The EverLearner

National Mock Exams 2024

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Mark Scheme
Edexcel A-level PE - Paper 1

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 Edexcel A-level PE Paper 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 April/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 (**Tuesday 30th of April, 16:30-18:00** 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

The EverLearner

Subject	Physical Education
Course	Edexcel Linear GCE PE Scientific Principles
Time allowed	2 hours 30 minutes

Title	Edexcel A-level PE Paper 1 Scientific Priciples National Mock Exam 2024

Guidance	• This paper is marked out of 140 marks. • You have 150 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 15-mark questions and five 8-mark questions. • Good luck.

Total marks	140

1. Define the following movements:
Adduction.
Rotation

Marking guidance

Correct answers must be related to the correct movement. For example, do not accept that rotation is movement towards the midline.

Accept the words "rotating" or "rotation" within a definition of rotation only if it is used in relation to an axis or around an axis.

Marking points **(maximum 2)**

(1) [AO 1] Adduction is movement towards the midline of the body/Towards the midline

(2) [AO 1] Rotation is the movement of a long bone around its longitudinal axis/Rotating around an axis

2. Summarise **three** different types of contraction and provide a suitable sporting example of each.

Marking guidance

Named examples of muscles should link to a movement. Marks can be given for a suitable sporting example without the correct definition.

Marking points **(maximum 6)**

(1) [AO 1] Isometric contraction involves the muscle remaining the same length when under tension/Muscle shortening under tension/Muscle staying the same length while contracting

(2) [AO 2] Rectus femoris during a badminton receiver's ready position/Erector spinae of a gymnast performing an arabesque balance/Deltoid of a prop forward during the initial shove in a scrum

(3) [AO 1] Isotonic concentric involves the muscle shortening while contracting/Muscle shortening under tension

(4) [AO 2] Biceps brachii during the upward phase of a bicep curl/Triceps brachii during the upward phase of a push-up

(5) [AO 1] Isotonic eccentric involves the muscle lengthening while contracting/Muscle lengthening under tension

(6) [AO 2] Triceps brachii during the downward phase of a bicep curl

3. Outline the functions of **four** anatomical structures of the respiratory system.

Marking guidance

Functions must relate to the correct anatomical structures. Answers are restricted to the respiratory system (nasal cavity to the alveoli), so do not accept diaphragm and intercostals, as they are involved in ventilation.

Marking points **(maximum 4)**

(1) [AO 1] Nasal cavity warms the air/Filters the air/Moistens the air

(2) [AO 1] Larynx contains vocal cords/Manipulates pitch and volume

(3) [AO 1] Pharynx receives food from mouth/Also moistens the air

(4) [AO 1] Trachea provides air flow to bronchi/Allows air to travel to bronchi

(5) [AO 1] Bronchus is the passageway to the lungs/Splits air into left and right passages/Enters left and right lung

(6) [AO 1] Bronchioles are the passageways to the alveoli/Sub-branches

(7) [AO 1] Alveoli allow gaseous exchange/Exchange of oxygen and carbon dioxide/Gaseous exchange

4. Summarise the vascular shunt mechanism.

Marking guidance

Vasoconstriction and vasodilation need to be described. Do not accept them if just listed.

Marking points **(maximum 4)**

(1) [AO 1] Blood is redistributed to match demands/Increased demand for oxygen in some areas of the body

(2) [AO 1] Vasoconstriction happens at areas of lower demand/Narrowing of arteries or arterioles

(3) [AO 1] Precapillary sphincter constricts to reduce blood flow in areas not needed/Blood is shunted through the central capillary/Does not pass through whole capillary bed

(4) [AO 1] Inactive muscles such as digestive system are areas where less blood flow is needed

(5) [AO 1] Vasodilation is the widening of arteries or arterioles/Happens at active areas

(6) [AO 1] Working muscles are areas where more blood flow is needed

(7) [AO 1] Precapillary sphincter dilates to increase blood flow to working muscles

