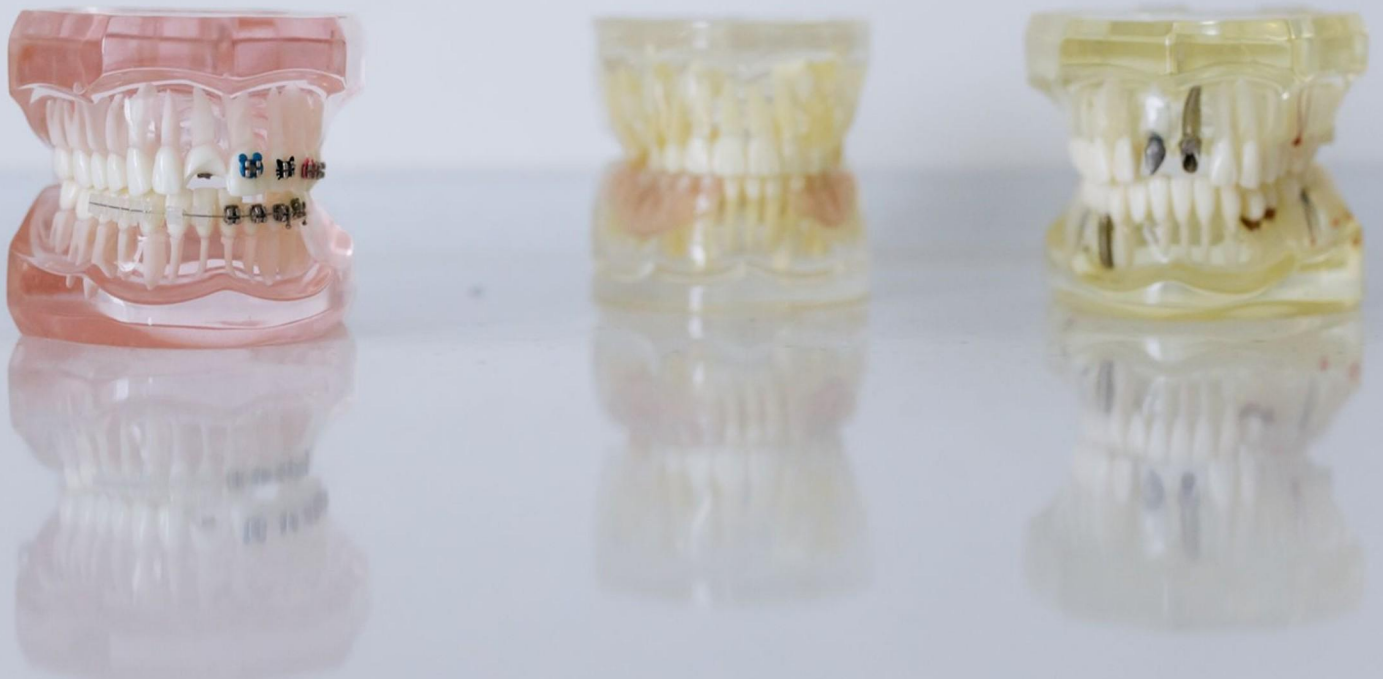


MTSA ADVANCED PHYSIOLOGY FOR NURSING PRACTICE TEST (SAMPLE)

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 type of stimulation is characterized as chemical in nature?**
 - A. Mechanical stimulation from touch
 - B. Electrical stimulation from cardiac signals
 - C. Acetylcholine acting on ligand gated ion channels
 - D. Thermal stimulation from environmental heat
- 2. In secondary active counter-transport, how do the solutes move?**
 - A. In the same direction
 - B. In opposite directions
 - C. Simultaneously with no specific direction
 - D. Only one solute moves
- 3. What is the typical extracellular concentration of calcium (Ca^{++}) in mEq/L?**
 - A. 140
 - B. 2.4
 - C. 1.2
 - D. 4
- 4. What is the typical extracellular concentration of sodium (Na^{+}) in mEq/L?**
 - A. 140
 - B. 14
 - C. 4
 - D. 2.4
- 5. The primary role of glycocalyx in cellular function is to:**
 - A. Protect DNA from damage
 - B. Facilitate metabolic reactions
 - C. Enhance cell recognition and attachment
 - D. Transport molecules across membranes
- 6. Which characteristic of channel proteins is important for facilitated diffusion?**
 - A. They are always open
 - B. They can be selective for certain solutes
 - C. They utilize ATP for energy
 - D. They create a physical barrier

- 7. Which of the following is a known antioxidant that scavenges toxic O₂ species?**
- A. Vitamin D
 - B. Vitamin A
 - C. Vitamin C
 - D. Vitamin K
- 8. How many ATP molecules are produced net from one glucose molecule during cellular respiration?**
- A. 30 ATP
 - B. 32 ATP
 - C. 36 ATP
 - D. 38 ATP
- 9. What is the primary protein responsible for affecting oncotic pressure in the plasma?**
- A. Hemoglobin
 - B. Albumin
 - C. Globulin
 - D. Fibrinogen
- 10. What is a potential problem associated with facilitated diffusion?**
- A. Carrier proteins can be easily activated
 - B. Solute can accumulate when carrier proteins are saturated
 - C. Transport occurs too rapidly
 - D. Facilitated diffusion cannot occur in low temperatures

Answers

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

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Explanations

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1. What type of stimulation is characterized as chemical in nature?

