The EverLearner

National Mock Exams 2024

POWERED BY ExamSimulator

Model Answers

BTEC Nationals Sport and Exercise Science
Unit 2 (Functional Anatomy)

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 BTEC L3 Sport and Exercise Science Revision page:

https://pages.theeverlearner.com/2024-btec-sport-and-exercise-science-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 and Exercise Science: Unit 2 Functional Anatomy
Time allowed	1 hour 30 minutes

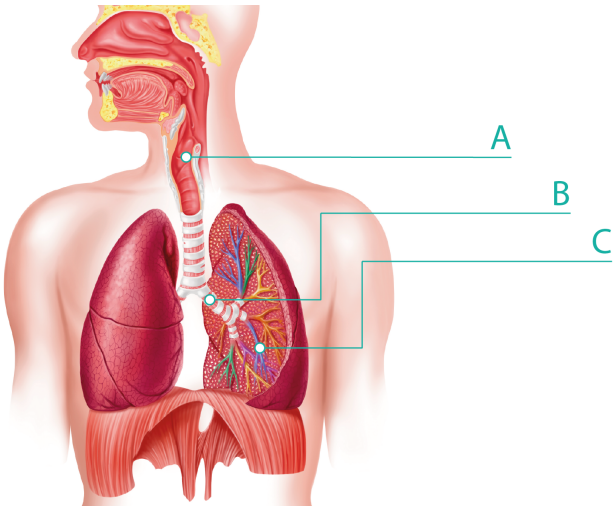
First name	
Last name	
Class	
Teacher	

Title	BTEC Level 3 Sport and Exercise Science - Unit 2 Functional Anatomy - National Mock Exam Summer 2024

Guidance	• This paper is marked out of 60 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 two 8-mark questions and one 14-mark question. • Good luck.

Total marks	60

1. Look at the image of the respiratory system.
Identify the components labelled A, B and C.



A: Trachea
B: Bronchi
C: Bronchioles

Marks: **[3]**

2. Describe the role of the **internal** intercostal muscles during **expiration**.

During expiration, the internal intercostal muscles contract, reducing the volume of the thoracic cavity to force air out more quickly.

Marks: **[3]**

3. State **one** function of the tricuspid valve.

The function is: Prevent the backflow of blood into the right atrium.

Marks: **[1]**

4. State **one** function of the pulmonary artery.

The function is: Carry deoxygenated blood from the right ventricle to the lungs.

Marks: [1]

5. Describe protraction of a joint.

Protraction occurs at the shoulder when the shoulders are brought forwards.

Marks: [2]

6. State **two** types of movement at the hip when moving along the frontal plane.

Movement 1: Abduction
Movement 2: Adduction

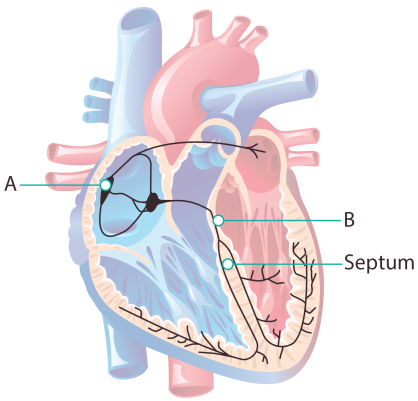
Marks: [2]

7. Review the image of a squat.
Explain the type of muscle contraction in the **quadriceps** when moving to position **B**.

Type of contraction: Eccentric contraction
Explanation: The quadriceps are eccentrically contracting as the muscle group is under tension and lengthening to control the movement of the squat.

Marks: [3]

8. Look at the image of the cardiac cycle.
Identify the components labelled A and B.



A: AV node
B: Bundle of His

Marks: [2]

9. Describe the role of the Purkinje fibres during the cardiac cycle.

Purkinje fibres The Purkinje fibres carry the nerve impulse into the ventricles. This causes ventricular contraction and blood is ejected from the heart.

Marks: **[3]**

10. Review the table. Identify A and B.

Lung volumes during exercise

Lung volume	Description	Response to exercise
Tidal volume	Amount of air inspired and expired per breath	A
Residual volume	B	Remains the same

A: Increase

B: The amount of air left in the lungs after maximum expiration

Marks: **[2]**

11. State one reason why residual volume remains constant during exercise.

To prevent a collapsed lung.

Marks: **[1]**

12. Protection is a function of the skeletal system.
Explain why protection is necessary in rugby.

The flat bones of the skeletal system are responsible for protection. For example, the cranium can protect the brain in a game of rugby from an arm in the face during a high tackle. The ribs and sternum protect the heart and lungs when a player dives forwards with their chest down to score a try.

