The EverLearner

Model Answers

OCR A-Level PE - Biomechanics

(Revision session on Tuesday 10th May 2022, 4.00-5.30pm)

This document contains:

- Model answers for the Practice Questions answered during the 2022 Revision series
- Questions in AEI order
- Where possible, examples of extended writing
- No one-mark or multiple-choice questions

How should schools use these papers?

This paper has been constructed specifically for use in preparation for and during the live revision shows provided by James Simms in May 2022. I encourage students to attempt the questions in advance of the revision shows.

Please, use these model answers in combination with the mark scheme and the revision session, available in the OCR A-Level PE Revision page (https://pages.theeverlearner.com/2022-ocr-a-level-pe-revision).

All questions are taken from ExamSimulator. Please note, there are hundreds of additional questions on ExamSimulator covering the AEI topics. ExamSimulator is a premium resource available via TheEverLearner.com.

I hope this helps both students and teachers in their exam preparations.

James Simms

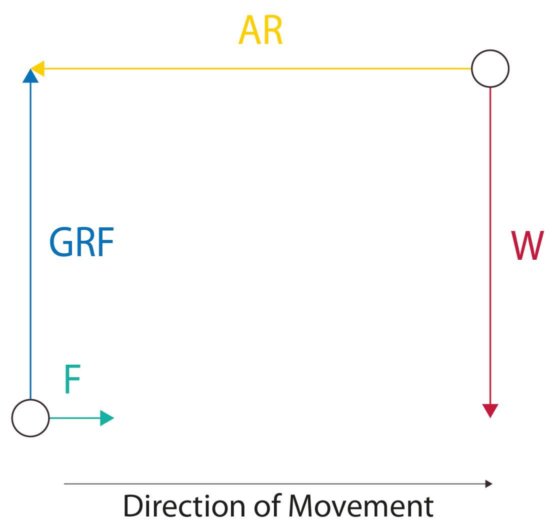
1. Define Newton's first law of motion **and** apply it to a sporting example of your choice.

Newton s first law states that [1] a body will remain in a state of inertia until compelled to change by an external force. The sprinter in the image has [2] already overcome their inertia in the sprint start position on the block by [3] pushing against the block and creating an external force. Newton s second law states that a body will accelerate proportionally to the force acting on it and will do so in the direction of that force. The sprinter is accelerating at a rate proportional to reaction force and doing so in a forwards and upwards direction because this is the direction of the reaction force.	No comments provided.
	Marks:[3/3]

2. Explain how **two** different factors affect the stability of a handstand in gymnastics.

The [3] mass of the gymnast affects the stability of the gymnast. This [4] gymnast appears to have a low mass which would tend towards having low stability. The [5] size of the base of support affects the stability of the gymnast. This gymnast has used the [6] flat of her hands to spread across the beam, therefore, increasing the base. This promotes better stability.	No comments provided.
	Marks:[4/4]

3. This image shows all the forces acting on a runner but the image of the runner has been removed.
Using your knowledge of net force, identify the nature of the vertical and horizontal forces acting **and** name the state of motion this runner is in.



(1) The runner has zero net vertical forces and is neither accelerating upwards nor downwards. The runner has (2) net forwards horizontal force because F > AR. (3) This means the runner is accelerating. Therefore, it (3) might be the start of the race and they are trying to gain position in the field.

(2) Unfortunately, you have this the wrong way round. The image shows that F<AR. :(

(3) Wrong way round here again. This point stems from the error on the previous one. Because F<AR, the athlete is actually decelerating.

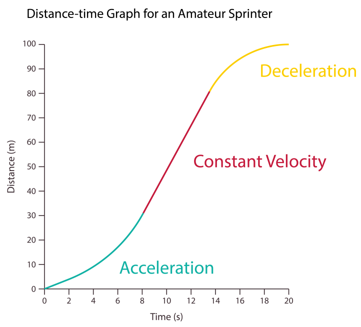
(3) This is the wrong way round again. Your logic is good but because you got point 2

3.	This image shows all the forces acting on a runner but the image of the runner has been removed. Using your knowledge of net force, identify the nature of the vertical and horizontal forces acting **and** name the state of motion this runner is in.	
		wrong, this application is wrong. This image actually shows an example such as a 400m runner in the home stretch decelerating.
		Marks: [1/3]

4. All sporting objects will be affected by either balanced or unbalanced forces. Explain balanced and unbalanced forces, giving a sporting example for each.

