MTSA ADVANCED PHYSIOLOGY FOR NURSING PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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.

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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!

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Questions

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1. What is the most abundant extracellular cation?

A. Potassium (K+)

B. Sodium (Na+)

C. Calcium (Ca2+)

D. Magnesium (Mg2+)

2. What is the typical electrical gradient of a resting cell?

A. -60mV

B. -70mV

C. -90mV

D. -100mV

3. What is the metabolic state associated with increased levels of ketone bodies?

A. Ketosis

B. Glycolysis

C. Fermentation

D. Oxidative phosphorylation

4. What type of transport moves substances with the concentration gradient without the use of energy?

A. Passive transport

B. Active transport

C. Facilitated diffusion

D. Endocytosis

5. 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

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6. Why is secondary active transport referred to as 'secondary'?

A. It directly uses ATP for energy

B. It relies on concentration gradients established by primary active transport

C. It occurs only in the absence of ATP

D. It uses passive mechanisms primarily

7. Which of the following is NOT a function of the smooth ER?

A. Detoxification of drugs

B. Synthesis of glycogen

C. Translation of RNA to proteins

D. Gluconeogenesis

8. What is the approximate intracellular pCO_2 level in mmHg?

A. 20-30 mmHg

B. 30-40 mmHg

C. 40-45 mmHg

D. 45-50 mmHg

9. What do hypertonic saline solutions generally do to body osmolarity?

A. Decrease it

B. Conserve it

C. Increase it

D. No effect

10. What is the number of calories released when the last phosphate bond is broken to convert AMP to adenosine?

A. 3,500

B. 5,000

C. 7,500

D. 10,000

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Answers

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

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Explanations

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1. What is the most abundant extracellular cation?

A. Potassium (K+)

B. Sodium (Na+)

C. Calcium (Ca2+)

D. Magnesium (Mg2+)

Sodium (Na+) is recognized as the most abundant extracellular cation in the human body. Its primary role is crucial in maintaining osmotic pressure and fluid balance, as well as in generating action potentials in neurons and muscle cells. Sodium contributes significantly to the physiological processes that regulate blood volume and pressure. In comparison, potassium primarily exists in the intracellular space and plays a vital role in nerve function and muscle contraction. Calcium and magnesium are also important cations, but their concentrations in the extracellular fluid are lower than that of sodium. Calcium is primarily involved in signaling pathways, muscle contractions, and bone health, while magnesium plays roles in enzyme activity and energy production. However, they do not surpass sodium in terms of abundance in the extracellular environment. Thus, sodium's predominance in extracellular fluid is key to many physiological processes and maintains homeostasis in the body.

2. What is the typical electrical gradient of a resting cell?

A. -60mV

B. -70mV

C. -90mV

D. -100mV

A typical resting membrane potential for most cells, particularly neurons, is approximately -70 mV. This value reflects the electrical gradient established across the cell membrane due to the differential distribution of ions, primarily sodium (Na+), potassium (K+), chloride (Cl-), and organic anions. The resting potential is largely maintained by the sodium-potassium pump, which actively transports three sodium ions out of the cell and two potassium ions into the cell, creating a negative charge inside relative to the outside. This gradient is crucial for the conduction of electrical impulses. While some specialized cells may have different resting potentials, -70 mV is considered the standard reference point, as it results from the balance of ion movements and the permeability of the membrane to these ions. Values like -60mV or -90mV represent different cell types or specific physiological states, but they do not reflect the typical resting potential most commonly observed in neurons and many other cells.

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3. What is the metabolic state associated with increased levels of ketone bodies?

A. Ketosis

B. Glycolysis

C. Fermentation

D. Oxidative phosphorylation

The correct response is associated with the metabolic state known as ketosis. This condition occurs when the body switches from glucose as its primary source of energy to fats, particularly during periods of fasting, prolonged exercise, or low-carbohydrate diets. In ketosis, the liver metabolizes fatty acids into ketone bodies—acetoacetate, beta-hydroxybutyrate, and aceton—providing an alternative energy source for the brain and other tissues when glucose is in short supply. In contrast, glycolysis is the metabolic pathway that breaks down glucose to produce energy and does not involve ketone bodies. Fermentation is an anaerobic process that generates energy in the absence of oxygen, which also does not lead to the production of ketone bodies. Oxidative phosphorylation is part of the aerobic respiration process that primarily utilizes oxygen to produce ATP and does not specifically relate to increased ketone body levels. Understanding these processes emphasizes the role of ketosis in energy metabolism and its importance in situations where carbohydrate intake is limited.

4. What type of transport moves substances with the concentration gradient without the use of energy?

A. Passive transport

B. Active transport

C. Facilitated diffusion

D. Endocytosis

The correct answer is passive transport, which refers to the movement of substances across cell membranes without the input of energy. This process relies on the concentration gradient, meaning substances move from areas of higher concentration to areas of lower concentration until equilibrium is achieved. This natural tendency of molecules to spread out is what drives passive transport mechanisms. Passive transport includes various processes such as simple diffusion, where nonpolar and small polar molecules directly pass through the phospholipid bilayer, and facilitated diffusion, where specific transmembrane proteins assist larger or polar molecules across the membrane. While facilitated diffusion is an important subcategory of passive transport, it specifically involves the use of protein carriers or channels to increase the presence of certain molecules across the membrane. In contrast, active transport requires energy, typically in the form of ATP, to move substances against their concentration gradient, which is not the case for passive transport. Endocytosis involves the engulfing of substances into the cell via membrane invagination, and it is also an energy-dependent process. Thus, passive transport is the correct term for movement along the concentration gradient without energy expenditure.