- A. Mechanical stimulation from touch
- B. Electrical stimulation from cardiac signals
- C. Acetylcholine acting on ligand gated ion channels**
- D. Thermal stimulation from environmental heat

The correct answer pertains to the action of acetylcholine acting on ligand-gated ion channels, which exemplifies chemical stimulation. In this context, chemical stimulation occurs when specific molecules bind to receptors on the surface of cells, leading to a physiological response. Acetylcholine is a neurotransmitter released at synapses and neuromuscular junctions, where it binds to ligand-gated ion channels. This binding induces a conformational change in the ion channel, allowing ions such as sodium to flow into the cell. This process generates an action potential, facilitating communication between neurons or between neurons and muscles. In contrast, mechanical stimulation involves forces exerted on sensory receptors (like touch), while electrical stimulation pertains to changes in membrane potential due to the movement of ions without direct chemical interaction, such as in cardiac signals. Thermal stimulation involves responses to temperature changes rather than specific chemical interactions. Thus, the unique interaction of acetylcholine with its receptor clearly represents chemical stimulation, making it the correct choice for this question.

2. In secondary active counter-transport, how do the solutes move?

- A. In the same direction
- B. In opposite directions**
- C. Simultaneously with no specific direction
- D. Only one solute moves

Secondary active counter-transport involves the movement of solutes across a cell membrane using the energy created by the movement of another solute. In this process, one solute moves into the cell while another moves out, which establishes a concentration gradient for the substances involved. This mechanism is dependent on the gradient created by primary active transport, which uses ATP to move ions, typically sodium or hydrogen ions, across the membrane. When one solute moves down its concentration gradient, it provides the energy required to move another solute against its concentration gradient. Therefore, in secondary active counter-transport, solutes move in opposite directions. This allows cells to efficiently maintain homeostasis and control the concentrations of various substances within the cytosol and extracellular environment.

3. What is the typical extracellular concentration of calcium (Ca^{++}) in mEq/L?

- A. 140
- B. 2.4**
- C. 1.2
- D. 4

The typical extracellular concentration of calcium in the body is approximately 1.2 mEq/L. This concentration is crucial as calcium plays an essential role in various physiological processes, including muscle contraction, neurotransmitter release, and blood coagulation. In the extracellular fluid, calcium exists in ionic form (Ca^{++}) and is vital for maintaining the stability of cell membranes and facilitating communication between cells. The balance of extracellular calcium is tightly regulated by hormones such as parathyroid hormone and calcitonin, in addition to vitamin D, which helps maintain appropriate levels of calcium in the blood and extracellular fluid. This specific concentration reflects the body's need for calcium to function correctly while preventing potential disruptions that could occur with either too high or too low levels. Hence, understanding this reference range is fundamental for nursing practice.

4. What is the typical extracellular concentration of sodium (Na⁺) in mEq/L?

- A. 140**
- B. 14
- C. 4
- D. 2.4

The typical extracellular concentration of sodium (Na⁺) is approximately 140 mEq/L. Sodium is the primary cation found in extracellular fluid and plays a critical role in various physiological processes including fluid balance, osmotic pressure regulation, and the generation of action potentials in nerve and muscle cells. In healthy individuals, the homeostatic mechanisms of the kidneys and other regulatory systems maintain sodium levels within a narrow range. This concentration is vital for maintaining proper cellular function and overall electrolyte balance in the body. While the other values mentioned (14 mEq/L, 4 mEq/L, and 2.4 mEq/L) are significantly lower than the typical extracellular concentration and would indicate severe electrolyte imbalances, they do not correctly represent the normal physiological state of sodium in extracellular fluid. Hence, the commonly accepted value is key for understanding normal versus pathological states in nursing practice and advanced physiology.

5. The primary role of glycocalyx in cellular function is to:

- A. Protect DNA from damage
- B. Facilitate metabolic reactions
- C. Enhance cell recognition and attachment**
- D. Transport molecules across membranes

The glycocalyx is a fuzzy-appearing coating found on the extracellular surface of the plasma membrane of many cells. Its primary role is to enhance cell recognition and attachment. This structure is composed mainly of glycoproteins and glycolipids, which contribute to the unique identification features of the cell. The glycoproteins and glycolipids function as "markers" for cell recognition, allowing cells to communicate with each other effectively and to adhere to one another. This capability is crucial in various physiological processes, such as tissue formation, immune response, and the repair of damaged tissues. In addition, the glycocalyx plays a part in protecting cells from the external environment; however, its most critical function lies in cell-cell recognition and interaction. For example, during the immune response, the glycocalyx helps immune cells recognize and bind to pathogens or infected cells. The distinct markers presented by the glycocalyx are vital for ensuring the proper functioning of biological systems.