5. Outline the process of wave summation **and** its role in controlling the strength of a muscular contraction.

Marking points **(maximum 5)**

(1) [AO 1] Wave summation is when repeated signals are received without time for full relaxation

(2) [AO 1] Wave summation uses greater frequency of impulses

(3) [AO 1] Each subsequent impulse is more powerful

(4) [AO 1] Until maximal contraction is achieved

(5) [AO 1] State of tetanus

(6) [AO 1] Allows a performer to contract a muscle with different levels of force

(7) [AO 1] Varying levels of force allow a skill to be adapted

6. Describe strategies that a coach may encourage their athletes to use in order to speed up the recovery process after physical activity.

Marking points **(maximum 4)**

(1) [AO 1] Use of cooling aids such as ice baths/Cryotherapy chamber using a very low temperature/Cooling jacket which can surround the body

(2) [AO 1] Active recovery between sessions such as peripheral training/Cool-down after the session such as gentle jogging

(3) [AO 1] Appropriate rest periods before the next training session/Appropriate rest before training again/Sufficient rest before the next game

(4) [AO 1] Massage or foam roller to manipulate the muscles worked

(5) [AO 1] Appropriate nutrition after performance such as rehydrating with water/Using protein supplements such as a shake/Replenishing carbohydrates after exercise

(6) [AO 1] Use of compression clothing such as tights

7. Summarise the structural and functional responses of the cardiovascular and respiratory systems when warming up prior to physical activity.

Marking guidance

Answers should infer an increase or decrease in the structural or functional characteristic. For example, an increase in tidal volume or a decrease in inspiratory and expiratory reserve volumes.

Marking points **(maximum 6)**

(1) [AO 1] Increased ventilation/Increased tidal volume/Decreased inspiratory and expiratory reserve volumes

(2) [AO 1] Increased frequency of breathing/Breathing faster

(3) [AO 1] Increased cardiac values/Increased stroke volume/Increased heart rate

(4) [AO 1] Increased blood pressure/Increased power of myocardial contraction

(5) [AO 1] Increased venous return/Efficient return of blood to the heart

(6) [AO 1] Vasodilation to increase blood flow to working muscles

(7) [AO 1] Vasoconstriction to reduce blood flow to areas not required

(8) [AO 1] Increased ejection fraction/Decreased end-systolic volume

(9) [AO 1] Greater filling of the heart/Increased end diastolic volume

8. Identify the lever system operating at the elbow when throwing a javelin **and** what acts as:
The fulcrum
The effort
The load

Marking guidance

Award one mark for identifying the correct lever and one mark for each element correctly identified.

Marking points **(maximum 4)**

(1) [AO 1] First-class lever/Class 1/First class

(2) [AO 1] Fulcrum is the elbow joint

(3) [AO 1] Effort is the contraction of the triceps brachii

(4) [AO 1] Load is the weight of the javelin/Weight of the arm and the javelin

9. Summarise the possible benefits of a named sports supplement to a performer.

Marking guidance

Only award marks for benefits linked to a named sports supplement (for example, linking caffeine to increased mental alertness).

Marking points **(maximum 3)**

(1) [AO 1] Isotonic/Hypertonic/Hypotonic drinks can improve hydration

(2) [AO 1] Caffeine can enhance metabolic processes/Improve alertness/Enable faster information processing

(3) [AO 1] Creatine/Creatine monohydrate can enhance energy stores/Increase PC stores

(4) [AO 1] Protein supplements/Whey protein/Glutamine increases rate of muscle adaptations

(5) [AO 1] Sodium bicarbonate buffers hydrogen/Delays onset of blood lactate accumulation/Faster recovery

(6) [AO 1] Herbal remedies such as ginseng improve alertness/Give energy boost/Glucosamine reduces inflammation

(7) [AO 1] Carbohydrate loading boosts glycogen stores/Enhances energy stores

10. Analyse the contribution of the anaerobic energy systems in maximising performance.
Use sporting examples to support your answer.

