



The EverLearner

National Mock Exams 2024

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Mark Scheme

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

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 BTEC Nationals Sport and Exercise Science Unit 2 exams in relation to command terms, skills, 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, 15:00-16:30 on 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	BTEC Level 3 Sport and Exercise Science: Unit 2 Functional Anatomy
Time allowed	1 hour 30 minutes

Title	BTEC Level 3 Sport and Exercise Science - Unit 2 Functional Anatomy - National Mock Exam Summer 2024
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Guidance	<ul style="list-style-type: none">• 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.
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Total marks	60
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1. Look at the image of the respiratory system.
Identify the components labelled A, B and C.

Marking guidance

Do not accept the answer linked to the wrong letter. For example, "A is the bronchioles" is wrong.

Marking points (maximum 3)

- (1) [AO 1] A is a the trachea/A trachea
- (2) [AO 1] B is the bronchi/B bronchi/B bronchus
- (3) [AO 1] C is the bronchioles/B bronchioles

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

Marking points (maximum 3)

- (1) [AO 1] Internal intercostal muscles contract/Contraction
- (2) [AO 1] Reduce the volume of the thoracic cavity
- (3) [AO 1] Increase the pressure in the thoracic cavity
- (4) [AO 1] To force air out quicker

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

Marking guidance

Do not accept general descriptions of the role of valves. Answers must relate to the tricuspid valve specifically.

Marking points (maximum 1)

- (1) [AO 1] Prevent backflow of blood into the right atrium/Ensure blood flows in one direction between the right atrium and right ventricle
- (2) [AO 1] Controls blood flow in the right side of the heart

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

Marking guidance

Do not accept "carry deoxygenated blood" on its own. This could be the case for the vena cava.

The answer must include the direction (for example, **from the right ventricle towards the lungs**).

Marking points (maximum 1)

(1) [AO 1] Carry deoxygenated blood from the right ventricle to the lungs

5. Describe protraction of a joint.

Marking points (maximum 2)

(1) [AO 2] Protraction occurs in the shoulders/Shoulder joint

(2) [AO 2] As they are moved towards the front of the body/Bringing the shoulders forwards

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

Marking points (maximum 2)

(1) [AO 1] Abduction

(2) [AO 1] Adduction

7. Review the image of a squat.

Explain the type of muscle contraction in the **quadriceps** when moving to position **B**.

Marking points (maximum 3)

(1) [AO 2] Quadriceps are contracting eccentrically/Eccentric muscle contraction

(2) [AO 2] Muscle under tension and lengthening

(3) [AO 2] To control the movement/Lower into the squat position/Act as a brake

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

Marking points **(maximum 2)**

(1) [AO 1] A is the atrioventricular node/AV node/AVN

(2) [AO 1] B is the bundle of His

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

Marking points **(maximum 3)**

(1) [AO 1] Purkinje fibres carry the nerve impulse into the ventricles

(2) [AO 1] Causing ventricular contraction/Ventricular systole

(3) [AO 1] Blood ejected from the heart

10. Review the table. Identify A and B.

Marking guidance

Please note that residual volume does decrease slightly at maximal exercise but that Edexcel require it to be a static value. Therefore, to ensure that no confusion was caused, we included Edexcel's interpretation.

Marking points **(maximum 2)**

(1) [AO 1] A is increase

(2) [AO 1] B is the amount of air left in the lungs after maximum expiration

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

Marking points **(maximum 1)**

(1) [AO 2] Prevent a collapsed lung/Prevent damage to the alveoli

12. Protection is a function of the skeletal system.

Explain why protection is necessary in rugby.

Marking guidance

Accept one mark for linking protection to flat bones.

Award a further two marks: one for a clear example of a flat bone and a linked mark to a clear example in rugby. The marking points are merely examples. Please accept specific links to protection in rugby.