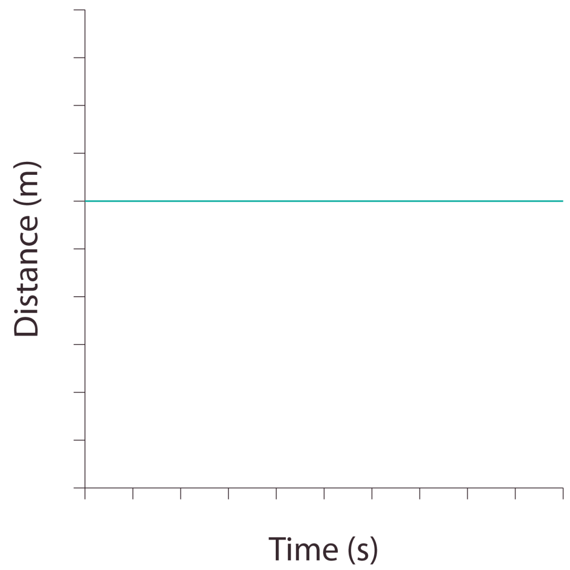
(1) Balanced forces are when two or more forces equal in size but opposite in direction. An example is the initial shove of a (2) rugby scrum where no forwards or backwards acceleration occur. (3) There is a zero net force acting.	(3) We needed reference to unbalanced forces here for marks three and four. You have not addressed unbalanced forces in your answer.
	Marks:[2/4]

5. A 100m coach has been employed.
Use this graph to suggest **two** weaknesses in the athlete's performance.



The athlete (1) needs to accelerate faster at the start of the race. They also need to (2) maintain their speed at the end and not decelerate so much.	No comments provided.
	Marks:[2/2]

6. Analyse what is occuring in the graph and suggest a suitable sporting example where this would occur.



The [1] performer is not moving. An example is a [2] badminton player in the ready position waiting to receive a serve.	No comments provided.
	Marks:[2/2]

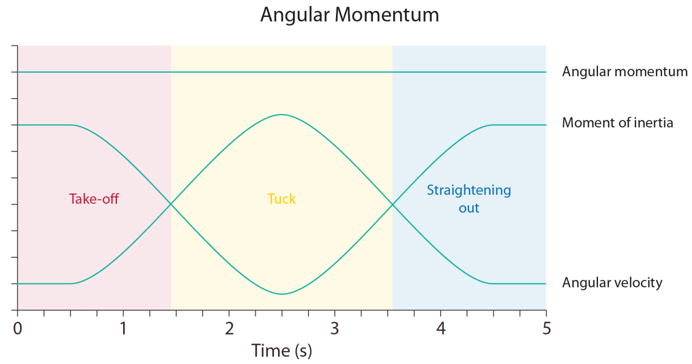
7. The three principal axes of rotation are longtitudinal, frontal and transverse.
Suggest a suitable sporting movement for each of these three axes.

Longitudinal is a [1] pivot in netball. [3] Frontal is a diving goalkeepers save to the side. [2] Transverse is a back somersault on a trampoline.	No comments provided.
	Marks:[3/3]

8. Define the term **angular velocity**, state the correct equation and give the suitable unit it is measured in.

Angular velocity is the [1] rate of change of angular displacement. [2] Angular displacement/time taken. [3] Radians per second.	No comments provided.
	Marks:[3/3]

9. The graph shows the relationship between moment of inertia, angular velocity and angular momentum for a diver performing a tuck forward somersault.
Analyse the graph, explaining the relationship between these three measurements throughout the entire movement.



At the point of 1 take off, the diver spreads their mass, increasing tier moment of inertia so that 2 angular velocity is low but the greatest potential angular momentum is established. During the tuck, 3 body weight is brought close to the transverse axis of at the hip which 4 decreases moment of inertia and increases angular velocity so that the diver rotates quickly. During the 5 straightening out phase, the diver increases moment of inertia thereby 6 decreasing angular velocity proportionally and the entry to the water is controlled. 7 Angular momentum remains constant in the air due to the law of conservation of angular momentum.	No comments provided.
	Marks:[6/6]

Feedback:

No feedback provided.