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Model Answers

OCR A-Level PE - Anatomy & Physiology

(Revision session on Thursday 5th 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.

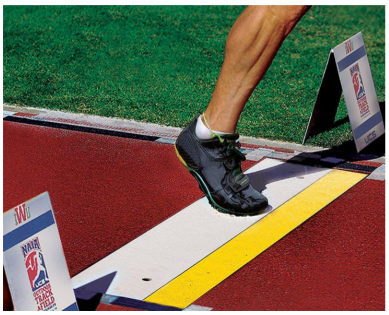
Please, use these model answers in combination with the mark scheme and the revision session, available in the OCR A-Level PE Revision page (https://pages.theeverlearner.com/2022-ocr-a-level-pe-revision).

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. Complete the table to analyse the long jump take-off action at the ankle.
Ensure your responses are correctly linked to the relevant letter in your answer.



Joint	Type of joint	Joint movement	Agonist	Plane of movement
Ankle	A	B	C	D

1 A is a hinge joint. 2 B is plantar flexion. 3 C is the gastrocnemius and soleus. 4 D is the sagittal plane.	No comments provided.
	Marks:[4/4]

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2. Complete the table to analyse the lunge action at the hip.
Ensure your responses are correctly linked to the relevant letter in your answer.

Joint	Phase	Joint movement	Agonist	Type of contraction during the downward motion
Hip	Left (front)	A	B	C
	Right (back)	Extended	Illiopsoas	D

1 A is hip flexion. 2 B is the gluteus maximus. 3 C is isotonic eccentric. 4 D is also isotonic eccentric.

No comments provided.

Marks:[4/4]

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3. This video shows a volleyball player performing a spike.
Using your knowledge of the musculoskeletal system and movement patterns, analyse the following:

The ankle joints during the take-off for the spike.
The knee joints during the landing phase of the spike.
Evaluate the use of plyometric training for a volleyball player.

The ankle is a hinge joint formed by the articulation of the tibia, fibula and talus. In the video, the ankle is moving with plantar flexion and this is an isotonic concentric contraction of the gastrocnemius which is the prime mover. The antagonist is the tibialis anterior and the movement is occurring along the sagittal plane and around the transverse axis. The knee is a hinge joint formed by the articulation of the tibia and femur. During the landing phase, the knee is undergoing knee flexion and this is controlled by an isotonic eccentric contraction of the rectus femoris muscle which is also the prime mover. The antagonist is the biceps femoris. Knee flexion occurs along the sagittal plane and around the transverse axis. Plyometric training involves any movement with an eccentric contraction rapidly followed by a concentric contraction. Examples are bounding, hurdles and depth jumps as well as medicine ball work for the upper body. Plyometric training improves elastic strength because the muscle is able to increase its elastic recoil and this increases the muscles overall contractility by increasing the force of the concentric phase of movement. This causes a volleyball player to be able jump higher to spike the ball and to hit the spike with more force. As a result, a spike is much harder to block. Furthermore, a player s serve will become more powerful and harder to return. However, plyometric training is ineffective in improving overall CV fitness which volleyball players do require and it is sometimes linked with joint injuries. OVerall, plyometrics is an essential training method for volleyball players

No comments provided.

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3.	This video shows a volleyball player performing a spike. Using your knowledge of the musculoskeletal system and movement patterns, analyse the following: The ankle joints during the take-off for the spike. The knee joints during the landing phase of the spike. Evaluate the use of plyometric training for a volleyball player.	
	and should be interspersed with other forms of both strength and aerobic training.	
		Marks:[20/20]

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Venous blood is under very low pressure.

4. Explain how venous return mechanisms ensure that sufficient blood arrives at the right atrium during exercise.

1 Skeletal muscle pump squeezes to increase blood pressure in the veins. 5 Smooth muscles in veins vasoconstrict to force blood upwards to the heart. 4 Pocket valves prevent back flow during diastole. Respiratory uses 3 pressure differences in the chest to force the blood back to the heart. 2 Gravity aids blood returning from the superior part of the body.	No comments provided.
	Marks:[5/5]

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5. Using your knowledge of the vascular shunt mechanism, explain how blood is redistributed during recovery from exercise.

1 Blood is shunted away from worked muscles back to other organs. 2 Arterioles leading to muscle vasoconstrict as do precapillary sphincters, whereas 3 arterioles leading to other organs like the stomach vasodilate to decrease resistance.	No comments provided.
	Marks:[3/3]

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6. Chemoreceptors are one example of neural control of heart rate.
Identify **two** other forms of neural control and explain how each helps to regulate heart rate **after** the final whistle in a rugby match.

