



Model Answers

OCR A Level PE - Paper 1

This document contains:

- Model answers for the National Mock Exam questions
- Model examples of extended writing
- Marking for each of the model answers in order to guide teachers and students to credit-worthy elements of the answers

How should schools use these papers?

These model answers are written to support PE teachers and students review the National Mock Exam 2023 and to prepare for the live revision sessions delivered by James in May 2023. We strongly recommend that students learn these model answers in preparation for the summer exams 2023. The questions posed and the answers provided are based on significant analysis of past papers.

Please, use these model answers in combination with the National Mock Exam paper, mark scheme and the revision session (Wednesday, 10th May 3.30pm-5.00pm), available in the OCR A Level PE Revision page: <https://pages.theeverlearner.com/2023-ocr-a-level-pe-revision>.

All questions are taken from ExamSimulator. Please note, there are hundreds of additional questions on ExamSimulator covering all topics and skills. 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	OCR Linear GCE PE Physiological Factors
Time allowed	2 hours

First name	
Last name	
Class	Physical Education A-Level
Teacher	

Title	OCR A-level (H555) Paper 1 National Mock Exam 2023
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Guidance	<ul style="list-style-type: none">• This paper is marked out of 90 marks.• You have 120 minutes (plus additional time for those who have Exam Access Arrangements).• Answer all questions.• A calculator is permitted for this exam.• This paper contains one 20-mark question.• Good luck.
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Total marks	90 / 90 (100%)
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Section A

1. Describe the all-or-none law of muscle contraction.

<p>The law states that ¹if the threshold is reached, the entire motor ³unit contracts. All the fibres within a unit contract or none do. ²This means that for larger units, a higher threshold is required.</p>	<p>No comments provided.</p>
	<p>Marks:[2/2]</p>

2. Identify **two** causes of cardiovascular drift.

<p>CV drift is caused by extended ¹periods of exercise in very hot ²conditions which causes extreme sweating, dehydration and the associated ³loss of blood plasma, ⁴triggering a reduction in stroke volume.</p>	<p>No comments provided.</p>
	<p>Marks:[2/2]</p>

3. Describe **two** long-term **neural** adaptations to strength training.

<p>²Increased speed of nerve transmission. ¹Increased coordination of muscle pairs.</p>	<p>No comments provided.</p>
	<p>Marks:[2/2]</p>

4. Look closely at this image.
State both missing stages of periodisation.

Preparatory phase	?	?
<ul style="list-style-type: none"> • 6-12 weeks before the start of the season • June and July for a football club 	<ul style="list-style-type: none"> • Perform, recover, train, taper 	<ul style="list-style-type: none"> • 4-6 weeks at the end of the season • Active rest, recuperation and recovery

1 Competitive and 2 transition phases.

No comments provided.

Marks:[2/2]

5. Look closely at this image.
Describe the type of contraction occurring in the triceps when moving from position A to position B.

Phase A



Phase B



1 It is an isotonic eccentric contraction of the triceps brachii, as
2 the muscle is lengthening whilst under tension.

No comments provided.

Marks:[2/2]

Section B

6. Look closely at this image.
Analyse the landing phase on the box by completing the table.



Joint	Type of joint	Joint movement	Agonist
Hip	A	B	C
Knee	D	E	F

1 A is a ball - and - socket joint. 2 B is hip flexion. 3 C is the gluteus maximus. 4 D is a hinge joint. 5 E is knee flexion. 6 F is the rectus femoris.

No comments provided.

Marks:[6/6]

7. The vascular system is responsible for venous return.
Describe what happens to the skeletal muscle pump and the respiratory pump during a recovery period.

1 Skeletal muscle pump applies less force to veins, as less movement and muscle contraction is occurring. 2 The respiratory pump applies less pressure to the thoracic cavity, as breathing rate and then breathing depth decrease.

No comments provided.

Marks:[2/2]

8. Explain how a middle-distance runner is able to exchange a greater quantity of gases at the alveoli when performing.

1 Diffusion occurs at a faster rate due to 2 deep breathing and 4 deeper alveoli being filled. Because 5 less oxygen is returning to the lung within deoxygenated blood, the 6 concentration gradient is steeper, once again causing a 3 faster rate of oxygen diffusion into the blood. More 7 carbon dioxide is produced as a product of more aerobic respiration and this, once transported to the lung, creates a 8 steeper concentration gradient and a faster rate of carbon dioxide diffusion into the alveoli.

