the duration of a whole competition. A long jumper would most likely prioritise training their lactate system and ATP-PC system over the training of their aerobic system.

Marks: [6]

24. Look closely at this image.
Analyse the role of the musculoskeletal system at the shoulder and elbow joints to allow the performer to propel the javelin.

During the javelin throw, elbow extension occurs through the triceps contracting, allowing the thrower to pull the javelin backwards in preparation for the throw. At the same time, shoulder extension is also occurring due to the deltoids contracting, again allowing the javelin to be pulled backwards in the approach to the throw.
At the point of release, elbow flexion and shoulder flexion occur through the biceps and pectorals contracting respectively. These contractions allow the thrower to pull the javelin through, past their head and propel the javelin towards its target.
These movements are able to happen due to tendons attaching muscles to bones, so the musculoskeletal system can work together in the throw. The skeleton also provides broad surfaces for muscle attachment, so the muscles can pull the skeleton to create movement. The skeleton is also able to provide protection to the muscles involved in the javelin throw to prevent muscle damage.
Meanwhile, muscles such as the biceps, triceps, pectorals and deltoids provide the force of contraction to create movement of the skeleton, to flex and extend at the elbow and shoulder.

Marks: [8]