Marking points (maximum 3)

- (1) [AO 1] Protection occurs through flat bones
- (2) [AO 2] Such as the cranium protecting the brain
- (3) [AO 2] To avoid injury to the brain from contact on a tackle
- (4) [AO 2] Such as the sternum protecting the heart and lungs
- (5) [AO 2] To avoid a fatal injury when players hit the chest area in a tackle

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

Marking points (maximum 4)

- (1) [AO 2] Type IIx muscle fibres are required for an explosive sprint start/To push off the starting blocks
- (2) [AO 3] Due to their high force of contraction/High speed of contraction/Exert the largest force
- (3) [AO 2] Type IIa muscle fibres are required to maintain speed throughout the entire race/Sprint for up to one minute
- (4) [AO 3] Due to their moderate resistance to fatigue/Oxidative capabilities with high levels of glycogen

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

Marking guidance

[8-Mark Level Descriptors](#)



Marking points (**maximum 8**)

- (1) [AO 3] Action potential is achieved from a nerve impulse
- (2) [AO 3] Triggers the release of calcium ions from the sarcoplasmic reticulum
- (3) [AO 3] Calcium binds with troponin
- (4) [AO 3] To change the shape of tropomyosin/Troponin moves the tropomyosin away from the actin
- (5) [AO 3] Binding sites on the actin are therefore exposed
- (6) [AO 3] Leading to the actin and myosin connecting/Cross-bridges are formed
- (7) [AO 3] Process of attach and reattach takes place with the use of ATP/ATP breakdown releases energy to break the cross-bridge
- (8) [AO 3] Pulling the Z lines close together
- (9) [AO 3] Causing the sarcomere to shorten
- (10) [AO 3] Known as a ratchet mechanism/Power stroke
- (11) [AO 3] H zones disappears
- (12) [AO 3] Occurs across the whole myofibril

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

Marking guidance

[8-Mark Level Descriptors](#)



Marking points (**maximum 8**)

(1) [AO 3] Elbow is a hinge joint

(2) [AO 3] Articulating bones at the elbow are the humerus and radius

(3) [AO 3] The movement at the elbows is extension to be able execute the pass/Movement at the elbows is extension

(4) [AO 3] Elbow movement takes place in the sagittal plane

(5) [AO 3] Wrist is a condyloid joint

(6) [AO 3] Articulating bones at the wrist are the radius and carpals

(7) [AO 3] The movement at the wrist is flexion to be able to execute the pass/Movement at the wrists is flexion/At the wrist there is slight rotation

(8) [AO 3] Wrist flexion takes place in the sagittal plane/Wrist pronation takes place in the transverse plane

(9) [AO 3] Right ankle is a hinge joint

(10) [AO 3] Articulating bones at the ankle are the tibia and tarsals

(11) [AO 3] The movement at the right ankle is plantar flexion as the heel comes off the floor/Movement at the right ankle is plantar flexion

(12) [AO 3] Ankle movement takes place in the sagittal plane

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

Marking guidance

[14-Mark Level Descriptors](#)



Marking points (**maximum 14**)

(1) [AO 3] Trunk is a gliding joint/Cartilaginous joint

(2) [AO 3] Articulating bones at the trunk are the vertebrae

(3) [AO 3] The movement at the trunk remains the same/Slight extension to move the trunk upright

(4) [AO 3] Trunk movement takes place in the sagittal plane

(5) [AO 3] Agonist muscle is the erector spinae/Erector spinae contracts and shortens as the agonist

(6) [AO 3] Antagonist muscles is the rectus abdominis/Rectus abdominis relaxes and lengthens as the antagonist

(7) [AO 3] Muscle contraction of the erector spinae is isotonic concentric/Isometric muscle contraction will be used in the muscles to keep the core stable

(8) [AO 3] Hip is a ball-and-socket

(9) [AO 3] Articulating bones at the hip are the pelvis and femur

(10) [AO 3] The movement at the hip is extension to drive the weight from the floor

(11) [AO 3] Hip movement takes place in the sagittal plane

(12) [AO 3] Agonist muscle is the gluteus maximus/Gluteus maximus contracts and shortens as the agonist

(13) [AO 3] Antagonist muscle is the iliopsoas/Iliopsoas relaxes and lengthens as the antagonist

(14) [AO 3] Muscle contraction of the gluteus maximus is isotonic concentric

(15) [AO 3] Knee is a hinge joint

(16) [AO 3] Articulating bones at the knee are the femur and tibia

(17) [AO 3] The movement at the knees is extension to straighten the legs

(18) [AO 3] Knee movement takes place in the sagittal plane

(19) [AO 3] Agonist muscles are the quadriceps/Quadriceps contracts and shortens as the agonist

(20) [AO 3] Antagonist muscles are the hamstrings/Hamstrings relax and lengthen as the antagonist

(21) [AO 3] Muscle contraction of the quadriceps is isotonic concentric