No comments provided.

Marks:[6/6]

9. Look closely at this image.
Calculate the missing values.

Average cardiac values for three A-level PE students during an 800m race

		Athlete		
		Shay	Thea	Georgie
Heart rate (HR)	bpm	A	136	144
Stroke volume (SV)	ml	109	110	B
Cardiac output (Q)	ml/min	13,516	C	13,800

1 A is 124. 2 B is 95.8. 3 C is 14,960.

No comments provided.

Marks:[3/3]

10. State the controlling enzyme and the fuel source of the ATP/PC system.

<p>1 The enzyme is creatine kinase. 2 The fuel is phosphocreatine.</p>	<p>No comments provided.</p>
	<p>Marks:[2/2]</p>

11. Other than the water jump, Identify one point of a 3,000m steeplechase race when the ATP/PC system would be predominant.



<p>1 Acceleration at the start of the race to get to the front.</p>	<p>No comments provided.</p>
	<p>Marks:[1/1]</p>

12. State **one** reason why a 3,000m steeplechase athlete is likely to consume protein **immediately after** an intense training session.

<p>1 To repair the muscle fibres and allow for quicker adaptation.</p>	<p>No comments provided.</p>
	<p>Marks:[1/1]</p>

13. Describe the role of fats during an elite 3,000m steeplechase race.

<p>Fats are capable of fuelling the aerobic system via beta oxidation but would be capable of only providing small proportions of the energy for a competition race as fats are specialised for low intensity energy release.</p>	<p>No comments provided.</p>
	<p>Marks:[2/2]</p>

14. Describe the Queen's College step test.

<p>Participants step up and down at a specific cadence onto a 41.3cm step. The rhythm is 24 steps per minute for men and 22 steps per minute for women. The test lasts three minutes and the heart rate is taken after five seconds of recovery and then for a further five minutes before being plotted onto a graph.</p>	<p>No comments provided.</p>
	<p>Marks:[4/4]</p>

15. Explain why an athlete would complete HIIT as part of their aerobic training.

<p>An aerobic athlete would use interval at a ratio of 2: 1. The recovery period needs to be timed very specifically, as this is when the aerobic system is stressed. HIIT burns large quantities of calories per unit of time. Furthermore, sessions are very practical, as they are relatively short, and because athletes of differing fitness levels can train together because "everyone recovers at the same intensity".</p>	<p>No comments provided.</p>
	<p>Marks:[4/4]</p>

16. State **one** pharmacological ergogenic aid that would help an open water swimmer to increase their aerobic capacity.

<p>1 Erythropoietin.</p>	<p>No comments provided.</p>
	<p>Marks:[1/1]</p>

17. Explain how the pharmacological ergogenic aid named in the previous question is able to increase aerobic capacity.

<p>1 EPO stimulates erythropoiesis (the production of red blood cells). This leads to a greater proportion of the blood being made up of RBCs which, in turn, increases the oxygen - carrying capacity of the blood. As a result, the athlete can work at higher intensities aerobically and delay OBLA to a higher intensity of exercise.</p>	<p>No comments provided.</p>
	<p>Marks:[4/4]</p>

18. Evaluate the use of PNF training.

<p>The main advantage of PNF over other stretches is that it inhibits the stretch reflex and allows the performer through a greater range of motion instantly. This is advantageous because it improves flexibility quickly. However, PNF can be contraindicated or cause more harm than good for some performers.</p> <p>Furthermore, it is less practical than some other stretching processes as it typically requires a partner.</p>	<p>No comments provided.</p>
	<p>Marks:[4/4]</p>

19.

Electric racing cars carry their batteries underneath the floor.
Explain why this helps to increase the stability of the car when cornering.



1

The battery weight makes the car's centre of mass closer to the ground thus increasing stability in corners.

