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

STUDY GUIDE

SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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. **Which method measures the concentration of inspired oxygen and expired carbon dioxide to assess metabolic gas exchange?**

   A. Indirect calorimetry

   B. Direct gas analysis

   C. Cycle ergometer

   D. Plyometrics

2. **Through which process are fatty acids converted to acetyl CoA for entry into the Krebs cycle?**

   A. Beta-oxidation

   B. Glycolysis

   C. Transamination

   D. Deamination

3. **Which factor is directly linked to lactate threshold?**

   A. Time of day

   B. Exercise intensity

   C. Ambient noise

   D. Body temperature

4. **What is a reported benefit for athletes returning to sea level after altitude training?**

   A. Decreased red blood cell count

   B. Enhanced oxygen-carrying capacity

   C. Increased lactate production

   D. Decreased VO2 max

5. **Lactate threshold is defined as:**

   A. Lactate threshold

   B. OBLA

   C. Cori cycle

   D. Calorimetry

6. In the aerobic energy system, which stage begins in the sarcoplasm and is anaerobic?

A. Glycolysis

B. Krebs cycle

C. Electron transport chain

D. Oxidative phosphorylation

7. In a 1500 metres race, the majority energy will be produced by which combination?

A. Aerobic metabolism with carbohydrate oxidation, with some anaerobic glycolysis

B. Purely anaerobic glycolysis

C. Fat oxidation dominates

D. Direct ATP from PC stores

8. What is the effect of a higher VO2 max on endurance?

A. It increases endurance capacity because more oxygen can reach the muscles and delay OBLA.

B. It has no effect on endurance.

C. It reduces endurance by increasing lactate.

D. It only affects sprint performance.

9. Which organ is primarily involved in the Cori cycle during recovery?

A. Liver

B. Skeletal muscle

C. Heart

D. Lungs

10. What is the maximum theoretical ATP yield per glucose molecule in aerobic metabolism?

A. 2

B. 36

C. 4

D. 38

Answers

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

Explanations

1. Which method measures the concentration of inspired oxygen and expired carbon dioxide to assess metabolic gas exchange?

A. Indirect calorimetry

B. Direct gas analysis

C. Cycle ergometer

D. Plyometrics

Indirect calorimetry analyzes metabolic gas exchange by measuring the concentrations of inspired oxygen and expired carbon dioxide to determine how much oxygen is consumed and how much carbon dioxide is produced. From these measurements you can calculate the respiratory quotient and energy expenditure, giving a clear picture of metabolic rate. This is typically done with a metabolic cart using a mask or hood to sample air as you breathe. The other options are exercise modes or a less directly relevant gas-measurement approach; they don't provide the streamlined readout of O2 uptake and CO2 production used to assess metabolic gas exchange.

2. Through which process are fatty acids converted to acetyl CoA for entry into the Krebs cycle?

A. Beta-oxidation

B. Glycolysis

C. Transamination

D. Deamination

The process that converts fatty acids into acetyl-CoA for entry into the Krebs cycle is beta-oxidation. In the mitochondrial matrix, beta-oxidation repeatedly cleaves two-carbon units from the fatty acyl chain, producing a new acetyl-CoA each cycle, plus NADH and FADH2 which feed the electron transport chain for additional ATP. For long-chain fatty acids, they are first transported into the mitochondrion via the carnitine shuttle before beta-oxidation can occur. The acetyl-CoA produced then enters the Krebs cycle to generate more energy. This differs from glycolysis, which starts with glucose to form pyruvate (and then acetyl-CoA via pyruvate dehydrogenase), not from fatty acids. Transamination and deamination are amino acid metabolism processes that remove or transfer amino groups, not pathways that convert fatty acids into acetyl-CoA.

3. Which factor is directly linked to lactate threshold?

A. Time of day

B. Exercise intensity

C. Ambient noise

D. Body temperature

Lactate threshold is all about how hard you're working. It's the point during increasing exercise intensity at which lactate starts to accumulate in the blood faster than the body can remove it, because glycolysis is pushing out more lactate than oxidative metabolism can clear. As you ramp up intensity, your muscles rely more on anaerobic glycolysis, and lactate is produced more quickly than it can be oxidized. Below this threshold, lactate production and clearance are balanced, so blood lactate stays low and you can sustain the effort. Once you push past the threshold, lactate builds up, signaling a shift toward greater anaerobic contribution. That's why the factor directly linked to lactate threshold is exercise intensity. Time of day, ambient noise, or general body temperature don't define where this tipping point occurs—the metabolic transition is driven by how hard you're working.

4. What is a reported benefit for athletes returning to sea level after altitude training?

A. Decreased red blood cell count

B. Enhanced oxygen-carrying capacity

C. Increased lactate production

D. Decreased VO2 max

Exposure to hypoxia during altitude training triggers the body to boost red blood cell production, increasing hemoglobin. When the athlete returns to sea level, this extra red blood cell mass enhances the blood's ability to pick up and deliver oxygen to working muscles. In other words, the oxygen-carrying capacity of the blood is improved, which supports better endurance and performance. The other ideas don't fit this common outcome: a lower red blood cell count would reduce oxygen transport, higher lactate production isn't a direct, typical benefit of altitude adaptation, and a lower VO2 max would hinder performance.

