AQA A-LEVEL PE ENERGY SYSTEMS PRACTICE EXAM (SAMPLE)

STUDY GUIDE

Prepare with structure. Pass with confidence

Table of Contents

Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

- Practice answering questions under realistic conditions,
- Improve accuracy and speed,
- Review explanations to strengthen weak areas, and
- Approach the exam with greater confidence.

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

Remember: successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

How to Use This Guide

This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here's how to get the most out of your Examzify study guide:

1. Start with a Diagnostic Review

Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.

2. Study in Short, Focused Sessions

Break your study time into manageable blocks (e.g. 30 – 45 minutes). Review a handful of questions, reflect on the explanations.

3. Learn from the Explanations

After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.

4. Track Your Progress

Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.

5. Simulate the Real Exam

Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.

6. Repeat and Review

Don't just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.

There's no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!

Questions

1. How does regular training affect lactate threshold relative to VO2 max?

A. No change with training.

B. The lactate threshold shifts to a higher percentage of VO2 max with training.

C. The lactate threshold lowers with training.

D. The threshold is determined by age.

2. Why are fatty acids the predominant energy source for long-duration, low-intensity exercise?

A. More ATP can be made from one molecule of fatty acids than one molecule of glucose

B. They are oxidized more quickly

C. They produce CO2 more rapidly

D. They are easier to transport in blood

3. Which statement best describes the potential benefits and drawbacks of altitude training for endurance athletes?

A. Altitude training always improves performance with no drawbacks.

B. Altitude training has no effect on endurance performance.

C. Altitude training only benefits sprinters.

D. It can increase red blood cell count and oxygen transport but may cause acclimatization issues and reduced training intensity.

4. Which RER value indicates fat oxidation predominates?

A. 1.0

B. 0.85

C. 0.7

D. Greater than 1

5. A key adaptation from altitude training is an increased red blood cell count. Which effect best describes this adaptation upon return to sea level?

A. Decreased VO2 max

B. Enhanced oxygen-carrying capacity on return to sea level

C. Increased resting heart rate

D. Decreased lactate threshold

6. In RER values, which value indicates fat oxidation predominates?

A. 1.0

B. 0.7

C. 0.85

D. Greater than 1

7. The electron transport chain occurs in which part of the mitochondrion?

A. Cytosol

B. Cristae of the mitochondria

C. Matrix

D. Nucleus

8. Phosphocreatine (PC) is described as

A. An energy-rich phosphate compound found in the sarcoplasm of the muscles

B. A lipid energy storage molecule

C. A protein that transports oxygen

D. A carbohydrate used for quick energy

9. What is the effect of aerobic training on VO2 max?

A. Can be improved up to 10-20% following a period of aerobic training.

B. VO2 max cannot be changed by training.

C. VO2 max decreases with aerobic training.

D. Only resistance training improves VO2 max.

10. How many molecules of ATP are produced as a net yield per glucose during the short-term lactate anaerobic system (anaerobic glycolysis)?

A. 0

B. 4

C. 2

D. 36

Answers

1. B
2. A
3. D
4. C
5. B
6. B
7. B
8. A
9. A
10. C

Explanations

1. How does regular training affect lactate threshold relative to VO2 max?

A. No change with training.

B. The lactate threshold shifts to a higher percentage of VO2 max with training.

C. The lactate threshold lowers with training.

D. The threshold is determined by age.

Regular endurance training boosts the body's ability to use lactate as a fuel, increasing oxidative capacity and lactate clearance. This means you can sustain a higher intensity before lactate starts to accumulate rapidly. In terms of VO2 max, the lactate threshold moves to a higher percentage of that max, so you're able to work harder before hitting a problematic rise in lactate. This shift happens because muscles gain more mitochondria, better capillarization, and more effective lactate transport and oxidation. Since VO2 max itself often increases with training, the same absolute workload represents a larger percentage of VO2 max after training. So the lactate threshold relative to VO2 max increases with regular training. It doesn't stay the same or decrease, and it isn't set by age.