6. Which characteristic of channel proteins is important for facilitated diffusion?

- A. They are always open
- B. They can be selective for certain solutes**
- C. They utilize ATP for energy
- D. They create a physical barrier

Channel proteins play a crucial role in facilitated diffusion by providing a pathway through which specific molecules can pass through the plasma membrane without the need for energy input. The selectivity of these proteins for certain solutes is vital because it ensures that only molecules of a particular size, charge, or type can cross the membrane. This selective permeability is essential for maintaining homeostasis within the cell, as it regulates what enters and exits, allowing the cell to control its internal environment effectively. For example, ion channels specifically allow ions like sodium or potassium to move across the membrane, which is essential for processes such as nerve impulse transmission and muscle contraction. This selectivity enhances the efficiency of cellular processes by ensuring that the right substances are available when needed while preventing the passage of unwanted molecules.

7. Which of the following is a known antioxidant that scavenges toxic O₂ species?

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

Vitamin C, also known as ascorbic acid, is well recognized for its role as a potent antioxidant in the body. It acts by scavenging reactive oxygen species (ROS), which are harmful byproducts of cellular metabolism that can cause oxidative stress and damage to cells. By neutralizing these toxic species, Vitamin C helps to protect cellular structures, including lipids, proteins, and DNA, thereby playing a crucial role in maintaining overall cellular health. In addition, Vitamin C is involved in the regeneration of other antioxidants, such as Vitamin E, further enhancing its protective capabilities. Furthermore, it contributes to various physiological functions including collagen synthesis and immune response. The other vitamins listed, while important for various physiological functions, do not primarily serve the role of scavenging toxic oxygen species in the same way that Vitamin C does. Vitamin D is mainly involved in calcium metabolism and bone health, Vitamin A plays crucial roles in vision and immune function, and Vitamin K is essential for blood clotting processes.

8. How many ATP molecules are produced net from one glucose molecule during cellular respiration?

- A. 30 ATP
- B. 32 ATP
- C. 36 ATP
- D. 38 ATP**

The correct answer is that cellular respiration produces a net of 36 ATP molecules from one molecule of glucose under ideal conditions. During the process of aerobic cellular respiration, glucose undergoes glycolysis, the citric acid cycle, and oxidative phosphorylation. In glycolysis, which occurs in the cytoplasm, two ATP molecules are consumed, but four ATP molecules are produced, resulting in a net gain of two ATP. The pyruvate produced then enters the mitochondria, where it is converted into acetyl-CoA and enters the citric acid cycle. Each turn of the citric acid cycle produces three NADH, one FADH₂, and one ATP (or GTP). Since each glucose molecule generates two acetyl-CoA, the cycle turns twice, resulting in six NADH, two FADH₂, and two ATP from one glucose molecule. The NADH and FADH₂ produced during these processes then enter the electron transport chain, where they are used to create a proton gradient that drives the synthesis of ATP through oxidative phosphorylation. Each NADH can yield approximately 2.5 ATP, and each FADH₂ can yield about 1.5 ATP. When these numbers are summed: - From glycolysis:

9. What is the primary protein responsible for affecting oncotic pressure in the plasma?

- A. Hemoglobin
- B. Albumin**
- C. Globulin
- D. Fibrinogen

Albumin is the primary protein responsible for affecting oncotic pressure in the plasma. Oncotic pressure, also known as colloid osmotic pressure, is the pressure exerted by proteins in the blood plasma that tends to pull water into the circulatory system. Albumin makes up a significant portion of the protein content in blood plasma and plays a critical role in maintaining this oncotic pressure. By drawing water into the circulatory system, albumin helps to regulate blood volume and fluid distribution between blood vessels and surrounding tissues. This function is vital for maintaining proper circulation and tissue perfusion, ensuring that cells receive adequate nutrients and oxygen while also facilitating the removal of waste products. While other proteins like globulin and fibrinogen do exist in plasma, their primary roles are not directly related to the regulation of oncotic pressure. Globulins play various roles including immune functions, while fibrinogen is crucial for blood coagulation. Hemoglobin, on the other hand, is primarily responsible for oxygen transport in the blood and does not significantly influence oncotic pressure.

10. What is a potential problem associated with facilitated diffusion?

- A. Carrier proteins can be easily activated
- B. Solute can accumulate when carrier proteins are saturated**
- C. Transport occurs too rapidly
- D. Facilitated diffusion cannot occur in low temperatures

The correct answer highlights a crucial aspect of facilitated diffusion, which involves the use of carrier proteins to transport solutes across cell membranes. When these carrier proteins become saturated, the rate of transport cannot increase further, even if concentrations of the solute on either side of the membrane continue to rise. This saturation leads to an accumulation of the solute on one side of the membrane because there are not enough available carrier proteins to facilitate its movement across the membrane. Understanding this phenomenon is important in various physiological processes, such as glucose transport into cells, where excessive accumulation could lead to metabolic disturbances or affect cellular function. In this way, the saturation of carrier proteins represents a potential bottleneck in the efficiency of facilitated diffusion, significantly impacting homeostasis and cellular health. The presence of a maximum transport capacity is a key feature of this type of transport mechanism.

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://mtsaadvphysiolfor nursing.examzify.com>

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

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