During recovery, baroreceptors (1) detect (2) a decrease in blood pressure and proprioceptors (3) detect (4) a decrease in muscle contraction. In both cases, this causes parasympathetic stimulation of the heart and rate to reduce.	No comments provided.
	Marks:[4/4]

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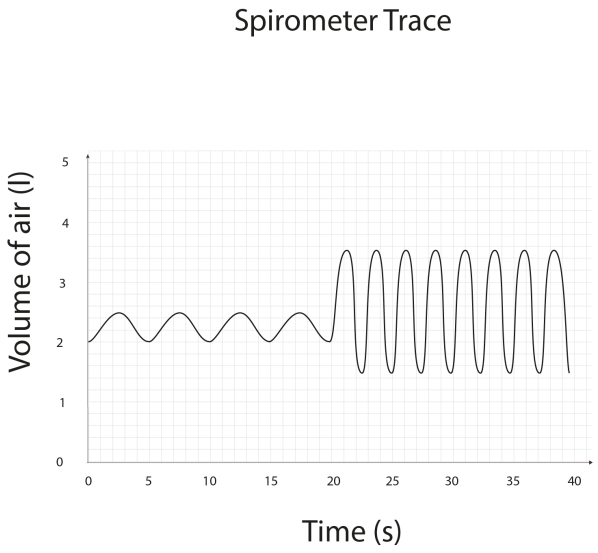
7. Analyse this spirometer trace showing the breathing patterns of a track athlete and do the following:
Estimate the resting tidal volume.

Estimate the exercising tidal volume.

Estimate the change in tidal volume between rest and exercise conditions.



Resting tidal volume is 500ml. Exercising tidal volume is 2, 000ml. Change in tidal volume is 1, 500ml.	No comments provided.
	Marks:[3/3]

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8. At the start of exercise, the diaphragm and external intercostals contract with more force to increase tidal volume.
Explain how this change is controlled.

This is done by the respiratory control centre in the medulla oblongata of the brain. Neural control mechanisms such as baroreceptors detect an increase in blood pressure and the RCC sympathetically stimulates the muscles to contract with more force.	No comments provided.
	Marks:[3/4]

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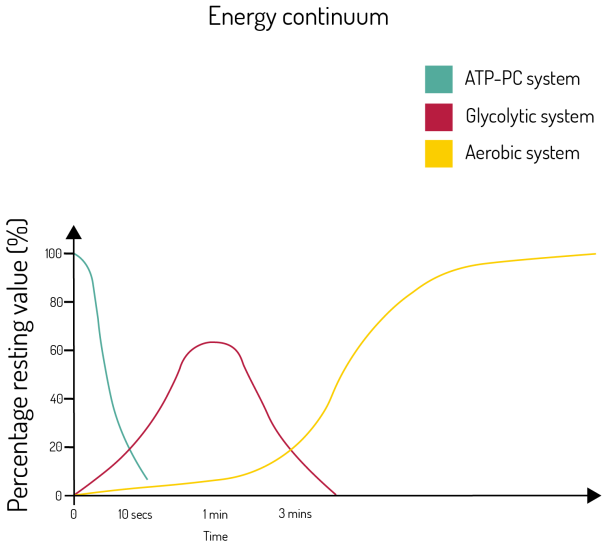
9. The graph shows the relative contributions of the three energy systems during a sporting performance.
Analyse the graph.



1 The ATP PC system is predominant at the start and only for about ten seconds and then this contribution dramatically 3 decreases and the glycolytic system becomes predominant. This system remains the 4 primary system up to three minutes but 5 peaks at approximately one minute. The 7 aerobic system 8 becomes predominant after three minutes. All energy systems 9 are contributing at all times. This graph is only relevant for sustained activity with no breaks.	No comments provided.
	Marks:[6/6]

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10. Footballers competing in Mexico City see a drop in performance due to the altitude. Describe the **short-term effects** of performing at high altitude on the **respiratory system**.

Athletes diffuse less oxygen at altitude because there is a 3 **decrease in partial pressure of oxygen in the air. The body responds with** 1 **an increased tidal volume and** 2 **an increased breathing rate.**	**No comments provided.**
	Marks:[3/3]

Feedback:

No feedback provided.

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