Cellular Respiration Practice Test (Sample)

Study Guide

Everything you need from our exam experts!

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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. What role do hydrogen atoms play in the Krebs cycle?

- **A. They serve as a source of electrons in the electron transport chain**
- **B. They are used to form glucose**
- **C. They are converted to oxygen**
- **D. They are not involved in cellular respiration**

2. How many times does the Krebs cycle turn for each glucose molecule?

- **A. Once**
- **B. Twice**
- **C. Three times**
- **D. Four times**

3. What molecule acts as a carrier of acetyl groups into the Krebs cycle?

- **A. Citrate**
- **B. Acetyl CoA**
- **C. Pyruvate**
- **D. Oxaloacetate**

4. How do plants and animals differ in their cellular respiration processes?

- **A. Both undergo cellular respiration and perform photosynthesis**
- **B. Only plants undergo cellular respiration**
- **C. Only animals undergo cellular respiration**
- **D. Animals perform photosynthesis while plants do not**

5. What occurs during the first step of glycolysis?

- **A. Glucose is split into two G3P molecules**
- **B. Two phosphate groups are added to glucose**
- **C. NADH is produced from NAD+**
- **D. ATP is synthesized from ADP**

6. What happens to pyruvate in the absence of oxygen?

A. It enters the Krebs cycle

B. It is converted to lactic acid

C. It is transformed into acetyl CoA

D. It gets stored as glycogen

7. Which of the following best describes oxidative phosphorylation?

A. The process of converting glucose into pyruvate

B. The electron transport chain and ATP synthase working to produce ATP

C. The synthesis of proteins in the ribosomes

D. The conversion of Acetyl-CoA into fatty acids

8. Which coenzymes are primarily involved in transferring electrons during cellular respiration?

A. FAD and NAD+

B. Coenzyme A and ATP

C. ADP and AMP

D. CoQ and Cyt c

9. What is the end product of lactic acid fermentation?

A. Glucose

B. Lactic acid

C. Carbon dioxide

D. Ethanol

10. Which of the following statements is true regarding a redox reaction?

A. Electrons are lost by one reactant and gained by another

B. Only oxygen is involved in redox reactions

C. It only occurs in anaerobic respiration

D. It is a strictly irreversible reaction

Answers

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

Explanations

1. What role do hydrogen atoms play in the Krebs cycle?

A. They serve as a source of electrons in the electron transport chain

B. They are used to form glucose

C. They are converted to oxygen

D. They are not involved in cellular respiration

In the Krebs cycle, hydrogen atoms primarily contribute as carriers of high-energy electrons that play a crucial role in cellular respiration. During the cycle, hydrogen atoms are transferred from substrates to electron carriers, specifically NAD+ and FAD, converting them to NADH and FADH2, respectively. These reduced coenzymes, NADH and FADH2, are then utilized in the electron transport chain, where they donate their electrons. This transfer of electrons leads to the generation of ATP, which is the energy currency of the cell. The other options do not accurately reflect the function of hydrogen atoms in the Krebs cycle. For instance, hydrogen does not directly form glucose in this process; glucose formation occurs during photosynthesis and not in the Krebs cycle. Additionally, hydrogen atoms are not converted into oxygen, nor are they extraneous to cellular respiration; they are vital components that facilitate energy transfer through redox reactions.

2. How many times does the Krebs cycle turn for each glucose molecule?

A. Once

B. Twice

C. Three times

D. Four times

The Krebs cycle, also known as the citric acid cycle, turns twice for each glucose molecule that undergoes cellular respiration. This is because each glucose molecule is broken down into two molecules of pyruvate during glycolysis, which then enter the mitochondria. Each pyruvate is converted into acetyl-CoA before entering the Krebs cycle. As the Krebs cycle processes one acetyl-CoA at a time, and since each glucose yields two acetyl-CoA molecules, the cycle must complete two full turns to oxidize both acetyl-CoA molecules. Each turn of the cycle generates important energy-carrying molecules such as NADH and FADH2, as well as ATP, which are critical for the subsequent steps in cellular respiration, particularly the electron transport chain. Therefore, the answer that indicates the Krebs cycle turns twice aligns perfectly with the metabolic pathway's mechanics.

