

NBEO BIOCHEMISTRY PRACTICE EXAM (SAMPLE)

STUDY GUIDE



**SAMPLE STUDY GUIDE
WITH LIMITED QUESTIONS**

**VISIT US ONLINE FOR
THE FULL VERSION STUDY GUIDE**

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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

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- 1. What is the effect of temperature on exothermic reactions?**
 - A. They slow down
 - B. They speed up
 - C. They remain unchanged
 - D. They occur only at high temperatures
- 2. Which group of organic molecules includes fats, oils, and waxes?**
 - A. Proteins
 - B. Nucleic acids
 - C. Carbohydrates
 - D. Lipids
- 3. During which phase of the cell cycle does DNA synthesis and replication occur?**
 - A. G1
 - B. S
 - C. G2
 - D. M
- 4. Which vitamin serves as a cofactor in collagen synthesis and acts as an antioxidant?**
 - A. Vitamin A
 - B. Vitamin C
 - C. Vitamin D
 - D. Vitamin E
- 5. What is the minimum HDL level that should be maintained?**
 - A. 30
 - B. 40
 - C. 50
 - D. 60

6. Which of the following is NOT a function of lipids?

- A. Serves as a major source of energy for the body
- B. Backbone of collagen
- C. Lipid derivatives function as hormones and intracellular messengers
- D. Modify proteins

7. Which acid is a precursor to the production of eicosanoids?

- A. Linoleic acid
- B. Arachidonic acid
- C. Alpha-linolenic acid
- D. Stearic acid

8. Which amino acid is a precursor for melanin?

- A. Arginine
- B. Tryptophan
- C. Tyrosine
- D. Glycine

9. Which structural level of proteins contains non-covalent and covalent disulfide bonds to form multimers?

- A. Primary
- B. Secondary
- C. Tertiary
- D. Quaternary

10. What is the primary purpose of Beta oxidation?

- A. Generate glucose
- B. Generate ATP
- C. Store fats
- D. Produce ketones

Answers

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

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Explanations

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1. What is the effect of temperature on exothermic reactions?

- A. They slow down
- B. They speed up**
- C. They remain unchanged
- D. They occur only at high temperatures

In exothermic reactions, where heat is released as a product, an increase in temperature generally results in an increased reaction rate. This acceleration occurs because higher temperatures provide more kinetic energy to the reactant molecules, leading to more frequent and effective collisions among them. Moreover, according to the principles of chemical kinetics, reactions typically exhibit higher rates at elevated temperatures due to increased molecular motion, which overcomes the activation energy barrier more efficiently. This means that the molecules are more likely to collide with enough energy and proper orientation to produce the products of the reaction. It's important to note that while higher temperatures can increase the reaction rates for exothermic processes, they may also influence the equilibrium position in reversible reactions, but in the context of this question, the focus is specifically on the rate of the exothermic reactions themselves.

2. Which group of organic molecules includes fats, oils, and waxes?

- A. Proteins
- B. Nucleic acids
- C. Carbohydrates
- D. Lipids**

Lipids are a diverse group of organic molecules that are primarily characterized by their hydrophobic nature, meaning they do not dissolve in water. This group includes fats, oils, and waxes, which are important for various biological functions. Fats and oils serve as energy storage molecules, providing a dense source of energy for organisms. Waxes, found in substances like plant cuticles and some animal coatings, play a crucial role in protecting organisms from water loss and environmental damage. Lipids are distinguished from other organic molecule groups due to their unique chemical structure. They are typically composed of long hydrocarbon chains or rings and include triglycerides, phospholipids, and steroids, among others. Their ability to form membranes, store energy, and serve as signaling molecules is fundamental to cellular function and overall organismal health. In contrast to proteins, nucleic acids, and carbohydrates, which serve distinct roles such as structural components, genetic information storage, and energy provision, lipids have a primary role in energy storage, insulation, and cellular membrane formation, making them essential to life.

