The EverLearner

Mark Scheme

AQA A-Level PE - Biomechanics

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?

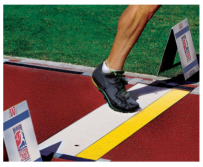
The mark scheme has been constructed specifically for the exam paper used in preparation for and during the live revision shows provided by James Simms in May 2022.

All questions/mark schemes are taken from ExamSimulator. Please note, there are hundreds of additional questions on ExamSimulator covering the AEI topics. 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.

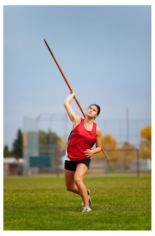
James Simms

1. This image shows three different projectiles from field athletics.
Describe the optimal release angle for all three projectiles.



Long jump

High jump



Javelin

Marking guidance

Responses must link the correct descriptions and angle of release to the relevant projectile. Do not accept "long jump has an optimal release angle of >45 degrees", for example.

Marking points

(1) [AO 1] Long jump is the same release height to landing height/Landing height and release height the same/Landing height is the same as release height

(2) [AO 1] Long jump has an optimal angle of release of 45 degrees/Optimal angle is 45 degrees/45 degrees

(3) [AO 1] High jump has landing height above release height/Landing height is higher than release height/Landing height above release height

(4) [AO 1] High jump has an optimal angle of release at >45 degrees/Optimal angle greater than 45 degrees/Greater than 45 degrees

(5) [AO 1] Javelin has the landing height lower than the release height/Landing height is lower than release height/Release height is higher than landing height

(6) [AO 1] Optimal angle of release for the javelin is <45 degrees/Optimal angle is less than 45 degrees/Less than 45 degrees

2. Evaluate the factors affecting the horizontal displacement of both a shot-put and a shuttlecock in flight.

Marking guidance

15 Mark Level Descriptors

Marking points

(1) [AO 1] Shortest horizontal distance between the release and landing point/Shortest distance between point A and B

(2) [AO 1] Affected by height of release, angle of release and velocity of release/Height of release/Angle of release

(3) [AO 1] Optimum angle based on relationship between release height and landing height

(4) [AO 1] Horizontal displacement is proportional to release velocity

(5) [AO 1] Greater release height causes a greater horizontal displacement

(6) [AO 1] Weight and air resistance affect the flight paths of proejectiles

(7) [AO 1] Objects with a large weight force tend to have low air resistance

(8) [AO 1] Objects with high air resistance tend to have low weight force

(9) [AO 2] Flight path of the shot is parabolic because weight force is dominant/Shot shows parabolic flight/Shot is symmetrical flight path

(10) [AO 2] Release height of the shot is above the landing height

(11) [AO 2] Optimal release angle of the shot is less than 45 degrees/<45 degrees

(12) [AO 2] Shot-putter increases velocity by shuffling across the throwing circle/Using rotation in the circle to increase release velocity

(13) [AO 2] Flight path of the shuttlecock as non-parabolic because air resistance is dominant/Shuttlecock flight is assymetrical

(14) [AO 2] Release height of the shuttlecock is above the landing height

(15) [AO 2] Release height of the shot is above the landing height

(16) [AO 2] Optimal release angle of the shuttlecock is less than 45 degrees/<45 degrees

(17) [AO 2] Badminton player increases velocity by applying a large force to the shuttle/Fast arm action/Flick of the wrist

(18) [AO 3] Shot-putter needs to release at the highest point without losing force by overstretching

(19) [AO 3] Shot-putter needs to apply maximal force through the centre of mass of the shot to gain maximal horizontal displacement

(20) [AO 3] Shot-putter needs to hit an angle just under 45 degrees to prevent a flat throw

2.	Evaluate the factors affecting the horizontal displacement of both a shot-put and a shuttlecock in flight.

(21) [AO 3] Badminton player needs to hit the shuttlecock at its highest point

(22) [AO 3] Badminton player needs to apply apropriate force to the shuttle otherwise it will go long/Must not over-hit the shuttlecock

(23) [AO 3] Because the horizontal displacement is shortened, the badminton player might hit an angle greater than 45 degrees

3. Explain how designers of F1 cars ensure the cars can travel quickly around sharp corners by applying the principles of fluid mechanics.

Marking guidance

Not provided

Marking points

(1) [AO 2] Car must be shaped like an inverted aerofoil/Upside down aerofoil/Inverted aerofoil

(2) [AO 2] Air travels further under the car/Air travels less distance above the car

(3) [AO 2] Air above the car travels less distance/Air below the car travels faster

(4) [AO 2] Air above the car is at higher pressure/Air below the car is at lower pressure

(5) [AO 2] Pressure differential created/Pressure gradient/Pressure differential

(6) [AO 2] Bernoulli lift force downwards/Downforce created/Downforce

(7) [AO 2] Downforce increases friction between the wheels and the track/Tendency to slide sideways when cornering is decreased/Car sticks to the track