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5. 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.

6. Why is secondary active transport referred to as 'secondary'?

A. It directly uses ATP for energy

B. It relies on concentration gradients established by primary active transport

C. It occurs only in the absence of ATP

D. It uses passive mechanisms primarily

Secondary active transport is termed 'secondary' because it relies on the energy stored in concentration gradients created by primary active transport mechanisms. In primary active transport, ATP is used directly to pump ions or molecules across a cell membrane, creating an electrochemical gradient. This gradient establishes a difference in the concentration of specific ions across the membrane. In secondary active transport, instead of using ATP directly, the transport process utilizes these existing concentration gradients. As ions move down their concentration gradient (from a region of higher concentration to a region of lower concentration), they can drive the transport of another substance against its concentration gradient. This coupling of the movement of one species with the movement of another is what distinguishes secondary active transport from primary transport, highlighting its reliance on the prior work of primary active transport processes. The term 'secondary' emphasizes that it does not directly use ATP for the transport of the second molecule but instead harnesses the energy stored in the gradients established by the initial ATP-driven processes.

7. Which of the following is NOT a function of the smooth ER?

A. Detoxification of drugs

B. Synthesis of glycogen

C. Translation of RNA to proteins

D. Gluconeogenesis

Smooth endoplasmic reticulum (smooth ER) has several key functions, including detoxification of drugs, synthesis of glycogen, and gluconeogenesis. It is primarily involved in lipid synthesis and metabolism, storage of calcium ions, and the detoxification of various metabolites and drugs. The correct answer indicates that translation of RNA to proteins is not a function of the smooth ER. This process occurs in the ribosomes, which can be found freely floating in the cytoplasm or attached to the rough endoplasmic reticulum (rough ER). The rough ER is specifically equipped with ribosomes, making it the site where protein synthesis, or translation, occurs. Therefore, since translation is associated with the rough ER and not the smooth ER, choosing the function associated with the smooth ER reinforces the understanding of cellular structures and their specific roles.

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8. What is the approximate intracellular pCO2 level in mmHg?

A. 20-30 mmHg

B. 30-40 mmHg

C. 40-45 mmHg

D. 45-50 mmHg

The intracellular pCO2 level typically reflects the metabolic activity occurring within cells and is generally higher than that found in systemic arterial blood due to the production of carbon dioxide during cellular respiration. The normal arterial pCO2 range is about 35-45 mmHg, and intracellular levels usually rise above this, as cells continuously produce CO2 as a byproduct of metabolism. The choice of 45-50 mmHg aligns with the expected physiological response, particularly in metabolically active tissues. Cells produce CO2 through the Krebs cycle and other metabolic processes, leading to these increased internal levels. This elevation helps drive the diffusion of CO2 out of the cells into the bloodstream for transport to the lungs for exhalation. Values lower than 45 mmHg, such as those suggested in the other options, would not accurately represent typical intracellular conditions, especially in highly active tissues where metabolism is robust and CO2 production is increased. Therefore, 45-50 mmHg reflects the range that can reasonably be expected in actively metabolizing cells.

9. What do hypertonic saline solutions generally do to body osmolarity?

A. Decrease it

B. Conserve it

C. Increase it

D. No effect

Hypertonic saline solutions are characterized by having a higher concentration of solutes compared to the body's own fluids. When hypertonic saline is administered, it introduces additional solutes into the extracellular space. This increase in solute concentration creates a gradient that draws water out of the cells and into the extracellular fluid in an attempt to equilibrate osmolarity across the membranes. As a result, the overall osmolarity of the body fluids increases. This effect can be critical in certain medical situations, such as managing conditions like hyponatremia, where raising serum sodium levels is necessary. The administration of hypertonic saline can lead to a significant alteration in fluid distribution within the body, promoting fluid shifts that elevate osmolarity. In summary, hypertonic saline solutions increase body osmolarity by contributing to a higher concentration of solutes in the extracellular compartment, which affects the distribution of water and solutes within the body.

10. What is the number of calories released when the last phosphate bond is broken to convert AMP to adenosine?

A. 3,500

B. 5,000

C. 7,500

D. 10,000

When the last phosphate bond is broken to convert AMP (adenosine monophosphate) to adenosine, it releases a significant amount of energy, measured in calories. In biochemistry, the hydrolysis of phosphate bonds in nucleotides is crucial for energy transfer and cellular energy metabolism. The conversion from AMP to adenosine involves breaking the bond between the terminal phosphate group and the rest of the nucleotide, which provides energy for various cellular processes, including muscle contraction and biochemical reactions. This reaction specifically releases approximately 7.5 kcal/mol, which explains why the choice that states 7,500 calories is considered correct. Understanding this energy release is essential for grasping how cells harness energy from nucleotides to perform work and maintain vital functions. The other numerical choices reflect energy values that are not accurate for this specific biochemical reaction.

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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:

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

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