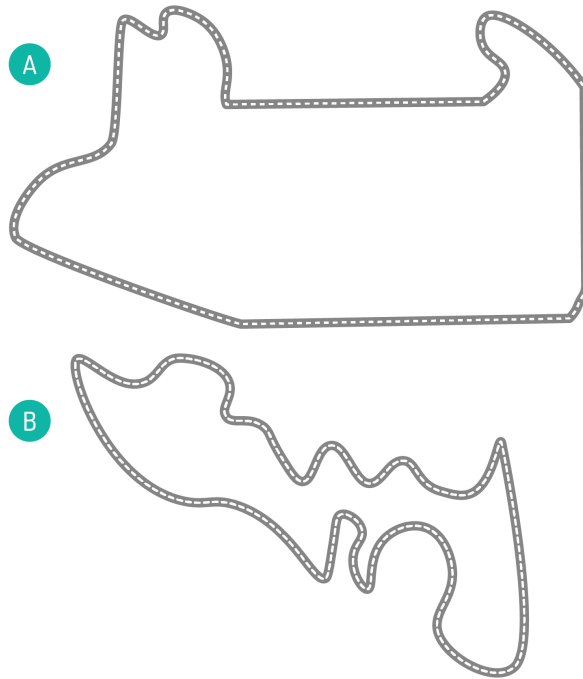
No comments provided.

Marks:[1/1]

20.

Look closely at this image.

Explain why a racing car travelling around track A is likely to have a smaller rear wing than a racing car travelling around track B.



3

A rear wing is an inverted aerofoil. Inverted aerofoils increase downforce. **Track A has many more straights** and fewer turns. Therefore, **track A requires less downforce** because downforce enables a car to make sharp turns at higher velocity. Track B, on the other hand, requires lots of downforce because it is a twisty track.

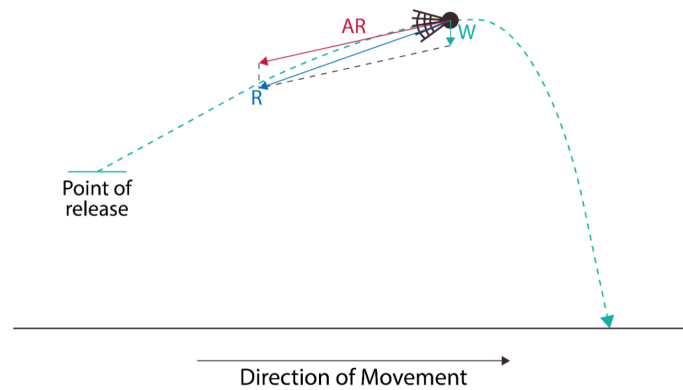
No comments provided.

Marks:[3/3]

21.

Look closely at this image of image of a shuttlecock in flight.

Using your knowing of fluid mechanics, explain why the shuttlecock has such a large air resistance.



The shuttle is ¹ travelling at a very high velocity as it leaves the racquet. Furthermore, the ³ frontal cross-sectional area is large due to the fanning shaped of the shuttle. This means the ⁴ shuttle is not streamlined. Beyond this, the shuttle, made of cork, ⁵ has rough surface characteristics. These factors cause a large air resistance and this force has greater ² impact due to the light-weight nature of the shuttle.

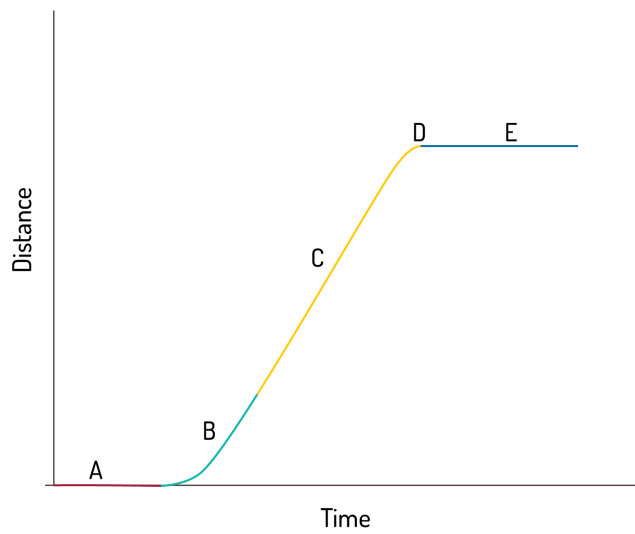
No comments provided.