Marks: [3]

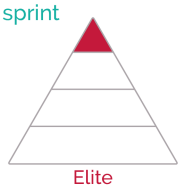
13. Explain why type IIx **and** type IIa muscle fibres are recruited in a 400m sprint race.

Shelley

Sport: 400m sprint

Age: 18

Level:



Intensity: 9/10

Duration (min): <1

Injury: 8/10 (ITBS)

Competitive orientation: 10/10

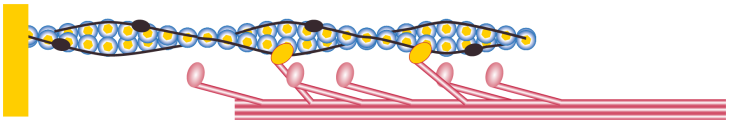
Type IIx: Type IIx muscle fibres have a high force of contraction and are recruited in 400m in order to get an explosive start to a race, when pushing out of the blocks.

Type IIa: Type IIa muscle fibres have a high resistance to fatigue and are recruited in 400m to maintain speed for the majority of the race without tiring.

Marks: **[4]**

14. Analyse how the sliding filament theory accounts for muscle contraction.

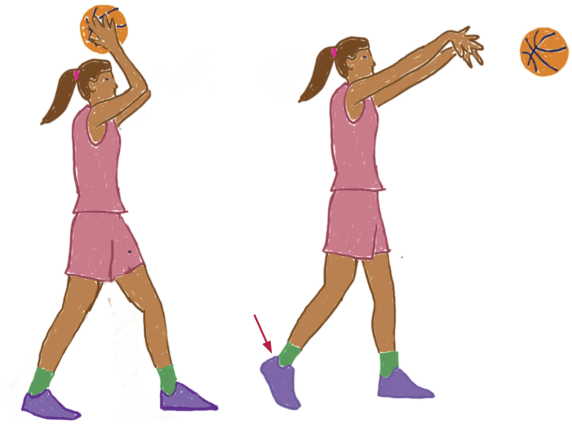
Sliding filament theory



The sliding filament theory states that action potential is achieved through a nerve impulse. This impulse triggers the release of calcium ions from the sarcoplasmic reticulum. The calcium binds with troponin and this leads to tropomyosin being moved away from actin. The binding sites on actin are therefore exposed, which leads to actin and myosin connecting and crossbridges are formed. A process of attachment and reattachment occurs with the use of ATP, pulling Z lines closer together and causing the sarcomere to shorten.

Marks: [8]

15. Review the image of an athlete completing an overhead pass.
Analyse how the axial and appendicular **skeletons** allow the movement necessary at the:
-Elbows
-Wrists
-Right ankle to move from preparation to execution



Elbows: In order to complete a successful overhead pass, elbow extension occurs. The elbow is a hinge joint, where the articulating bones are the humerus and radius. Elbow extension takes place on the sagittal plane as the ball moves from behind the player's head to the point of releasing the pass.

Wrists: The wrist is a condyloid joint and the articulating bones are the carpals and radius. Wrist flexion occurs on the sagittal plane as the pass is executed as the ball is flicked out of the hands.

Right ankle: The right ankle is a hinge joint and the articulating bones are the tibia and tarsals. Plantar-flexion occurs as the ball is released to allow the player to go up onto their toes to get maximum height and stay balanced as the ball is passed.

Marks: **[8]**

16. Review the image of a deadlift.

Analyse the required movement necessary at the:

-Trunk

-Hips

-Knees for the athlete to move from preparation to execution

Trunk: The trunk is a gliding joint and movement of the trunk remains similar throughout the deadlift, though there is slight extension of the trunk as execution takes place. The trunk keeps the performer's core stable as they lift the weight, with the erector spinae concentrically contracting as the agonist and the rectus abdominis relaxes as the antagonist.

Hips: For the performer to complete the deadlift, extension is required at the hip. The hip is a ball-and-socket joint, where the articulating bones are the pelvis and femur. Hip extension takes place on the sagittal plane as the performer moves from preparation to execution. Hip extension allows the performer to drive their legs upwards in an explosive movement to assist in lifting the weight. The gluteus maximus contracts concentrically and is the agonist in this movement, whilst the iliopsoas is the antagonist.

Knees: At the knee joint, extension is also required to execute the deadlift. The knee is a hinge joint and movement is on the sagittal plane. For extension to occur at the knee, the quadriceps are the agonist and they contract concentrically, whilst the hamstrings are the antagonist. Extension at the knee allows the performer to straighten their legs as the weight is lifted upwards.

Marks: [14]