Marking guidance

Do not give credit for any points related to the aerobic energy system. Students who only show achievement against AO1 will not be able to gain marks beyond level 1. AO3 marks should only be awarded for answers which include correct links between energy systems and appropriate activities. For example,any reference to the ATP-PC system should link to activities with very high intensity movements, such as a javelin throw.
Responses may include (but are not limited to) the answers in the mark scheme.

Marking points **(maximum 8)**

(1) [AO 1] ATP-PC system has phosphocreatine as the energy source

(2) [AO 1] Glycolytic system has glycogen as the energy source

(3) [AO 1] Site of reaction for both systems is the sarcoplasm

(4) [AO 1] Controlling enzyme of the ATP-PC system is creatine kinase

(5) [AO 1] Controlling enzyme of the glycolytic system is PFK/GPP

(6) [AO 1] Yield of the ATP-PC system is 1:1

(7) [AO 1] Yield of the glycolytic system is 1:2

(8) [AO 1] ATP-PC system has no by-products

(9) [AO 1] Glycolytic system produces lactic acid as a by-product

(10) [AO 1] ATP-PC system lasts about 10 seconds and releases very high intensity energy

(11) [AO 3] Used to power very explosive movements such as maximal javelin throws/Tumble in a gymnastics floor routine/Maximal jump of a goalkeeper to save a looping shot

(12) [AO 3] Reactants are available in the cell, so produces on-demand power movements within games such as a smash in tennis

(13) [AO 3] Lack of fatiguing by-products means the ATP-PC system can recover rapidly for subsequent powerful movements/Striker in hockey making many sprints during the first 10 minutes/Badminton player making smashes in succesive rallies

(14) [AO 1] Glycolytic system lasts up to three minutes and releases high intensity energy

(15) [AO 3] Athletes such as Olympic rowers can sustain repeated powerful strokes/800m runner can maintain fast-paced running for the whole race/Basketballer can sustain a full-court press without recovery

(16) [AO 3] Glycolytic system is capable of high intensity energy, so produces more power than the aerobic system/800m runners run at a higher average pace than 10,000m runners

(17) [AO 3] Both anaerobic systems work in unison/Both work simultaneously/Games-playing involves energy release from both systems

(18) [AO 3] Glycolytic system becomes predominant at the 10-second threshold/Glycolytic system can take over from the ATP-PC system but intensity will be lower

11. The images below show information about lifestyle factors for people in Wiggleton-by-Sea. Examine the factors and how they could contribute to cardiovascular and respiratory issues.

Marking guidance

Students who only show achievement against AO1 will not be able to gain marks beyond level 1. AO3 marks should only be awarded with correct links between risk factors, data from the images and the impact on cardiovascular or respiratory health. Accept the converse when referring to data or risk factors. For example, 43% of adults take part in recommended levels of physical activity/57% of adults do not take part in recommended levels of physical activity. Responses may include (but are not limited to) the answers in the mark scheme.

Marking points **(maximum 8)**

(1) [AO 1] Factors mentioned in the table can negatively affect the cardiovascular system

(2) [AO 1] Factors mentioned in the table can negatively affect the respiratory system/Factors mentioned could negatively affect the lungs

(3) [AO 1] Obesity impairs ability to undertake some physical exercise

(4) [AO 1] Smoking can make it more difficult to take part in physical activity

(5) [AO 3] 15% of adults smoking can lead to stiffening of blood vessels, which will reduce blood flow and increase chances of coronary heart disease

(6) [AO 3] 15% of adults who smoke will cause damage to lung tissue, which will increase the risk of lung cancer

(7) [AO 3] 32% of adults classed as obese/38% of adults classed as overweight can increase other CV risk factors such as diabetes/Obesity levels can lead to high blood pressure and increased risk of heart attack