2. Why are fatty acids the predominant energy source for long-duration, low-intensity exercise?

A. More ATP can be made from one molecule of fatty acids than one molecule of glucose

B. They are oxidized more quickly

C. They produce CO2 more rapidly

D. They are easier to transport in blood

In long-duration, low-intensity exercise the body relies on aerobic metabolism, and lipids provide a huge energy reservoir with a very high energy yield. Fatty acids undergo beta-oxidation to generate many acetyl-CoA units, which feed the TCA cycle and oxidative phosphorylation, producing much more ATP per molecule of substrate than glucose. Add in the fact that fats store about twice the energy per gram of carbohydrate, so there's a larger total energy supply available from fat reserves. This combination makes fats the most efficient long term fuel source. The other statements don't fit: fats aren't oxidized more quickly (they're slower to oxidize), they don't inherently produce CO2 more rapidly for the same energy output, and fats aren't easier to transport in blood than glucose.

3. Which statement best describes the potential benefits and drawbacks of altitude training for endurance athletes?

A. Altitude training always improves performance with no drawbacks.

B. Altitude training has no effect on endurance performance.

C. Altitude training only benefits sprinters.

D. It can increase red blood cell count and oxygen transport but may cause acclimatization issues and reduced training intensity.

Altitude training uses a low-oxygen environment to trigger adaptations that can help endurance performance. When athletes train in these conditions, the body often increases production of red blood cells, boosting the oxygen-carrying capacity of the blood and making oxygen delivery to working muscles more efficient. This can translate into better endurance performance after returning to normal oxygen levels, because the muscles receive more oxygen during aerobic work. But there are drawbacks to balance this with the benefits. Adapting to altitude can cause acclimatization issues such as headaches, sleep disturbance, fatigue, and overall reduced well-being. Because the air is thinner, sustaining training at the same intensity as at sea level is harder, so training quality and volume are often reduced. If the training stimulus is too limited for too long, adaptations can be blunted or lost. So the overall picture is that altitude exposure can enhance oxygen transport and endurance potential, but only if the training is carefully planned to manage acclimatization and maintain enough training load. The statement that altitude training always improves performance with no drawbacks is too simplistic, and the idea that it has no effect isn't accurate. It's primarily used for endurance athletes rather than sprinters, and the benefits depend on how well the program manages the altitude-related challenges.

4. Which RER value indicates fat oxidation predominates?

A. 1.0

B. 0.85

C. 0.7

D. Greater than 1

RER shows which fuel is being oxidized by comparing carbon dioxide produced to oxygen consumed. Fat oxidation sits around 0.7, so a value near 0.7 indicates fat is the predominant fuel. Carbohydrate oxidation pushes RER toward 1.0, and values above 1 can occur with very intense exercise due to buffering and non-metabolic CO_2 release. Since fat yields less CO_2 per unit of O_2 consumed, the lower ratio (0.7) reflects fat being used more than carbohydrates.

5. A key adaptation from altitude training is an increased red blood cell count. Which effect best describes this adaptation upon return to sea level?

A. Decreased VO_2 max

B. Enhanced oxygen-carrying capacity on return to sea level

C. Increased resting heart rate

D. Decreased lactate threshold

When you train at altitude, your body makes more red blood cells to carry oxygen more efficiently in the blood. Return to sea level with this greater oxygen-carrying capacity means your blood can deliver more oxygen to working muscles during exercise. That directly supports a higher VO_2 max or improved endurance since VO_2 max is limited by how much oxygen can be delivered and utilized. So the best description of this adaptation on return to sea level is enhanced oxygen-carrying capacity. The other options don't fit as well. VO_2 max isn't typically decreased after acclimatization; resting heart rate often remains lower with improved fitness rather than higher; and while lactate threshold can shift with training, the most direct and specific effect of more red blood cells is improved oxygen transport, not a decrease in lactate threshold.

