



Model Answers

AQA A-Level PE – Anatomy & Physiology

(Revision session on Thursday 5th May 2022, 5.45-7.15pm)

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 AQA A-Level PE Revision page (<https://pages.theeverlearner.com/2022-aqa-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.

The shot put is one of the most explosive events in athletics.
Describe the predominant energy system which resynthesises ATP during this event.



1 The **ATP PC system** is predominant for the shot putt and involves
2 the **breakdown of PC** in the presence **5** of **creatine kinase** and the
release of energy exothermically within the **6** **sarcoplasm** of the
4 muscle cell. The **7** **reaction is anaerobic** and has a **yield of 1: 1**.

No comments
provided.

Marks:[3/3]

2. Discuss the effectiveness of the anaerobic glycolytic system to resynthesise ATP.

The glycolytic system is effective because it has ¹ no delay for ² oxygen delivery and ³ glycogen stores are already present in the muscle. This makes the system able to ⁴ break down glucose quickly and ⁵ provide energy for high intensity activity. However, the system releases ⁶ lactic acid as a by - product and this denatures enzymes and prevents further energy release. The system also has a low yield of 1: 2.

No comments provided.

Marks:[4/4]

3. Identify the three stages of the **aerobic system**.

<p>1 Aerobic glycolysis, the 2 Kreb s cycle and the 3 electron transport chain.</p>	<p>No comments provided.</p>
	<p>Marks:[3/3]</p>

4.

The image shows a 3,000m track race.

Analyse the role of the aerobic energy system throughout the race and the benefits of glycogen loading and bicarbonate supplementation for a 3,000m runner.



Aerobic system involves ¹ glycolysis, Krebs cycle and the electron ⁵ transport chain. Glycolysis occurs in the sarcoplasm and involves the breakdown of glycogen into glucose. ²⁸ Glucose is then converted into pyruvate in the presence of sufficient oxygen. Pyruvate is converted to citric acid ⁹ and carried into the Krebs cycle by acetyl co - enzyme A. ¹⁵ This occurs in the mitochondria as does the ² electron transport chain where hydrogen ions are oxidised. In total, 38 ATP are resynthesised net and this energy is sustainable throughout the 3, 000m race unless the athlete accelerates to a much higher intensity. The ²⁶ aerobic system is ideal for 3, 000m because it powers longer duration activities that take ¹³ longer than three minutes but are completed at moderate intensity. Apart from CO₂ and water, there are no byproducts and these two products are simply processed and breathed out. Furthermore, the system releases lots of energy. The weakness of the system is that it cannot power a sprint finish. This is where the anaerobic systems are necessary. Carbo - loading is a ⁸ 7 day process which starts with full glycogen depletion before ⁸ carbohydrates are reintroduced to the diet in the three days before performance. This causes an ¹⁶ increase in the glycogen store ²⁴ and means the runner can run at higher intensities aerobically without depleting glycogen. Therefore, the

No comments provided.

4.

The image shows a 3,000m track race.
Analyse the role of the aerobic energy system throughout the race and the benefits of glycogen loading and bicarbonate supplementation for a 3,000m runner.

runner is **not likely to hit the wall**. One downside of carbo - loading is it can cause bloating and a heavy feeling on the day of the race. Bicarbonate supplements, **often taken with water**, help with the body's **buffering of lactic acid**. Bicarbonate is released into the blood which then **mops up hydrogen ions** released from lactic acid and **converts them to carbonic acid** before they are **broken down into CO₂ and water and breathed out**. This helps to **delay OBLA** and allows a runner to **run at higher speeds without fatiguing**.

Marks:[15/15]

5.

The Denver Nuggets often have a large home-court advantage due to the opponents not having acclimatised to the altitude.

Describe the **short-term effects** of performing at high altitude.



By David Herrera - <https://www.flickr.com/photos/dph1110/3588446548/> (in album <https://www.flickr.com/photos/dph1110/3588446548/>) / <https://commons.wikimedia.org/w/index.php?curid=48209597>

Altitude conditions cause a decreased rate of diffusion due to a **lower partial pressure of oxygen in the air**. This means **the haemoglobin saturation levels fall** and **less oxygen is delivered to the working muscles**. This, in turn, causes the need for **increased breathing rate and tidal volume** to maintain a diffusion gradient.

No comments provided.

Marks:[2/2]

6. Discuss the use of plyometrics for a high jump athlete.



5 Plyometrics training recruits type IIb/IIx fibres for maximal power and involve an 1 eccentric contraction followed by a powerful concentric contraction. Plyometrics is excellent for high jumping because the 3 athlete can focus on the legs specifically and the 4 actions replicate the bounding movement of the high jump. Plyometrics 6 also develops core stability and balance which are essential for a jumper. However, plyometrics is 7 not effective at developing back flexibility which is critical for high jump and it also has a 8 tendency to cause injury as it is so high impacting.

No comments provided.

Marks:[4/4]

7. High-intensity interval training (HIIT) can be altered in different ways. Describe **three** methods of altering a HIIT session.

HIIT can be adapted by lengthening or ¹shortening the work ⁴interval or ²by increasing or decreasing the intensity of the interval. ³The rest interval can also be shortened or lengthened or, with trained athletes, the ⁶recovery can be made active to replicate game situations. Finally, the ⁶entire session can be made longer.

No comments provided.

Marks:[3/3]

Feedback:

No feedback provided.