3. During which phase of the cell cycle does DNA synthesis and replication occur?

- A. G1
- B. S**
- C. G2
- D. M

DNA synthesis and replication occur during the S phase of the cell cycle. This phase is specifically designated for the duplication of the genetic material, which is essential for cell division. During the S phase, each chromosome is replicated to produce two identical sister chromatids, ensuring that when the cell divides, each daughter cell receives an exact copy of the DNA. This process is critical for maintaining genetic consistency across cell generations. The S phase follows G1, where the cell grows and prepares for DNA synthesis, and precedes G2, which is focused on further growth and preparation for mitosis. M phase (mitotic phase) is where the actual division of the cell occurs, and it relies on the successful completion of the S phase. Therefore, the S phase is uniquely responsible for the comprehensive processes of DNA synthesis and replication.

4. Which vitamin serves as a cofactor in collagen synthesis and acts as an antioxidant?

- A. Vitamin A
- B. Vitamin C**
- C. Vitamin D
- D. Vitamin E

Vitamin C plays a crucial role in collagen synthesis and functions as a powerful antioxidant. In the context of collagen production, vitamin C is essential because it is a cofactor for the enzymes prolyl hydroxylase and lysyl hydroxylase, which are responsible for adding hydroxyl groups to proline and lysine residues in collagen. This hydroxylation is vital for the stability and cross-linking of collagen fibers, ensuring that the collagen formed has the structural integrity necessary for connective tissues. Moreover, vitamin C's antioxidant properties are significant as it helps protect cells from oxidative damage caused by free radicals. This dual role in both collagen synthesis and antioxidation makes vitamin C a unique and vital nutrient for maintaining healthy skin, blood vessels, and overall connective tissue health. The benefits of vitamin C in this regard underscore its importance in various biological processes, particularly in roles associated with growth, repair, and immune function.

5. What is the minimum HDL level that should be maintained?

- A. 30
- B. 40**
- C. 50
- D. 60

The minimum level of high-density lipoprotein (HDL) cholesterol that is generally recommended to be maintained is 40 mg/dL. HDL is often referred to as "good" cholesterol because it plays a crucial role in transporting cholesterol away from the arteries and back to the liver, where it can be processed and eliminated from the body. Low levels of HDL cholesterol are associated with an increased risk of cardiovascular disease, as they are less effective at removing excess cholesterol from the bloodstream. A level of 40 mg/dL is considered a threshold below which individuals may be at higher risk of heart disease. It's important to note that optimizing HDL levels can be a component of a broader strategy for cardiovascular health, which also includes managing other risk factors such as LDL cholesterol levels, triglycerides, blood pressure, and lifestyle choices. Maintaining higher levels of HDL (such as 60 mg/dL or above) may be associated with additional cardiovascular protection, but the minimum recommendation for maintaining adequate protection against heart disease is set at 40 mg/dL for men and 50 mg/dL for women.

6. Which of the following is NOT a function of lipids?

- A. Serves as a major source of energy for the body
- B. Backbone of collagen**
- C. Lipid derivatives function as hormones and intracellular messengers
- D. Modify proteins

The chosen answer highlights that the backbone of collagen is not a function of lipids. Collagen is a structural protein that provides strength and support in various tissues, including skin, bones, and tendons. While collagen itself is composed of amino acids rather than lipids, lipids serve different roles in the body. In contrast, lipids are indeed a major source of energy for the body. They are more energy-dense than carbohydrates and are stored as triglycerides in adipose tissue, which can be broken down for energy when needed. Moreover, lipid derivatives are known to function as hormones and intracellular messengers, playing significant roles in regulating various physiological processes. Examples include steroid hormones like testosterone and estrogen, which are derived from cholesterol. Additionally, while lipids themselves do not modify proteins directly, certain lipid-related enzymes can influence protein function through post-translational modifications, such as palmitoylation. However, this is distinct from the structural form and function of proteins like collagen. Therefore, identifying that lipids do not have a structural role as the backbone of collagen clarifies their distinct biological functions and the role of proteins in tissue construction and support.