3. What molecule acts as a carrier of acetyl groups into the Krebs cycle?

A. Citrate

B. Acetyl CoA

C. Pyruvate

D. Oxaloacetate

Acetyl CoA is the molecule that acts as a carrier of acetyl groups into the Krebs cycle, also known as the citric acid cycle. This is an essential step in cellular respiration where Acetyl CoA, derived from pyruvate, fatty acids, or amino acids, enters the cycle to undergo a series of enzymatic reactions. Once inside the Krebs cycle, Acetyl CoA donates its acetyl group to oxaloacetate, forming citrate and initiating the cycle. This process is crucial because the Krebs cycle is responsible for generating energy-rich electron carriers, NADH and FADH2, which are later used in the electron transport chain to produce ATP through oxidative phosphorylation. Acetyl CoA thus serves as a significant link between glycolysis and the Krebs cycle, facilitating the flow of carbon and energy through cellular respiration.

4. How do plants and animals differ in their cellular respiration processes?

A. Both undergo cellular respiration and perform photosynthesis

B. Only plants undergo cellular respiration

C. Only animals undergo cellular respiration

D. Animals perform photosynthesis while plants do not

Both plants and animals undergo cellular respiration, which is the process of breaking down glucose and oxygen to produce energy in the form of ATP, carbon dioxide, and water. However, an essential distinction is that while plants also perform photosynthesis—converting light energy into chemical energy in the form of glucose—they are unique in their ability to harness solar energy to create their own food. This capability allows plants to take in carbon dioxide and release oxygen, whereas animals do not have this ability and must obtain energy by consuming organic matter. The answer acknowledges that both kingdom groups participate in cellular respiration, highlighting that photosynthesis is exclusive to plants. This option accurately reflects the dual role of plants in energy conversion, emphasizing their distinct processes while recognizing the universal nature of cellular respiration across life forms.

5. What occurs during the first step of glycolysis?

A. Glucose is split into two G3P molecules

B. Two phosphate groups are added to glucose

C. NADH is produced from NAD+

D. ATP is synthesized from ADP

During the first step of glycolysis, glucose undergoes phosphorylation, which involves the addition of phosphate groups to the glucose molecule. This reaction is catalyzed by the enzyme hexokinase or glucokinase, depending on the tissue type. The addition of these phosphate groups—one from ATP—converts glucose into glucose-6-phosphate. This step is crucial as it helps to trap glucose inside the cell and also prepares it for further breakdown in subsequent steps of glycolysis. The reaction consumes one molecule of ATP, which is transformed into ADP in the process. By attaching phosphate groups to glucose, the energy from ATP is utilized, ultimately facilitating the pathway that leads to the production of ATP and NADH in later stages of glycolysis. This early investment of energy helps to regulate the pathway and ensures that glucose is effectively broken down for energy production.

6. What happens to pyruvate in the absence of oxygen?

A. It enters the Krebs cycle

B. It is converted to lactic acid

C. It is transformed into acetyl CoA

D. It gets stored as glycogen

In the absence of oxygen, pyruvate undergoes a process called fermentation to be converted into lactic acid. This is particularly relevant in anaerobic conditions where organisms, such as certain bacteria and animal cells (like muscle cells), require a way to regenerate NAD+ for glycolysis to continue producing ATP. When oxygen is not present, the electron transport chain cannot function, so cells switch to fermentation pathways. During this conversion, each pyruvate molecule is transformed into lactic acid, which allows the continued production of ATP through glycolysis despite the lack of oxygen. This process is why lactic acid can build up in muscles during intense exercise, resulting in the familiar feeling of muscle fatigue. This pathway provides a quick source of energy but is less efficient compared to aerobic respiration which uses oxygen and involves the Krebs cycle and oxidative phosphorylation for higher ATP yield. The other options represent pathways that depend on the presence of oxygen, as pyruvate typically enters the Krebs cycle and is transformed into acetyl CoA when oxygen is available, and pyruvate does not get stored as glycogen or converted to lactic acid in all scenarios. The biochemical pathways are designed to adapt to the availability of oxygen, with lactic acid fermentation being a direct and efficient