Marks:[5/5]

22.

Look closely at this image which represents a shot being putt. Analyse the state of motion at each point.

Distance-time graph of a shot being putt



1

Point A: The shot in the hand before the putt. Point B:

2

Acceleration of the shot as the thrower moves across (or around)

3

the circle. Point C: Constant velocity of the shot whilst in the air.

4

Point D: Rapid deceleration as the shot strikes the ground. Point

5

E: The shot resting on the ground

No comments provided.

Marks:[5/5]

23.

Look closely at the table in this image.

Identify the three classifications of levers A, B and C.

Identify the three components X, Y and Z of the bottom lever classification in the table.

Lever classification	Order of components	Movement	Lever components
A	FLE	Plantar flexion	Fulcrum is the ball of the foot. Load is the body weight. Effort is the insertion of the gastrocnemius muscle on the heel.
B	FEL	Flexion	Fulcrum is the elbow joint. Load is a dumbbell. Effort is the insertion of biceps tendon onto the radius.
C	LFE	Extension	Fulcrum is X. Load is Y. Effort is Z.

1 A is a 2nd class lever. 2 B is a 3rd class lever 3 C is a 1st class lever.
4 X is the elbow 5 Y is the weight of the object being thrown such as
6 a javelin Z is the muscular force of the triceps brachii

No comments provided.

Marks:[6/6]

Section B

24. Explain how blood is redistributed by a player during a netball match. Identify treatment methods for exercise-induced muscle damage **and** evaluate the effectiveness of these treatments for a netball player.



Redistribution of blood flow during a netball match occurs as a result of both vasodilation and constriction of arterioles and pre-capillary sphincters. This process, controlled by the VCC, distributes blood at all times to the areas of most need. During a netball match, this is towards the skeletal muscles in the legs, arms and core. The arterioles and pre-capillary sphincter muscles leading to the vastus medialis, say, vasodilate which reduces resistance to blood flow and a greater proportion of cardiac output is delivered to the working muscle tissue. This is known as parasympathetic control. In contrast, arterioles and pre-capillary sphincter muscles leading to the liver, say, vasoconstrict which, in turn, increases resistance to blood flow and a lesser proportion of cardiac output reaches tissues other than the muscle. This is known as sympathetic control. Painkillers are effective for exercise-induced muscle damage (EIMD). They are effective at masking pain, allowing the netballer to compete or train again sooner. However, the masking effect

No comments provided.

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can be negative, as it can ¹² cause the netballer to compete or train when muscles need to be rested and this can lead to soft tissue injuries. ¹³ Anti - inflammatories are also often used for EIMD, as they ¹⁴ prevent swelling which results due to the body's inflammatory response system. Once again, this allows the muscle to be more mobile and to be played on or trained again sooner. However, anti - inflammatories ¹⁵ can cause nausea and this could hamper the training routine of the netballer. ¹⁶ Massage can be used as to treat EIMD and is ¹⁷ outstanding at working on a localised area of muscle, such as the deltoids of a centre player. But the main weakness of massage is that it is ¹⁸ exclusive and the netball player may well not have this option available to him/her. ¹⁹ Stretching can be used for EIMD and is advantageous because it is a ²⁰ very practical method. In fact, our netballer is likely to stretch muscles subconsciously if they are feeling sore. The netballer could also use ²² hot and cold (contrast) therapy for EIMD. Changes in temperature help to flush the sore muscle tissue with oxygenated blood and can ²³ make recovery faster. However, ²² Contrast therapy is ²⁴ only effective once the muscle tissue has begun healing, making it less relevant when the netball player first experiences the strain, say. Finally, the netballer could use medical intervention in the form of ²⁵ physiotherapy and/or ²⁸ surgery. Physiotherapy is outstanding for a netball player, as it is ²⁶ very ²⁷ specific and localised to the exact site of injury but it is also very ²⁹ expensive, making it exclusive for most players. Surgery ³⁰ should be used for very serious muscle injuries but is far less relevant for most, low - level muscle injuries that a netball player will experience such as strains.

Marks:[20/20]

END OF QUESTIONS