7. Which acid is a precursor to the production of eicosanoids?

- A. Linoleic acid
- B. Arachidonic acid**
- C. Alpha-linolenic acid
- D. Stearic acid

Arachidonic acid is the primary precursor to the production of eicosanoids, which are signaling molecules that play crucial roles in various physiological and pathological processes, including inflammation, immunity, and cell signaling. Arachidonic acid is released from the membrane phospholipids of cells through the action of phospholipase A2, and it can then be metabolized by specific enzymatic pathways, including cyclooxygenase and lipoxygenase pathways, to produce various eicosanoids such as prostaglandins, thromboxanes, and leukotrienes. Other fatty acids listed, such as linoleic acid and alpha-linolenic acid, are essential fatty acids that serve as precursors to arachidonic acid and other long-chain fatty acids. Linoleic acid can be converted into arachidonic acid through a series of elongation and desaturation steps in the body. However, it is not the direct precursor for eicosanoids; it is instead a building block in the metabolic pathway leading to arachidonic acid. Stearic acid, although a fatty acid, does not play a role in the synthesis of eicosanoids and is instead primarily associated with saturated fat metabolism.

8. Which amino acid is a precursor for melanin?

- A. Arginine
- B. Tryptophan
- C. Tyrosine**
- D. Glycine

The correct choice is the amino acid tyrosine, as it plays a critical role in the biosynthesis of melanin. Melanin is a pigment that gives color to skin, hair, and eyes, and it is produced through a series of enzymatic reactions that begin with the amino acid tyrosine. Tyrosine is converted into DOPA (3,4-dihydroxyphenylalanine) through the action of the enzyme tyrosinase. Following this step, DOPA undergoes further oxidation and polymerization processes, ultimately resulting in the formation of melanin. Thus, tyrosine is not only a building block for melanin but also serves as a vital precursor that initiates the complex biochemical pathway leading to the pigmentation. This pathway underscores the importance of tyrosine in the synthesis of key biological molecules. Other amino acids listed, while important in various metabolic processes, do not directly lead to melanin production. For instance, arginine is primarily involved in the urea cycle and nitric oxide synthesis, tryptophan is a precursor for serotonin and melatonin, and glycine is an amino acid involved in protein synthesis and the production of other biomolecules, but none serve as precursors for melanin like ty

9. Which structural level of proteins contains non-covalent and covalent disulfide bonds to form multimers?

- A. Primary
- B. Secondary
- C. Tertiary
- D. Quaternary**

The structural level of proteins that contains both non-covalent interactions and covalent disulfide bonds to form multimers is the quaternary structure. Proteins at this level are composed of more than one polypeptide chain, which are referred to as subunits. These subunits can be identical or different and are held together by various types of interactions. In quaternary structures, non-covalent interactions, such as hydrogen bonds, ionic bonds, and hydrophobic interactions, play a significant role in stabilizing the assembly of the subunits. Additionally, disulfide bonds, which are covalent links between the sulfur atoms of cysteine residues, contribute to the overall stability and structural integrity of the protein complex. This level is crucial for the functionality of many proteins, as the arrangement and interactions between multiple subunits can directly influence the protein's biological activity. For instance, hemoglobin, which carries oxygen in the blood, is a classic example of a protein that exhibits quaternary structure through the assembly of four polypeptide chains, including both non-covalent interactions and disulfide bonds.

10. What is the primary purpose of Beta oxidation?

- A. Generate glucose
- B. Generate ATP**
- C. Store fats
- D. Produce ketones

The primary purpose of beta oxidation is to generate ATP. This process occurs in the mitochondria of cells and is a key part of fatty acid metabolism. During beta oxidation, fatty acids are broken down into two-carbon units in the form of acetyl-CoA. Each cycle of beta oxidation removes a two-carbon fragment from the fatty acid chain, eventually leading to the formation of acetyl-CoA, which can then enter the citric acid cycle (Krebs cycle) to produce ATP. Additionally, beta oxidation generates reducing equivalents in the form of NADH and FADH₂, which further contribute to ATP production through the electron transport chain. This process is particularly crucial when glucose levels are low, allowing the body to utilize stored fats for energy. Therefore, the main focus of beta oxidation is energy production in the form of ATP rather than directly generating glucose, storing fats, or producing ketones, even though these processes can also occur in conjunction with beta oxidation under different metabolic circumstances.

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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://nbeobiochemistry.examzify.com>

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

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