(8) [AO 3] Only 20% of adults eating daily recommendations for fruit and vegetables can lead to high cholesterol levels which is linked to heart disease/Poor diet can lead to increased blood pressure and greater strain on the CV system/Poor diet can lead to high LDL cholesterol levels

(9) [AO 3] Only 15% of children eating five fruit and veg per day can lead to an imbalanced diet which can lead to CV issues in adulthood and problems linked to heart disease

(10) [AO 3] Problems with diet from an earlier age will have a negative impact on weight, meaning a greater risk of cardiovascular problems linked to heart disease

(11) [AO 3] Poor diet can lead to obesity, which increases the energy cost of moving and puts more strain on the heart and lungs

(12) [AO 3] A lack of physical activity means that the heart is not experiencing hypertrophy

(13) [AO 3] 35% of adults exceeding weekly alcohol limit can be linked to increased chances of blood clotting

(14) [AO 3] 35% of adults exceeding weekly alcohol limit can be linked to increased chances of high blood pressure

(15) [AO 3] 43% of adults not taking part in regular physical activity means that they are not strengthening the CV system and reducing incidents of high blood pressure/Lack of physical activity for 43% of adults will not reduce chances of CV disease

(16) [AO 3] 57% of adults not meeting recommended physical activity guidelines means that lungs and respiratory muscles are weaker, which will inhibit oxygen delivery/High percentage of adults not doing regular exercise can lead to inefficient gaseous exchange and problems with undertaking higher intensity exercise

(17) [AO 3] Only 25% of boys and 17% of girls meeting weekly physical activity guidelines means greater risk of developing type 2 diabetes/Heart and circulatory diseases in later life

12. Analyse the physiology of all three muscle fibre types and their suitability for different sports.
Use your knowledge and understanding from across the course of study to answer this question.

Marking guidance

Students who only show achievement against AO1 will not be able to gain marks beyond level 1. AO3 marks should only be awarded with correct links between functional characteristics and suitable/unsuitable activities with valid reasoning. Do not award marks for mentioning structural characteristics. Accept the converse when referring to functional characteristics and activities. Responses may include (but are not limited to) the answers in the mark scheme.

Marking points **(maximum 15)**

(1) [AO 1] Slow-twitch muscle fibres have a low contractile force/Type I fibres have low contractile force

(2) [AO 1] Fast oxidative glyolytic fibres have moderate contractile force/Type IIa muscle fibres have moderate contractile force

(3) [AO 1] Fast glyolytic muscle fibres have high contractile force/Type IIx muscle fibres have high contractile force

(4) [AO 1] Slow-twitch muscle fibres have low contractile speed/Type I fibres have low contractile speed

(5) [AO 1] Fast oxidative glyolytic fibres have moderate contractile speed/Type IIa muscle fibres have moderate contractile speed

(6) [AO 1] Fast glyolytic muscle fibres have fast contractile speed/Type IIx muscle fibres have fast contractile speed

(7) [AO 1] Slow-twitch muscle fibres have a high resistance to fatigue/Type I fibres have a high resistance to fatigue

(8) [AO 1] Fast oxidative glyolytic fibres have a moderate resistance to fatigue/Type IIa muscle fibres have a moderate resistance to fatigue

(9) [AO 1] Fast glyolytic muscle fibres have a low resistance to fatigue/Type IIx muscle fibres have a low resistance to fatigue

(10) [AO 1] Slow-twitch muscle fibres have high aerobic potential/Type I fibres have high aerobic potential/Slow-twitch muscle fibres have low anaerobic potential

(11) [AO 3] Type I suited to endurance-based sports such as marathon running/Endurance cycling/Open-water swimming

(12) [AO 3] Slow-twitch less suited to explosive events such as a javelin throw

(13) [AO 3] Suited to endurance-based sports due to their ability to utilise oxygen and produce force for longer periods of time