7. Which of the following best describes oxidative phosphorylation?

A. The process of converting glucose into pyruvate

B. The electron transport chain and ATP synthase working to produce ATP

C. The synthesis of proteins in the ribosomes

D. The conversion of Acetyl-CoA into fatty acids

Oxidative phosphorylation is best described as the process involving the electron transport chain and ATP synthase working together to produce ATP. This process takes place in the inner mitochondrial membrane during cellular respiration. After glycolysis and the Krebs cycle generate high-energy electron carriers such as NADH and FADH2, these carriers donate their electrons to the electron transport chain. As electrons move through this chain, energy is released and used to pump protons (H+ ions) across the mitochondrial membrane, creating a proton gradient. This gradient is essential for ATP synthesis. ATP synthase, an enzyme embedded in the membrane, uses the energy from the flow of protons back across the membrane to convert ADP and inorganic phosphate into ATP. This coupling of electron transport and ATP synthesis constitutes oxidative phosphorylation, which is crucial for the efficient production of ATP in aerobic organisms. In contrast, the other options refer to processes that do not align with the specific function of oxidative phosphorylation—those being steps in glycolysis, protein synthesis, and fatty acid synthesis, respectively. Each of these processes has distinct pathways and mechanisms that do not involve the electron transport chain or ATP synthase in the context described in the question.

8. Which coenzymes are primarily involved in transferring electrons during cellular respiration?

A. FAD and NAD+

B. Coenzyme A and ATP

C. ADP and AMP

D. CoQ and Cyt c

FAD and NAD+ are crucial coenzymes in cellular respiration because they play a vital role in the transfer of electrons during the metabolic process. Both these coenzymes act as electron carriers that help facilitate the flow of electrons from glucose breakdown through a series of reactions, ultimately leading to the production of ATP. During glycolysis and the citric acid cycle, NAD+ is reduced to NADH, and FAD is reduced to FADH2. These reduced forms then transport electrons to the electron transport chain, a series of proteins embedded in the inner mitochondrial membrane. As electrons are passed through the chain, they release energy that is used to pump protons across the mitochondrial membrane, creating a proton gradient that drives ATP synthesis through oxidative phosphorylation. In contrast, the other options provided do not primarily serve as electron carriers. Coenzyme A is involved in the transfer of acyl groups and does not carry electrons, while ATP is the energy currency of the cell but does not directly participate in electron transfer. ADP and AMP are related to the energy state of the cell but are not involved in transferring electrons. CoQ (ubiquinone) and Cyt c (cytochrome c) are involved in electron transfer but are more specialized electron carriers within

9. What is the end product of lactic acid fermentation?

A. Glucose

B. Lactic acid

C. Carbon dioxide

D. Ethanol

The end product of lactic acid fermentation is lactic acid. This process occurs in certain bacteria and animal cells when oxygen is scarce, such as during intense exercise. During lactic acid fermentation, glucose is broken down into pyruvate through glycolysis, and then, in the absence of sufficient oxygen, the pyruvate is converted into lactic acid. This conversion allows for the continuous generation of ATP, albeit at a lower yield compared to aerobic respiration, which is especially important during short bursts of high energy activity. In contrast, glucose is the substrate that undergoes fermentation rather than a product. Carbon dioxide is released as a byproduct in some fermentation processes, notably in alcoholic fermentation, but not in lactic acid fermentation. Ethanol is the primary product of alcoholic fermentation, which occurs in yeast and some types of bacteria, not in lactic acid fermentation. Thus, the correct identification of lactic acid as the end product highlights its role in anaerobic metabolism, particularly in muscle cells and certain microorganisms.

10. Which of the following statements is true regarding a redox reaction?

A. Electrons are lost by one reactant and gained by another

B. Only oxygen is involved in redox reactions

C. It only occurs in anaerobic respiration

D. It is a strictly irreversible reaction

In a redox reaction, the fundamental principle is that electrons are transferred between reactants, leading to a change in oxidation states. When one reactant loses electrons, it undergoes oxidation, while the reactant that gains electrons experiences reduction. This transfer of electrons is what makes option A a correct statement about redox reactions, as they are inherently about the exchange of electrons between different chemical species. The other statements do not accurately represent the nature of redox reactions. For instance, while oxygen often participates in many types of redox reactions, it is not a requirement, as these reactions can occur with a variety of different elements and compounds. Additionally, redox reactions are not limited to anaerobic processes; they are fundamental to both aerobic and anaerobic respiration. Lastly, redox reactions are not strictly irreversible; many can proceed in both directions under certain conditions, depending on the reaction environment and the concentrations of the reactants and products involved.

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://cellularrespiration.examzify.com

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