6. In RER values, which value indicates fat oxidation predominates?

A. 1.0

B. 0.7

C. 0.85

D. Greater than 1

RER shows which fuel is being burned by comparing CO2 produced to O2 consumed. Fat oxidation uses more O2 per CO2 produced, so the ratio sits toward the lower end of the scale when fat is the main fuel. Carbohydrate oxidation produces more CO2 for the same amount of O2, pushing the ratio toward the higher end. A value in the middle suggests a mix of fats and carbohydrates; a value above 1 typically indicates some anaerobic processes or buffering of lactic acid that raises CO2. Therefore, the value indicating fat oxidation predominates is the one toward the left end of the scale.

7. The electron transport chain occurs in which part of the mitochondrion?

A. Cytosol

B. Cristae of the mitochondria

C. Matrix

D. Nucleus

The electron transport chain is located on the inner mitochondrial membrane, specifically on the cristae. These folds increase the membrane surface area, allowing many protein complexes and ATP synthase to be packed in, which is essential for efficient oxidative phosphorylation. As electrons move along the chain, protons are pumped into the intermembrane space, creating a gradient that drives ATP production when protons flow back through ATP synthase in the membrane. The matrix houses the Krebs cycle enzymes that generate the electron carriers, the cytosol is outside the mitochondrion, and the nucleus is a separate organelle. So, the cristae are the correct site.

8. Phosphocreatine (PC) is described as

A. An energy-rich phosphate compound found in the sarcoplasm of the muscles

B. A lipid energy storage molecule

C. A protein that transports oxygen

D. A carbohydrate used for quick energy

Phosphocreatine serves as a rapid phosphate donor that replenishes ATP in contracting muscles. It is an energy-rich phosphate compound stored in the sarcoplasm of muscle fibers. When a sudden, high intensity effort begins, the enzyme creatine kinase transfers the phosphate from phosphocreatine to ADP to quickly form ATP without the need for oxygen. This phosphagen system supports very short, powerful bursts—roughly the first few seconds of activity—before other energy systems take over. It isn't a lipid energy store, a protein that transports oxygen, or a carbohydrate used for energy, so descriptions of those roles don't fit phosphocreatine.

9. What is the effect of aerobic training on VO2 max?

A. Can be improved up to 10-20% following a period of aerobic training.

B. VO2 max cannot be changed by training.

C. VO2 max decreases with aerobic training.

D. Only resistance training improves VO2 max.

VO2 max measures how well the body can deliver and use oxygen at maximal effort. Aerobic training drives several adaptations that boost this capacity: the heart can pump more blood per beat (increasing stroke volume and cardiac output), muscles develop more capillaries to improve oxygen delivery, and mitochondria within muscle fibers become more numerous and efficient at using oxygen. All of these changes mean you can take in, transport, and utilize oxygen more effectively during intense exercise, so VO2 max rises. The typical gain after a period of aerobic training is about 10-20%, though the exact amount depends on how fit you were to start with and how you train (duration, intensity, frequency). Not all training is equal for VO2 max: it can be increased with training, it doesn't decrease with aerobic training, and while resistance training has its own benefits, aerobic work is the main driver of improvements in VO2 max.

10. How many molecules of ATP are produced as a net yield per glucose during the short-term lactate anaerobic system (anaerobic glycolysis)?

A. 0

B. 4

C. 2

D. 36

The key idea is that anaerobic glycolysis provides energy only through substrate-level phosphorylation in glycolysis itself, because there is no oxygen for oxidative phosphorylation. Glucose is broken down to lactate in the cytoplasm, and this pathway yields a net 2 ATP per glucose: four ATP are produced during glycolysis, but two are used in the early steps, so the net gain is two. The NADH produced is used to convert pyruvate to lactate, regenerating NAD+ to keep glycolysis going, but it does not generate additional ATP in the absence of oxygen. In contrast, the 36 ATP figure comes from full aerobic respiration, which isn't happening here. So the net ATP yield per glucose in the short-term lactate anaerobic system is two.

Next Steps

Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.

As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.

If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at hello@examzify.com.

Or visit your dedicated course page for more study tools and resources:

https://aqaalevelpeenergysystems.examzify.com

We wish you the very best on your exam journey. You've got this!