(14) [AO 3] Less suited to explosive movements due to low contractile force and speed, so not able to produce the required amount of power

(15) [AO 1] Fast oxidative glyolytic fibres have moderate aerobic potential/Type IIa muscle fibres have moderate aerobic potential/Fast oxidative glyoclytic fibres have moderate anaerobic potential

(16) [AO 3] Type IIa fibres suited to intermittent sports/Sports with varying intensities such as hockey/Netball

(17) [AO 3] Type IIa suited to sports with varying intensities due to ability to produce more forceful contractions when required during a game/Ability to use oxygen without fatigue

(18) [AO 1] Fast glycolytic muscle fibres have high anaerobic potential/Type IIx muscle fibres have high anaerobic potential/Fast glycolytic muscle fibres have low aerobic potential

(19) [AO 3] Type IIx fibres suited to short duration/High-intensity activities such as 100m sprint/Long jump

(20) [AO 3] Suited to high-intensity activities such as a javelin throw due to their ability to exert rapid force

(21) [AO 3] Less suited to endurance-based sports due to high fatiguability

13. Define the term agility and give a sporting example.

Marking guidance

Award one mark for a definition of agility and one mark for a suitable sporting example.

Accept other relevant sporting examples not included in the mark scheme.

Marking points **(maximum 2)**

(1) [AO 1] Agility is changing direction at speed/Changing position of the body at speed/Changing position of the body quickly and with control

(2) [AO 2] Dribbling around a defender in hockey

(3) [AO 2] Sidestepping in rugby

(4) [AO 2] Dodging a defender in netball

14. Outline the protocol for the Margaria-Kalamen test.

Marking points **(maximum 5)**

(1) [AO 1] Assistant weighs the athlete (kg)

(2) [AO 1] Athlete warms up

(3) [AO 1] Steps approximately 17.5cm high with steps 3, 6, 9 clearly marked

(4) [AO 1] Athlete stands ready at the start line, six metres in front of the first step

(5) [AO 1] On the command "Go", the athlete sprints up three steps at a time

(6) [AO 1] Aim to go up the steps as fast as possible

(7) [AO 1] Time from contact with 3rd step to contact with 9th step is recorded using a stopwatch/Recorded using switch mats on 3rd and 9th steps

(8) [AO 1] Three trials allowed with 2-3 minutes recovery in between each trial

15. Define submaximal aerobic fitness.

Marking guidance

Answers must refer to extended periods of time for a mark to be awarded.

Marking points **(maximum 1)**

(1) [AO 1] Ability to maintain high percentage of VO2 max for **prolonged** periods

16. Using the FITT principle, explain how a performer could improve their aerobic fitness.

Marking guidance

Answers must relate to improving aerobic fitness in order to be credited.

Marking points **(maximum 4)**

(1) [AO 2] Frequency by increasing the number of training sessions during the week

(2) [AO 2] Intensity by training at a higher percentage of VO2 max/Increasing number of repetitions and sets

(3) [AO 2] Time by training for a longer period of time/Increasing the number of repetitions/Reducing the rest time between repetitions

(4) [AO 2] Type by doing training specific to aerobic fitness such as continuous training/Cross-training

17. Identify **four** examples of sporting injuries.

Marking points **(maximum 4)**

(1) [AO 1] Cruciate ligament injury

(2) [AO 1] Soft tissue damage

(3) [AO 1] Ruptured Achilles tendon

(4) [AO 1] Fracture/Stress fracture/Open fracture

(5) [AO 1] Dislocation

(6) [AO 1] Strained muscle

(7) [AO 1] Shin splints/Periostitis

(8) [AO 1] Tendonitis/Tennis elbow/Golfer's elbow

18. Outline Newton's laws of motion.

Marking points **(maximum 3)**

(1) [AO 1] First law/Law of inertia states an object will remain in motion until an outside force acts on it/Object will remain stationary until an outside force acts on it

(2) [AO 1] Second law/Law of acceleration states an increase in velocity of moving object is directly proportional to the force applied/Inversely proportional to the object's mass

(3) [AO 1] Object will accelerate in the direction of the external force

(4) [AO 1] Third law/Law of reaction states for every action there is an equal and opposite reaction

19. Summarise two advantages and two disadvantages of fitness testing.

Marking guidance

Award a sub max of two marks for advantages and a sub max of two marks for disadvantages.