5. Lactate threshold is defined as:

A. Lactate threshold

B. OBLA

C. Cori cycle

D. Calorimetry

The main concept is the point during increasing exercise intensity when blood lactate begins to accumulate above resting levels, signaling a shift toward greater reliance on anaerobic metabolism. This moment is what we call the lactate threshold. Up to this point, lactate production and clearance are balanced, so blood lactate stays near baseline. Once threshold is passed, lactate builds up faster than it can be cleared, contributing to fatigue and limiting sustained performance. OBLA, or onset of blood lactate accumulation, is related but refers to a specific fixed level of lactate (often around 4 mmol/L) at which accumulation becomes noticeable. It's a useful marker, but it isn't the general definition of the threshold itself. The Cori cycle is the liver's conversion of lactate back to glucose, a related metabolic process but not a description of when lactate begins to accumulate. Calorimetry measures energy expenditure, not lactate dynamics. So, the best description here is the lactate threshold—the exercise intensity at which lactate begins to rise in the blood above resting levels.

6. In the aerobic energy system, which stage begins in the sarcoplasm and is anaerobic?

A. Glycolysis

B. Krebs cycle

C. Electron transport chain

D. Oxidative phosphorylation

Glycolysis is the stage that starts in the sarcoplasm (the cytoplasm of a muscle cell) and operates without oxygen. In this pathway, glucose is split into two pyruvate molecules, yielding a small amount of energy—net about 2 ATP—and reducing NAD+ to NADH. Because it doesn't require oxygen, glycolysis is the anaerobic part of the aerobic energy system. If oxygen is present, the pyruvate moves into the mitochondria to be further oxidized via the Krebs cycle and the electron transport chain, producing most of the ATP. If oxygen isn't available, pyruvate can be converted to lactate to keep glycolysis going.

7. In a 1500 metres race, the majority energy will be produced by which combination?

A. Aerobic metabolism with carbohydrate oxidation, with some anaerobic glycolysis

B. Purely anaerobic glycolysis

C. Fat oxidation dominates

D. Direct ATP from PC stores

In a 1500 m race, the body relies mainly on aerobic metabolism using carbohydrate fuel to keep a high, sustainable pace. The duration of the event (a few minutes) means oxygen supply can support most of the ATP production throughout the race. Carbohydrates are preferred at this intensity because they yield more ATP per unit of oxygen than fats, making them efficient for maintaining a fast speed. The running pace is hot enough that the body taps into anaerobic glycolysis as a supplementary source to provide extra ATP and help sustain speed, especially as the effort approaches the lactate threshold. Energy from phosphocreatine stores is only available for a brief initial burst in the first seconds and cannot power the race. Fat oxidation is too slow to meet the fast energy demands at this distance. So the majority of energy comes from aerobic metabolism with carbohydrate oxidation, plus a contribution from anaerobic glycolysis.

8. What is the effect of a higher VO2 max on endurance?

A. It increases endurance capacity because more oxygen can reach the muscles and delay OBLA.

B. It has no effect on endurance.

C. It reduces endurance by increasing lactate.

D. It only affects sprint performance.

The key idea is how VO2 max influences endurance by governing how much oxygen the body can deliver and use during sustained effort. When VO2 max is higher, more oxygen can reach the working muscles and fuel aerobic metabolism, so you can sustain a higher workload for longer before your body relies heavily on anaerobic glycolysis. This helps delay the onset of blood lactate accumulation (OBLA), meaning you can maintain a higher pace without fatiguing quickly. In short, a greater VO2 max expands the range of sustainable effort by enhancing oxygen delivery and utilization, which is central to endurance. The other statements aren't correct because endurance is indeed affected by oxygen transport and usage, higher VO2 max doesn't inherently raise lactate and reduce endurance, and VO2 max contributes to endurance beyond sprint performance.

9. Which organ is primarily involved in the Cori cycle during recovery?

A. Liver

B. Skeletal muscle

C. Heart

D. Lungs

During recovery after high-intensity exercise, lactate built up in working muscles is cleared and reused. The liver is the key player because it performs gluconeogenesis, turning lactate back into glucose. Lactate travels in the blood to the liver, where it is converted to pyruvate and then to glucose, which can be released into the bloodstream to restore blood glucose and refuel muscles. This lactate-to-glucose conversion is the main function that makes the liver essential in the Cori cycle. While muscles do produce lactate and the heart can use lactate as fuel, the step that regenerates glucose occurs primarily in the liver, which is why it's the best answer.

10. What is the maximum theoretical ATP yield per glucose molecule in aerobic metabolism?

A. 2

B. 36

C. 4

D. 38

In aerobic metabolism, glucose is fully oxidized so most energy comes from oxidative phosphorylation driven by NADH and FADH2 produced along the pathway. The best-case breakdown gives a large total: glycolysis directly provides 2 ATP and makes 2 NADH; if these NADH enter the mitochondria efficiently (via a shuttle like malate–aspartate), they can contribute about 6 ATP. That puts glycolysis up to around 8 ATP. Pyruvate oxidation yields 2 NADH, adding about 6 ATP. The citric acid cycle, for the two acetyl-CoA produced from one glucose, generates 6 NADH (18 ATP), 2 FADH2 (3 ATP), and 2 GTP (2 ATP), totaling 23 ATP. Summing these gives about 37 ATP in the most favorable case. In practice, small losses from transporting molecules across membranes and rounding of numbers typically bring the commonly cited maximum to 36 ATP per glucose. So 36 ATP is the standard upper bound used in many contexts, reflecting the best-case efficiency while acknowledging transport and rounding factors. Real cellular yields are usually lower due to inefficiencies and leaks, often around 30–32 ATP.

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!