Marking points **(maximum 4)**

(1) [AO 1] Many fitness tests are cheap/Require little or no equipment

(2) [AO 1] Can cater for large groups at once

(3) [AO 1] Many tests are easy to administer/Many tests are easy to administer easily replicated

(4) [AO 1] Can help to identify strengths and weaknesses/Identify areas for improvement

(5) [AO 1] Pre- and post-tests show a starting level of fitness/Allow improvement to be monitored

(6) [AO 1] Allow for comparison to norm data/Comparison to national averages

(7) [AO 1] DisadvantagesTests are often not sports-specific/Too general

(8) [AO 1] Tests do not replicate movements of an activity/Do not replicate competitive scenarios

(9) [AO 1] Some tests predict results based on estimates

(10) [AO 1] Some tests require motivation to get best score/Maximal tests require motivation to complete to exhaustion

(11) [AO 1] Some tests are not reliable/May be errors in timekeeping/Errors in recording

(12) [AO 1] Submaximal tests are less accurate

(13) [AO 1] Some tests are very expensive to conduct/Require expensive equipment/May not be accessible

(14) [AO 1] Can be demotivating for a performer

20. The table below shows data about a female high jumper who wants to improve her PB.
Identify the most appropriate fitness test for this performer.

Marking points **(maximum 1)**

(1) [AO 1] Margaria Kalamen power test

(2) [AO 1] 20m acceleration sprint

(3) [AO 1] Wingate 30-second test

(4) [AO 1] Illinois agility test

(5) [AO 1] Vertical jump

(6) [AO 1] Standing broad jump

21. Identify the predominant energy system when performing in the high jump.

Marking points **(maximum 1)**

(1) [AO 1] ATP-PC system

22. Using Karvonen's theory, calculate the high jumper's heart-rate reserve.

Marking guidance

Award one mark for correct answer and one mark for correct units of measurement. Can gain two marks for correct answer only.

Marking points **(maximum 2)**

(1) [AO 2] 195bpm-54bpm

(2) [AO 2] 141bpm

23. Using the data in the table, calculate the high jumper's training heart rate.

Marking guidance

Award one mark for correct answer and one mark for correct units of measurement. Can gain two marks for correct answer only.

Marking points **(maximum 2)**

(1) [AO 2] 90/100*141=126.9

(2) [AO 2] 126.9+54=180.9bpm

(3) [AO 2] 181bpm

24. Outline periodisation.

Marking points **(maximum 3)**

(1) [AO 1] Macrocycles

(2) [AO 1] Mesocycles

(3) [AO 1] Microcycles

(4) [AO 1] Preparation phase/General preparation phase/Specific preparation phase

(5) [AO 1] Competition phase

(6) [AO 1] Transition phase

25. Analyse the factors that affect the horizontal displacement of a shot.

Marking guidance

Students who only show achievement against AO1 will not be able to gain marks beyond level 1. Responses may include (but are not limited to) the answers in the mark scheme.

Marking points **(maximum 8)**

(1) [AO 1] Velocity of release

(2) [AO 1] Aim to increase velocity of release

(3) [AO 3] Performer should aim to maximise velocity of release by generating greater impulse through preparation phase/Bringing throwing arm through quickly before release/Releasing shot from the fingertips last to maximise contact time

(4) [AO 3] Greater impulse will cause increased momentum/Force applied over longer period of time will increase the distance travelled

(5) [AO 3] Increased velocity due to law of acceleration means that the shot will travel further/Law of angular acceleration means that increased velocity leads to the shot travelling further/Shot will travel further in the direction of the force applied

(6) [AO 1] Angle of release

(7) [AO 1] Aim to increase angle of release up to optimum point

(8) [AO 3] Optimum angle of release at just below 45 degrees due to release height being higher than landing height

(9) [AO 3] Angle of release significantly lower than 45 degrees will reduce velocity/Height of release

(10) [AO 1] Height of release

(11) [AO 1] Aim to increase height of release/Increase height of release up to optimum point

(12) [AO 3] Performer can maximise height of release by fully extending at the elbow/Plantar flexion at the ankle

(13) [AO 3] Maximising height of release will increase the velocity as the shot leaves the fingertips and increase the distance putted

(14) [AO 3] If shot is released too high, this will reduce the velocity/Distance

(15) [AO 3] Shot being released too high reduces the velocity due to performer stretching too high and reducing momentum

(16) [AO 3] If shot released too low, this will reduce velocity due to less time in the air/Law of conservation of angular momentum

(17) [AO 3] Air resistance is irrelevant due to law of conservation of angular momentum/Shot is very heavy, so weight overcomes air resistance/Parabolic flight path so angle of release crucial to maximising distance

26. Discuss the use of rehabilitation strategies such as physiotherapy and ice treatments following an injury .

Marking guidance

Students who only show achievement against AO1 will not be able to gain marks beyond level 1. Responses may include (but are not limited to) the answers in the mark scheme.

Marking points **(maximum 8)**

(1) [AO 1] Physiotherapy can involve ultrasound/Physiotherapy may include massage as part of treatment

(2) [AO 1] Physiotherapist can help to structure a rehab programme for an athlete

(3) [AO 1] Physio involves a combination of treatment methods

(4) [AO 1] Physiotherapist will advise performer on gradual return

(5) [AO 3] Physiotherapy requires a specialist and may be expensive in comparison to alternatives such as ice baths

(6) [AO 1] Ice treatments can include ice baths/Cryotherapy/Cryotherapy chambers

(7) [AO 1] Ice baths/Cryotherapy chambers help to reduce inflammation

(8) [AO 1] Ice treatments involve vasoconstriction and vasodilation of blood vessels to promote recovery from injury

(9) [AO 3] Cryotherapy treatment is expensive and only available to elite athletes

(10) [AO 3] Cryotherapy much more expensive than ice baths or physiotherapy due to ongoing requirement, so may not be accessible/Could limit its effectiveness in comparison to physiotherapy if not regularly available

27. Examine the ways in which a marathon runner could manipulate their diet before a race and how this would affect their performance.

Marking guidance

Students who only show achievement against AO1 will not be able to gain marks beyond level 1. Responses may include (but are not limited to) the answers in the mark scheme.

Marking points **(maximum 8)**

(1) [AO 1] Appropriate timing of meal before a race/Aim to eat around three hours before a race

(2) [AO 1] Consume foods with low glycaemic index/Low GI/Slow release of energy

(3) [AO 1] Foods with low GI such as pasta/Rice/Vegetables

(4) [AO 1] Energy bar two hours before a race/Simple carbohydrates two hours before a race

(5) [AO 1] Helps to top up glycogen stores

(6) [AO 3] Foods with low glycaemic index helps runner to maintain blood sugar levels throughout the race/Allows them to maintain pace at a higher intensity

(7) [AO 1] Carbohydrate loading in the lead up to a race/In the week leading up to a race/Manipulate amount of carbohydrates a week prior to a race

(8) [AO 1] Day one, glycogen-depleting bout of endurance exercise/Depleted glycogen stores through endurance exercise/Endurance exercise to deplete glycogen

(9) [AO 1] Days two to three, high protein/High-fat diet/Diet high in fat

(10) [AO 1] Day four, glycogen-depleting bout of endurance exercise/Depleted glycogen stores through endurance exercise/Endurance exercise depletes glycogen

(11) [AO 1] Days five to seven, high carbohydrate diet/Consume high amounts of carbohydrate/Increase carbohydrate intake

(12) [AO 1] Days five to seven, training reduced/Tapering/Rest

(13) [AO 3] Glycogen loading leads to 50% greater glycogen stores/Large increase in glycogen stores/Increases glycogen stores

(14) [AO 3] Takes longer to reach exhaustion, meaning marathon runner can work at higher intensity for longer/Can exercise for longer before exhaustion/Increase time to exhaustion

(15) [AO 3] Delays fatigue/More resistant to fatigue/Reduces rate of fatiguing so marathon runner can aim to overtake others and finish in a higher position in the race

(16) [AO 1] Adequate hydration before the race

(17) [AO 1] Hydration prevents loss of electrolytes

(18) [AO 1] Helps runner to regulate body temperature/Prevents runner overheating

(19) [AO 1] Helps maintain blood viscosity

(20) [AO 1] Helps to maintain concentration

(21) [AO 1] Helps to prevent cramps

(22) [AO 3] Ensures runner is adequately hydrated during the early stages prior to staying hydrated during the race/Helps to prevent dehydration and the runner slowing down/Helps prevent dehydration and runner having to stop

28. Evaluate the use of SAQ and fartlek training for a games player.

Marking guidance

Students who only show achievement against AO1 will not be able to gain marks beyond level 1. Answers in the top mark band must give a comprehensive evaluation of both SAQ and fartlek training for a games player with a range of suitable examples. Responses may include (but are not limited to) the answers in the mark scheme.

Marking points **(maximum 15)**

(1) [AO 2] Both methods of training can improve speed, which is crucial to a games player

(2) [AO 2] SAQ training improves speed, which can be beneficial in games such as hockey/SAQ training improves agility, which can be beneficial in games such as hockey/SAQ training improves quickness, which can be beneficial in games such as hockey

(3) [AO 2] SAQ training improves anaerobic energy system, which is used by games players during higher intensity periods

(4) [AO 2] Fartlek training improves aerobic fitness/VO2 max, which is used by a player to maintain performance throughout a game

(5) [AO 2] Fartlek training can improve aerobic and anaerobic energy systems, which are used by games players

(6) [AO 2] Fartlek involves changes of speed, which is similar to varying game intensities

(7) [AO 3] Both methods can include a variety of activities to avoid tedium which could encourage them to work harder in training and improve overall performance

(8) [AO 3] Fartlek can increase a performer's lactacte threshold, which means they can work at a higher intensity for longer periods in a game

(9) [AO 3] Can be difficult to measure the intensity a performer is working at/Difficult to monitor if an athlete is working at the required intensity

(10) [AO 3] Fartlek training can involve aerobic and anaerobic energy systems, whereas SAQ only focuses on anaerobic intervals

(11) [AO 3] Both methods can closely replicate game intensities if training is adapted to the requirements of a performer

(12) [AO 3] Game intensities can be replicated leading to faster speeds when sprinting for the ball in netball

(13) [AO 3] Multi-direction training in SAQ leads to improved agility when dodging a defender in basketball

(14) [AO 3] SAQ leads to improvements in neuromuscular efficiency, so games players can run faster with less effort

(15) [AO 3] Both training methods will be ineffective if not tailored to the specific requirements of a game and the athlete trying to improve

(16) [AO 3] Both methods can be adapted to suit games players of varying fitness levels

(17) [AO 3] SAQ training can develop coordination due to footwork drills involved, which will benefit a footballer when dribbling with the ball at speed and moving around a defender

(18) [AO 3] SAQ training can lead to muscle soreness due to high intensity of training, so games players may experience fatigue and a negative impact on performance